



**Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan
Final Draft**

Prepared for
Maryland Department of the Environment



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Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

Table of Contents

Acronyms and Abbreviations	vii
1.0 Executive Summary	8
1.1 Introduction	8
1.2 Summary of Findings	8
2.0 Introduction	11
2.1 Overview	11
2.2 Methodology	11
3.0 Findings.....	12
3.1 Energy	12
3.1.1 Regional Greenhouse Gas Initiative (RGGI).....	12
3.1.2 GHG Reductions from Imported Power	17
3.1.3 Federal New Source Performance Standard	20
3.1.4 MACT	23
3.1.5 GHG Prevention of Significant Deterioration Permitting Program.....	26
3.1.6 Energy Efficiency in the Residential Sector	29
3.1.7 Energy Efficiency in the Commercial and Industrial Sectors.....	32
3.1.8 Energy Efficiency—Appliances and Other Products	35
3.1.9 Energy Efficiency in the Power Sector – General	38
3.1.10 EmPOWER – Utility Subprograms	41
3.1.11 Maryland Renewable Energy Portfolio Standard Subprogram	44
3.1.12 Incentives and Grant Subprograms to Support Renewable Energy.....	47
3.1.13 Offshore Wind Initiatives to Support Renewable Energy	50
3.1.14 Combined Heat and Power	53
3.1.15 Main Street.....	56
3.1.16 Weatherization and Energy Efficiency for Low-Income Houses	59
1.2 Transportation	62
3.2.1 Maryland Clean Cars Subprogram.....	62
3.2.2 Federal Medium- and Heavy-Duty GHG Standards.....	66
3.2.3 Clean Fuel Standard.....	69
3.2.4 Transportation and Climate Initiative	73
3.2.5 Public Transportation Initiatives.....	76
3.2.6 Initiatives to Double Transit Ridership by 2020.....	79
3.2.7 Intercity Transportation Initiatives	82
3.2.8 Bike and Pedestrian Initiatives.....	85
3.2.9 Pricing Initiatives	88
3.2.10 Transportation Technology Initiatives	91
3.2.11 Electric Vehicle Initiatives.....	94
3.2.12 Low-Emitting Vehicles Initiatives.....	97
3.2.13 Evaluating the GHG Emissions Impacts from Major Projects and Plans.....	100
3.2.14 Airport Initiatives.....	100
3.2.15 Port Initiatives.....	104
3.2.16 Freight and Freight Rail Strategies	107
3.2.17 Renewable Fuels Standard.....	110



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

3.2.18	CAFÉ Standards: Model Years 2008-2011	113
3.2.19	Promoting Hybrid and Electric Vehicles	116
3.2.20	PAYD Insurance in Maryland	120
3.3	Agriculture and Forestry	123
3.3.1	Managing Forests to Capture Carbon	123
3.3.2	Creating Ecosystem Markets to Encourage GHG Emissions Reductions	126
3.3.3	Increasing Urban Trees to Capture Carbon	130
3.3.4	Creating and Protecting Wetlands and Waterway Borders to Capture Carbon	134
3.3.5	Geological Opportunities to Store Carbon.....	138
3.3.6	Planting Forests in Maryland.....	141
3.3.7	Biomass for Energy Production.....	144
3.3.8	Conservation of Agricultural Land for GHG Benefits	147
3.3.9	Buy Local for GHG Benefits	150
3.3.10	Nutrient Trading for GHG Benefits.....	153
3.4	Recycling.....	157
3.4.1	Recycling and Source Reduction	157
3.5	Multi-Sector	160
3.5.1	Greenhouse Gas Emissions Inventory Development.....	160
3.5.2	Subprogram Analysis, Goals, and Overall Implementation	160
3.5.3	Outreach and Public Education.....	161
3.6	Buildings	164
3.6.1	Green Building Initiatives.....	164
3.6.2	Building Codes.....	167
3.7	Land Use	170
3.7.1	Reducing Transportation Issues through Smart Growth.....	170
3.7.2	GHG Targets for Local Government’s Transportation and Land Use Planning ..	173
3.7.3	Land Use Planning GHG Benefits.....	176
3.7.4	Growth Boundary GHG Benefits.....	179
3.8	Innovative Initiatives.....	182
3.8.1	Leadership-by-Example – Local Government.....	182
3.8.2	Leadership-by-Example – Federal Government.....	185
3.8.3	Leadership-by-Example – Maryland University Lead-by-Example Initiatives....	189
3.8.4	Voluntary Stationary Source Reductions.....	193
3.8.5	State of Maryland Initiatives to Lead by Example	196
3.8.6	State of Maryland Carbon and Footprint Initiatives	199
3.8.7	Job Creation and Economic Development Initiatives Related to Climate Change 203	
3.8.8	Public Health Initiatives Related to Climate Change	207
3.8.9	Title V Permits for GHG Sources.....	210



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

Table of Figures

Figure 1: Total Economic Impacts by Strategy Subject Area—Investment Phase 9

Figure 2: Total Economic Impacts by Strategy Subject Area—Operation Phase 9

Figure 3: Total Fiscal Impacts by Strategy Subject Area 10

Figure 4: Regional Greenhouse Gas Initiative—Investment Phase..... 14

Figure 5: Regional Greenhouse Gas Initiative—Operation Phase 16

Figure 6: GHG Reductions from Imported Power—Investment Phase..... 18

Figure 7: GHG Reductions from Imported Power—Operation Phase 19

Figure 8: Federal New Source Performance Standard—Investment Phase..... 21

Figure 9: Federal New Source Performance Standard—Operation Phase 22

Figure 10: MACT—Investment Phase 24

Figure 11: MACT—Operation Phase 25

Figure 12: Prevention of Significant Deterioration—Investment Phase 27

Figure 13: Prevention of Significant Deterioration—Operation Phase 28

Figure 14: Energy Efficiency in the Residential Sector—Investment Phase 30

Figure 15: Energy Efficiency in the Residential Sector—Operation Phase 31

Figure 16: Energy Efficiency in the Commercial and Industrial Sectors—Investment Phase 33

Figure 17: Energy Efficiency in the Commercial and Industrial Sectors—Operation Phase..... 34

Figure 18: Energy Efficiency – Appliances and Other Products—Investment Phase..... 36

Figure 19: Energy Efficiency – Appliances and Other Products—Operation Phase..... 37

Figure 20: Energy Efficiency in the Power Sector – General—Investment Phase..... 39

Figure 21: Energy Efficiency in the Power Sector – General—Operation Phase 40

Figure 22: EmPOWER – Utility Subprograms—Investment Phase..... 42

Figure 23: EmPOWER – Utility Subprograms—Operation Phase 43

Figure 24: Maryland Renewable Energy Portfolio Standard Subprogram—Investment Phase... 45

Figure 25: Maryland Renewable Energy Portfolio Standard Subprogram—Operation Phase..... 46

Figure 26: Incentives and Grant Subprograms to Support Renewable Energy—Investment Phase 48

Figure 27: Incentives and Grant Subprograms to Support Renewable Energy—Operation Phase 49

Figure 28: Offshore Wind Initiatives to Support Renewable Energy—Investment Phase..... 51

Figure 29: Offshore Wind Initiatives to Support Renewable Energy—Operation Phase 52

Figure 30: Combined Heat and Power—Investment Phase..... 54

Figure 31: Combined Heat and Power—Operation Phase 55

Figure 32: Main Street—Investment Phase 57

Figure 33: Main Street—Operation Phase 58

Figure 34: Weatherization and Energy Efficiency for Low-Income Houses—Investment Phase 60

Figure 35: Weatherization and Energy Efficiency for Low-Income Houses—Operation Phase . 61

Figure 36: Maryland Clean Cars Subprogram—Investment Phase 63

Figure 37: Maryland Clean Cars Subprogram—Operation Phase..... 65

Figure 38: Federal Medium- and Heavy-Duty GHG Standards—Investment Phase 67

Figure 39: Federal Medium- and Heavy-Duty GHG Standards—Operation Phase..... 68

Figure 40: Clean Fuel Standard—Investment Phase 70

Figure 41: Clean Fuel Standard—Operation Phase 72



Regional Economic Studies Institute

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

Figure 42: Transportation and Climate Initiative—Investment Phase 74

Figure 43: Transportation and Climate Initiative—Operation Phase 75

Figure 44: Public Transportation Initiatives—Investment Phase 77

Figure 45: Public Transportation Initiatives—Operation Phase 78

Figure 46: Initiatives to Double Transit Ridership by 2020—Investment Phase 80

Figure 47: Initiatives to Double Transit Ridership by 2020—Operation Phase 81

Figure 48: Intercity Transportation Initiatives—Investment Phase 83

Figure 49: Intercity Transportation Initiatives—Operation Phase 84

Figure 50: Bike and Pedestrian Initiatives—Investment Phase 86

Figure 51: Bike and Pedestrian Initiatives—Operation Phase 87

Figure 52: Pricing Initiatives—Investment Phase 89

Figure 53: Pricing Initiatives—Operation Phase 90

Figure 54: Transportation Technology Initiatives—Investment Phase 92

Figure 55: Transportation Technology Initiatives—Operation Phase 93

Figure 56: Electric Vehicle Initiatives—Investment Phase 95

Figure 57: Electric Vehicle Initiatives—Operation Phase 96

Figure 58: Low-Emitting Vehicles Initiatives—Investment Phase 98

Figure 59: Low-Emitting Vehicles Initiatives—Operation Phase 99

Figure 60: Airport Initiatives—Investment Phase 102

Figure 61: Airport Initiatives—Operation Phase 103

Figure 62: Port Initiatives—Investment Phase 105

Figure 63: Port Initiatives—Operation Phase 106

Figure 64: Freight and Freight Rail Strategies—Investment Phase 108

Figure 65: Freight and Freight Rail Strategies—Operation Phase 109

Figure 66: Renewable Fuels Standard—Investment Phase 111

Figure 67: Renewable Fuels Standard—Operation Phase 112

Figure 68: CAFÉ Standards: Model Years 2008-2011—Investment Phase 114

Figure 69: CAFÉ Standards: Model Years 2008-2011—Operation Phase 115

Figure 70: Promoting Hybrid and Electric Vehicles—Investment Phase 117

Figure 71: Promoting Hybrid and Electric Vehicles—Operation Phase 119

Figure 72: PAYD Insurance in Maryland—Investment Phase 121

Figure 73: PAYD Insurance in Maryland—Operation Phase 122

Figure 74: Managing Forests to Capture Carbon—Investment Phase 124

Figure 75: Managing Forests to Capture Carbon—Operation Phase 125

Figure 76: Creating Ecosystem Markets to Encourage GHG Emissions Reductions—Investment Phase 127

Figure 77: Creating Ecosystem Markets to Encourage GHG Emissions Reductions—Operation Phase 129

Figure 78: Increasing Urban Trees to Capture Carbon—Investment Phase 131

Figure 79: Increasing Urban Trees to Capture Carbon—Operation Phase 133

Figure 80: Creating and Protecting Wetlands and Waterway Borders to Capture Carbon—Investment Phase 135

Figure 81: Creating and Protecting Wetlands and Waterway Borders to Capture Carbon—Operation Phase 137



Regional Economic Studies Institute

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

Figure 82: Geological Opportunities to Store Carbon—Investment Phase	139
Figure 83: Geological Opportunities to Store Carbon—Operation Phase	140
Figure 84: Planting Forests in Maryland—Investment Phase	142
Figure 85: Planting Forests in Maryland—Operation Phase	143
Figure 86: Biomass for Energy Production—Investment Phase	145
Figure 87: Biomass for Energy Production—Operation Phase	146
Figure 88: Conservation of Agricultural Land for GHG Benefits—Investment Phase	148
Figure 89: Conservation of Agricultural Land for GHG Benefits—Operation Phase	149
Figure 90: Buy Local for GHG Benefits—Investment Phase	151
Figure 91: Buy Local for GHG Benefits—Operation Phase	152
Figure 92: Nutrient Trading for GHG Benefits—Investment Phase	154
Figure 93: Nutrient Trading for GHG Benefits—Operation Phase	156
Figure 94: Recycling and Source Reduction—Investment Phase	158
Figure 95: Recycling and Source Reduction—Operation Phase	159
Figure 96: Outreach and Public Education—Investment Phase	162
Figure 97: Outreach and Public Education—Operation Phase	163
Figure 98: Green Building Initiatives—Investment Phase	165
Figure 99: Green Building Initiatives—Operation Phase	166
Figure 100: Building Codes—Investment Phase	168
Figure 101: Building Codes—Operation Phase	169
Figure 102: Reducing Transportation Issues through Smart Growth—Investment Phase	171
Figure 103: Reducing Transportation Issues through Smart Growth—Operation Phase	172
Figure 104: GHG Targets for Local Government’s Transportation and Land Use Planning— Investment Phase	174
Figure 105: GHG Targets for Local Government’s Transportation and Land Use Planning— Operation Phase	175
Figure 106: Land Use Planning GHG Benefits—Investment Phase	177
Figure 107: Land Use Planning GHG Benefits—Operation Phase	178
Figure 108: Growth Boundary GHG Benefits—Investment Phase	180
Figure 109: Growth Boundary GHG Benefits—Operation Phase	181
Figure 110: Leadership-by-Example – Local Government—Investment Phase	183
Figure 111: Leadership-by-Example – Local Government—Operation Phase	184
Figure 112: Leadership-by-Example – Federal Government—Investment Phase	186
Figure 113: Leadership-by-Example – Federal Government—Operation Phase	188
Figure 114: Leadership-by-Example – Maryland University Lead-by-Example Initiatives— Investment Phase	190
Figure 115: Leadership-by-Example – Maryland University Lead-by-Example Initiatives— Operation Phase	192
Figure 116: Voluntary Stationary Source Reductions—Investment Phase	194
Figure 117: Voluntary Stationary Source Reductions—Operation Phase	195
Figure 118: State of Maryland Initiatives to Lead by Example—Investment Phase	197
Figure 119: State of Maryland Initiatives to Lead by Example—Operation Phase	198
Figure 120: State of Maryland Carbon and Footprint Initiatives—Investment Phase	200
Figure 121: State of Maryland Carbon and Footprint Initiatives—Operation Phase	202



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

Figure 122: Job Creation and Economic Development Initiatives Related to Climate Change—
Investment Phase 204

Figure 123: Job Creation and Economic Development Initiatives Related to Climate Change—
Operation Phase 206

Figure 124: Public Health Initiatives Related to Climate Change—Investment Phase..... 208

Figure 125: Public Health Initiatives Related to Climate Change—Operation Phase..... 209

Figure 126: Title V Permits for GHG Sources—Investment Phase 211

Figure 127: Title V Permits for GHG Sources—Operation Phase 213



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

Acronyms and Abbreviations

BGE	Baltimore Gas and Electric
BWI	Baltimore/Washington International Thurgood Marshall Airport
CAP	Climate Action Plan
CAFÉ	Corporate Average Fuel Economy
DBED	Department of Business and Economic Development
DGS	Department of General Services
DHCD	Department of Housing and Community Development
DHMH	Department of Health and Mental Hygiene
DNR	Department of Natural Resources
EPA	U.S. Environmental Protection Agency
GGRA	Greenhouse Gas Emissions Reduction Act
GHG	Greenhouse Gas
IMPLAN	Impact Analysis for Planning
MACT	Maximum Achievable Control Technology
MARC	Maryland Area Regional Commuter
MDOT	Maryland Department of Transportation
MDP	Maryland Department of Planning
MEA	Maryland Energy Administration
MIA	Maryland Insurance Administration
MDE	Maryland Department of the Environment
NAICS	North American Industrial Classification System
PAYD	Pay-As-You-Drive®
PEPCO	Potomac Electric Power Company
RESI	Regional Economic Studies Institute of Towson University
RGGI	Regional Greenhouse Gas Initiative
SAM	Social Accounting Matrix
SMECO	Southern Maryland Electric Cooperative

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

1.0 Executive Summary

1.1 Introduction

Climate change and mitigation strategies are important factors for many elements of the economy and society in general: the rising costs of energy and transportation, threats to the environment, and the health of the greater population (and, by extension, the labor pool). Energy, transportation, agriculture and forestry, recycling, buildings, land use, and many other areas are affected by climate change. As such, mitigating climate change is a vital concern.

Maryland state government agencies are doing their part to mitigate the negative effects of climate change by creating and implementing climate change mitigation strategies designed to reduce GHG emissions in the state. The 65 strategies under various state government agencies have been organized into eight subject areas: energy, transportation, agriculture and forestry, recycling, multi-sector, buildings, land use, and innovative initiatives.

RESI conducted a preliminary analysis of the potential economic impacts of mitigation strategies for the 2012 GGRA report. This report estimates the job creation, economic activity, and wage effects of these strategies and their subprograms in development or already enacted. The findings in this report should be considered preliminary findings. They will be refined in a further report to be developed and completed by RESI in 2012.

1.2 Summary of Findings

RESI analyzed data collected by state agencies and MDE contractors as provided by MDE in order to estimate the economic impacts of climate action strategies and their subprograms. Using data contained in strategy write-ups provided by MDE as well as external research from a variety of sources, RESI estimated the impacts of each strategy and subprogram.

RESI coordinated with MDE to develop a methodology. MDE assisted in the development and finalization of all assumptions used in the economic modeling for RESI's analysis. Through this coordinated effort, RESI and MDE determined two phases to be modeled for each policy and subprogram: an investment phase and an operation phase. A detailed explanation of the investment and operation phases and what they entail can be found in Section B.1.

In order to quantify the economic and fiscal impacts of climate action strategies and their subprograms, RESI utilized the IMPLAN input/output model. For more information regarding IMPLAN, please refer to Section B.2.

A summary of RESI's findings, including the total economic (employment, output, and wages) impacts of all strategies within a subject area can be found in Figures 1 and 2. A summary of the fiscal impacts of all strategies for each subject area for the investment phase and the operation phase can be found in Figure 3. For more detailed impacts and further explanation, please refer

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan Final Draft

RESI of Towson University

to Section 3.0 and Appendix A.¹ For information regarding the modeling assumptions and procedures used to derive impacts for each strategy within the subject areas, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with each subject area, please refer to Appendix D.

Figure 1: Total Economic Impacts by Strategy Subject Area—Investment Phase²

Subject Area	Employment	Output	Wages
Energy	17	\$1,949,711	\$454,732
Transportation	13	\$1,857,687	\$289,214
Agriculture and Forestry	28	\$1,776,977	\$556,274
Recycling	12	\$1,829,493	\$625,625
Multi-Sector	12	\$1,797,988	\$638,975
Buildings	12	\$1,785,590	\$654,874
Land Use	12	\$1,851,662	\$711,657
Innovative Initiatives	11	\$1,810,215	\$634,689
Average	15	\$1,832,415	\$570,755

Source: RESI

Figure 2: Total Economic Impacts by Strategy Subject Area—Operation Phase

Subject Area	Employment	Output	Wages
Energy	2,793	\$488,058,326	\$165,611,533
Transportation	11,848	\$2,077,970,194	\$604,118,519
Agriculture and Forestry	16,275	\$2,633,645,666	\$1,019,994,530
Recycling	568	\$104,113,041	\$37,207,473
Multi-Sector	1	\$196,064	\$61,054
Buildings	39	\$5,791,698	\$2,144,306
Land Use	993	\$233,220,468	\$70,893,340
Innovative Initiatives	3,464	\$517,147,877	\$155,929,994
Total	35,981	\$6,060,143,334	\$2,055,960,749

Source: RESI

As shown in the figures above, \$1 million dollars invested in policy implementation will generate 15 jobs, \$1.8 million in output, and \$0.6 million in wages on average. In addition, the

¹ Total average economic impacts for the investment phase have been included on a basis of per \$1 million invested. For more information regarding the investment phase, please refer to Section B.1.

² Totals at the bottom of all tables associated with the investment phase reflect the total average impact across all subject areas, strategies, and/or subprograms if \$1 million is invested in each subprogram under each strategy. The average output impact across strategies does not reflect a “flat average.” As such, these averages are provided for reference purposes. In addition, summed impacts throughout the report may not add up exactly to totals due to rounding.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan Final Draft

RESI of Towson University

policies will support a total of 35,981 jobs, \$6.1 billion in output, and \$2.1 billion in wages annually once in operation. It is important to note that employment impacts associated with the operation phase for any subject area or strategy do not indicate new job creation after the initial year, but rather job retention. This applies throughout the report.

Figure 3: Total Fiscal Impacts by Strategy Subject Area³

Subject area	Investment Phase	Operation Phase
Energy	\$79,893	\$25,666,228
Transportation	\$224,489	\$44,146,360
Agriculture and Forestry	\$62,955	\$101,260,691
Recycling	\$98,504	\$2,643,996
Multi-Sector	\$79,705	\$15,669
Buildings	\$86,031	\$381,621
Land Use	\$113,229	\$3,577,915
Innovative Initiatives	\$78,159	\$14,359,389
Average/Total	\$102,871	\$192,051,869

Source: RESI

RESI also found that the strategies would generate a significant fiscal impact (state and local tax revenues). As shown in Figure 3, the total state and local tax revenues for all subject areas, strategies, and subprograms would come to approximately \$0.1 million on average per \$1 million for the investment phase and an annual total of \$192.0 million for the operation phase.

³ For an explanation of negative impacts, please refer to Section B.1.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

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2.0 Introduction

2.1 Overview

Climate change and mitigation strategies are important factors for many elements of the economy and society in general: the rising costs of energy and transportation, threats to the environment, and the health of the greater population (and, by extension, the labor pool). Energy, transportation, agriculture and forestry, recycling, buildings, land use, and many other areas are affected by climate change. As such, mitigating climate change is a vital concern.

Maryland state government agencies are doing their part to mitigate the negative effects of climate change by creating and implementing climate change mitigation strategies designed to reduce GHG emissions in the state.

Originally, 42 mitigation strategies were determined and then outlined in the 2008 Climate Action Plan (CAP). The CAP report presented a series of recommendations (the strategies) to be considered in order to meet the goals set forth in the GGRA, including the requirement to develop a plan by 2012 which outlines Maryland's strategy for meeting GGRA requirements. The 2012 draft plan is to be submitted to the Governor and General Assembly by December 31, 2011 and will be finalized in December 2012.

These recommendations have since evolved into 65 strategies under various state government agencies. RESI conducted a preliminary analysis of the potential economic impacts of these mitigation strategies for the 2012 GGRA report. This report estimates the job creation, economic activity, and wage effects of these strategies and their subprograms in development or already enacted. The findings in this report should be considered preliminary findings. They will be refined in a further report to be developed and completed by RESI in 2012.

2.2 Methodology

RESI analyzed data collected by state agencies and MDE contractors as provided by MDE in order to quantify the economic impacts of climate action strategies and their subprograms. RESI estimated the impacts of each strategy and subprogram using data contained in strategy write-ups provided by MDE as well as external research from a variety of sources.

The impacts were modeled for two phases: an investment phase and an operation phase. The investment phase refers to the entire period during which a strategy and its subprograms are being developed, invested in, and implemented. The operation phase refers to the period during which a strategy and its subprograms have already been implemented and the "end user" cost savings are being realized. A detailed explanation of the investment and operation phases and what they entail can be found in Section B.1.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan Final Draft

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In order to quantify the economic and fiscal impacts of climate action strategies and their subprograms, RESI used the IMPLAN input/output model. This model enumerates the economic and fiscal impacts of each dollar earned and spent by the following: employees associated with the strategies, other supporting vendors (business services, retail, etc.), each dollar spent by these vendors on other firms, and each dollar spent by the households associated with the strategies' employees, other vendors' employees, and other businesses' employees. For more information regarding IMPLAN, please refer to Section B.2.

The 65 strategies have been organized into eight subject areas: energy, transportation, agriculture and forestry, recycling, multi-sector, buildings, land use, and innovative initiatives. RESI's report is similarly organized, with each subject area separated into a different section. The economic impacts are broken down by industry sector, which coincide with NAICS sectors at the 2-digit level (or "supersectors" of the economy). RESI will refer to these simply as "industries" in the report.

3.0 Findings

RESI's findings show that all strategies and subprograms will have a significant economic impact. The direct, indirect, induced, and total economic impacts (employment, output, and wages) for each strategy and subprogram for the investment phase and the operation phase were calculated. It is important to note that employment impacts associated with the operation phase for any subject area or strategy do not indicate new job creation after the initial year, but rather job retention. This applies throughout the report.

For more detailed economic impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for each strategy within the subject areas, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with each subject area, please refer to Appendix D.

3.1 Energy

3.1.1 Regional Greenhouse Gas Initiative (RGGI)

In 2006, Maryland was required to join RGGI as part of the provisions of the Healthy Air Act. RGGI consists of ten Northeast and Mid-Atlantic States with the goal to create a regional GHG cap-and-trade program. In creating this program, RGGI strives to reduce carbon dioxide emissions sources of power generation within the region. Through the program, pollution limits are set to a standard lower than previously recorded. The program aims to drive emission reduction in three ways. Regional emissions are set below a well-defined cap. Auctions are held where companies can purchase enough credits to cover their emissions. These auctions help generate investment by the state for environmental programs which aim to low GHGs on a smaller scale. According to the RGGI website, RGGI will move forward with future auctions

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

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next year and has raised approximately \$800,000,000 to date, of which Maryland has received approximately \$180,000,000

Investment Phase

The total economic impacts of the investment phase of the *Regional Greenhouse Gas Initiative* strategy can be found in Figure 4. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Figure 4: Regional Greenhouse Gas Initiative—Investment Phase⁴

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$521	\$66
Mining	0.0	-\$6,118	\$67
Utilities	-1.1	-\$986,373	-\$144,324
Construction	-0.1	-\$14,418	-\$6,006
Manufacturing	0.0	\$13,742	\$2,387
Wholesale trade	0.1	\$17,296	\$6,483
Retail trade	0.5	\$30,415	\$15,312
Transportation and warehousing	0.0	-\$14,013	-\$2,712
Information	0.1	\$23,232	\$4,741
Finance and insurance	0.3	\$63,091	\$17,522
Real estate and rental and leasing	0.3	\$105,772	\$5,112
Professional, scientific, and technical services	7.8	\$971,839	\$537,309
Management of companies and enterprises	0.0	\$7,791	\$4,211
Administrative and support and waste management and remediation services	0.7	\$53,586	\$25,995
Educational services	0.1	\$8,114	\$4,558
Health care and social assistance	0.6	\$62,983	\$30,315
Arts, entertainment, and recreation	0.1	\$6,498	\$2,253
Accommodation and food services	0.2	\$14,814	\$5,148
Other services (except public administration)	0.4	\$31,859	\$12,033
Public administration	0.4	\$113,082	\$30,025
Average	10.6	\$503,712	\$550,495

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 11 jobs, \$503,712 in output, and \$550,495 in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Professional, scientific, and technical services*, primarily due to the expectation that sources subject to RGGI will either hire their own environmental consultants or contract with a similar agency in order to determine how to reduce emissions to meet RGGI requirements.

⁴ Summed impacts throughout the report may not add up exactly to totals due to rounding.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

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Continued implementation of RGGI may also result in increased demand for GHG emissions reduction technologies, which would fall under this industry.

Operation Phase

The total economic impacts of the operation phase of the *Regional Greenhouse Gas Initiative* strategy can be found in Figure 5. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Figure 5: Regional Greenhouse Gas Initiative—Operation Phase⁵

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.4	\$31,243	\$3,972
Mining	1.6	\$345,493	\$51,654
Utilities	1.6	\$1,592,664	\$191,866
Construction	24.1	\$3,046,768	\$1,171,323
Manufacturing	4.8	\$1,873,638	\$323,694
Wholesale trade	8.7	\$1,807,335	\$677,468
Retail trade	23.2	\$1,411,200	\$712,424
Transportation and warehousing	10.1	\$1,235,670	\$433,226
Information	4.4	\$1,419,044	\$308,891
Finance and insurance	20.5	\$4,701,135	\$1,350,629
Real estate and rental and leasing	25.8	\$6,556,861	\$374,586
Professional, scientific, and technical services	44.4	\$6,209,886	\$2,962,716
Management of companies and enterprises	1.2	\$255,804	\$138,266
Administrative and support and waste management and remediation services	34.0	\$2,876,316	\$1,172,058
Educational services	4.9	\$358,526	\$200,774
Health care and social assistance	25.2	\$2,689,908	\$1,294,677
Arts, entertainment, and recreation	5.6	\$260,904	\$93,765
Accommodation and food services	15.8	\$1,027,208	\$357,036
Other services (except public administration)	14.3	\$1,174,883	\$469,372
Public administration	159.7	\$44,374,089	\$11,273,071
Total	430.1	\$83,248,576	\$23,561,470

Source: RESI

As shown in the figure above, the strategy will support a total of 430 jobs, \$83.2 million in output, and \$23.6 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Public administration*, primarily due to the expectation that continued operation of the RGGI strategy implementation will be overseen by state government and facilitated by state-sanctioned allowance auction officials.

⁵ Summed impacts throughout the report may not add up exactly to totals due to rounding.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

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Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately -\$82,439 on average per \$1 million for the investment phase and an annual total of \$138,677 for the operation phase.

3.1.2 GHG Reductions from Imported Power

Through the 2008 Climate Action Plan, a generation performance standard was set for load-serving entities, including electricity providers. The promotion of energy and capacity from low-carbon or renewable sources through the policy aim to reduce the amount of energy imported annually, specifically for those states in which electricity generators primarily produce electricity using a higher concentration of coal in their fuel mixtures. The policy's goal is to enact a standard of no more than 1,125 pounds of GHGs per megawatt-hour by 2013.

Investment Phase

The total economic impacts of the investment phase of the *GHG Reductions from Imported Power* strategy can be found in Figure 6. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Figure 6: GHG Reductions from Imported Power—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$679	\$86
Mining	0.0	\$4,424	\$177
Utilities	0.5	\$464,675	\$67,677
Construction	0.2	\$23,024	\$8,901
Manufacturing	0.1	\$20,393	\$3,363
Wholesale trade	0.1	\$26,598	\$9,970
Retail trade	0.6	\$35,462	\$17,874
Transportation and warehousing	0.2	\$28,731	\$9,220
Information	0.1	\$36,961	\$8,162
Finance and insurance	0.3	\$79,169	\$22,185
Real estate and rental and leasing	0.4	\$117,249	\$5,653
Professional, scientific, and technical services	4.3	\$540,317	\$290,650
Management of companies and enterprises	0.0	\$6,768	\$3,658
Administrative and support and waste management and remediation services	0.6	\$44,434	\$20,656
Educational services	0.1	\$9,421	\$5,298
Health care and social assistance	0.7	\$70,463	\$33,920
Arts, entertainment, and recreation	0.2	\$7,238	\$2,584
Accommodation and food services	0.5	\$31,601	\$11,020
Other services (except public administration)	0.4	\$29,596	\$11,986
Public administration	0.4	\$115,599	\$31,125
Average	9.6	\$1,692,801	\$564,164

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 10 jobs, \$1.7 million in output, and \$0.6 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Professional, scientific, and technical services*, primarily due to the expectation that the demand for low-carbon and renewable energy technologies would increase. Companies involved in the development of such technologies are a part of this industry.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Operation Phase

The total economic impacts of the operation phase of the *GHG Reductions from Imported Power* strategy can be found in Figure 7. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 7: GHG Reductions from Imported Power—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$341	\$43
Mining	0.0	\$6,338	\$74
Utilities	0.9	\$856,367	\$125,065
Construction	0.2	\$23,864	\$9,426
Manufacturing	0.0	\$10,133	\$1,601
Wholesale trade	0.1	\$14,171	\$5,312
Retail trade	0.3	\$16,653	\$8,401
Transportation and warehousing	0.2	\$30,709	\$9,016
Information	0.1	\$21,205	\$4,862
Finance and insurance	0.2	\$37,695	\$10,598
Real estate and rental and leasing	0.1	\$50,730	\$2,379
Professional, scientific, and technical services	0.3	\$42,169	\$16,574
Management of companies and enterprises	0.0	\$2,303	\$1,245
Administrative and support and waste management and remediation services	0.2	\$12,764	\$5,623
Educational services	0.1	\$4,426	\$2,492
Health care and social assistance	0.3	\$32,069	\$15,440
Arts, entertainment, and recreation	0.1	\$3,298	\$1,206
Accommodation and food services	0.3	\$20,588	\$7,188
Other services (except public administration)	0.1	\$11,002	\$4,852
Public administration	0.0	\$6,029	\$2,525
Total	3.4	\$1,202,854	\$233,921

Source: RESI



**Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan
Final Draft**

RESI of Towson University

As shown in the figure above, the strategy will support a total of 3 jobs, \$1.2 million in output, and \$0.2 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Utilities*, primarily due to the expectation that utilities switching from fossil fuel-based imported electricity to renewable energy sources would experience a net fuel cost savings after they recoup the upfront cost of fuel switching.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$120,810 on average per \$1 million for the investment phase and an annual total of \$145,024 for the operation phase.

3.1.3 Federal New Source Performance Standard

In accordance with a court settlement from December 2010, the EPA will use the New Source Performance Standard authority under the Clean Air Act to enforce reduction of GHG emissions from fossil fuel power plants and petroleum refineries. Companies which use fossil fuel electricity generators would be subjugated to this rule for all new or modified electricity-generating units. In accordance with the rule, companies would also need to establish set GHG emission guidelines for all existing electricity generating units involved in electricity production.

Investment Phase

The total economic impacts of the investment phase of the *Federal New Source Performance Standard* strategy can be found in Figure 8. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Figure 8: Federal New Source Performance Standard—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$587	\$74
Mining	-0.1	-\$33,452	-\$55
Utilities	-0.8	-\$986,999	-\$101,432
Construction	0.0	-\$3,530	-\$1,687
Manufacturing	0.0	\$13,695	\$2,189
Wholesale trade	0.1	\$18,504	\$6,936
Retail trade	0.6	\$34,993	\$17,620
Transportation and warehousing	0.1	-\$1,271	\$924
Information	0.1	\$28,795	\$6,086
Finance and insurance	0.3	\$61,091	\$16,925
Real estate and rental and leasing	0.4	\$112,315	\$5,358
Professional, scientific, and technical services	7.8	\$971,607	\$535,788
Management of companies and enterprises	0.0	\$7,320	\$3,957
Administrative and support and waste management and remediation services	0.7	\$53,421	\$26,063
Educational services	0.1	\$8,655	\$4,875
Health care and social assistance	0.7	\$71,843	\$34,581
Arts, entertainment, and recreation	0.2	\$7,265	\$2,537
Accommodation and food services	0.3	\$22,057	\$7,682
Other services (except public administration)	0.4	\$32,134	\$12,240
Public administration	0.4	\$113,627	\$30,141
Average	11.2	\$532,656	\$610,801

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 11 jobs, \$532,600 in output, and \$610,800 in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Professional, scientific, and technical services*, primarily due to the expectation that sources subject to the standard will seek out cost-effective measures to reduce air pollutants. Business entities providing such services are within this industry.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Operation Phase

The total economic impacts of the operation phase of the *Federal New Source Performance Standard* strategy can be found in Figure 9. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 9: Federal New Source Performance Standard—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$601	\$76
Mining	0.0	\$11,155	\$130
Utilities	1.6	\$1,507,206	\$220,114
Construction	0.3	\$42,001	\$16,590
Manufacturing	0.0	\$17,835	\$2,818
Wholesale trade	0.1	\$24,940	\$9,349
Retail trade	0.5	\$29,310	\$14,785
Transportation and warehousing	0.3	\$54,047	\$15,868
Information	0.1	\$37,320	\$8,558
Finance and insurance	0.3	\$66,343	\$18,652
Real estate and rental and leasing	0.3	\$89,285	\$4,187
Professional, scientific, and technical services	0.5	\$74,218	\$29,170
Management of companies and enterprises	0.0	\$4,053	\$2,191
Administrative and support and waste management and remediation services	0.3	\$22,465	\$9,896
Educational services	0.1	\$7,790	\$4,386
Health care and social assistance	0.5	\$56,441	\$27,174
Arts, entertainment, and recreation	0.1	\$5,805	\$2,123
Accommodation and food services	0.6	\$36,235	\$12,651
Other services (except public administration)	0.3	\$19,363	\$8,539
Public administration	0.1	\$10,610	\$4,444
Total	6.0	\$2,117,023	\$411,702

Source: RESI



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

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As shown in the figure above, the strategy will support a total of 6 jobs, \$2.1 million in output, and \$0.4 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Utilities*, primarily due to the expectation that sources subject to the standard will switch from fossil fuel use in order to reduce air pollution and will experience cost savings from cost-effective, cleaner fuels and technologies in the long run as a result.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately -\$38,978 on average per \$1 million for the investment phase and an annual total of \$255,241 for the operation phase.

3.1.4 MACT

Over the next three years, newly developed air emissions requirements for industrial, commercial, and institutional boilers will go into effect under the authority of the EPA. Under the new requirements, thousands of boilers currently in use at various facilities will be classified as major sources of hazardous air pollutants. The official MACT boiler regulation applies to any stationary source with a boiler or group of stationary sources with boilers. According to the regulation, boilers must be operating under common pollution controls and located within a certain distance which can emit ten tons per year of any single hazardous air pollutant. Boilers may emit 25 tons per year, but only of a combination of hazardous air pollutants. All boilers under these new provisions will be evaluated annually to verify compliance with this ruling.

Investment Phase

The total economic impacts of the investment phase of the *MACT* strategy can be found in Figure 10. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Figure 10: MACT—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$126	\$15
Mining	-1.2	-\$76,757	-\$15,523
Utilities	0.2	\$208,609	\$30,678
Construction	0.1	\$10,856	\$4,212
Manufacturing	-1.8	-\$529,520	-\$127,122
Wholesale trade	-0.1	-\$14,820	-\$5,555
Retail trade	0.1	\$4,551	\$2,278
Transportation and warehousing	-0.1	-\$14,163	-\$3,902
Information	0.0	\$7,201	\$1,647
Finance and insurance	0.0	\$11,072	\$2,483
Real estate and rental and leasing	0.1	\$17,190	\$42
Professional, scientific, and technical services	2.1	\$258,096	\$140,936
Management of companies and enterprises	0.0	-\$6,542	-\$3,536
Administrative and support and waste management and remediation services	0.1	\$8,087	\$3,820
Educational services	0.0	\$1,494	\$843
Health care and social assistance	0.1	\$10,733	\$5,168
Arts, entertainment, and recreation	0.0	\$1,512	\$552
Accommodation and food services	0.1	\$7,862	\$2,738
Other services (except public administration)	0.1	\$5,504	\$1,891
Public administration	0.4	\$104,389	\$26,677
Average	0.3	\$15,480	\$68,344

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately less than one job, approximately \$15,480 in output, and \$68,344 in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy is *Professional, scientific, and technical services*, primarily due to the expectation that professionals such as environmental consultants in this field would be contracted to develop and implement the technologies associated with MACT. The top losing industry in terms of employment is *Mining*, as efficient boiler technology will reduce the demand for coal extraction.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *MACT* strategy can be found in Figure 11. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 11: MACT—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.1	\$4,192	\$529
Mining	0.3	\$77,800	\$909
Utilities	11.3	\$10,511,787	\$1,535,153
Construction	2.3	\$292,927	\$115,706
Manufacturing	0.3	\$124,386	\$19,655
Wholesale trade	0.8	\$173,943	\$65,201
Retail trade	3.4	\$204,416	\$103,116
Transportation and warehousing	1.9	\$376,943	\$110,672
Information	0.9	\$260,285	\$59,683
Finance and insurance	2.0	\$462,698	\$130,087
Real estate and rental and leasing	1.8	\$622,703	\$29,199
Professional, scientific, and technical services	3.3	\$517,623	\$203,444
Management of companies and enterprises	0.1	\$28,270	\$15,280
Administrative and support and waste management and remediation services	2.2	\$156,680	\$69,016
Educational services	0.7	\$54,329	\$30,589
Health care and social assistance	3.7	\$393,642	\$189,520
Arts, entertainment, and recreation	0.8	\$40,486	\$14,809
Accommodation and food services	3.9	\$252,713	\$88,235
Other services (except public administration)	1.8	\$135,046	\$59,555
Public administration	0.4	\$74,000	\$30,994
Total	42.0	\$14,764,866	\$2,871,352

Source: RESI

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

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As shown in the figure above, the strategy will support a total of 42 jobs, \$14.8 million in output, and \$2.8 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Utilities*, primarily due to the expectation that utilities and energy producing entities within the industry which house boilers subject to the strategy will reduce boiler fuel consumption in order to decrease pollutants, which will in turn result in cost savings.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately -\$13,054 on average per \$1 million for the investment phase and an annual total of \$1,780,142 for the operation phase.

3.1.5 GHG Prevention of Significant Deterioration Permitting Program

Under the Prevention of Significant Deterioration Permitting Program, all new major stationary sources and major modifications to existing major stationary sources will be subject to a preconstruction and review analysis. As a principal requirement of the program, new major sources or preexisting source modifications must apply Best Available Control Technology. The application is determined on a per-case basis in regard to cost effectiveness and environmental impact. Analysis on the approach of Best Available Control Technology will rely on two key factors: (1) assessed existing air quality and (2) predictions of the applicants' resulting ambient concentrations associated with the project using dispersion modeling.

Investment Phase

The total economic impacts of the investment phase of the *Prevention of Significant Deterioration* strategy can be found in Figure 12. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Figure 12: Prevention of Significant Deterioration—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	-\$74	-\$11
Mining	0.0	\$667	\$116
Utilities	0.0	-\$3,686	-\$566
Construction	0.0	\$4,930	\$1,899
Manufacturing	0.0	\$1,511	\$8
Wholesale trade	0.0	\$763	\$286
Retail trade	-0.1	-\$3,156	-\$1,585
Transportation and warehousing	0.1	\$8,209	\$3,378
Information	3.3	\$592,838	\$208,560
Finance and insurance	-0.1	-\$13,030	-\$4,620
Real estate and rental and leasing	0.0	-\$16,369	-\$1,431
Professional, scientific, and technical services	2.2	\$265,821	\$151,064
Management of companies and enterprises	-4.6	-\$994,381	-\$537,480
Administrative and support and waste management and remediation services	0.3	\$15,973	\$8,511
Educational services	0.0	-\$788	-\$424
Health care and social assistance	-0.1	-\$7,774	-\$3,733
Arts, entertainment, and recreation	-0.1	-\$4,522	-\$1,198
Accommodation and food services	0.0	-\$2,517	-\$886
Other services (except public administration)	-0.1	-\$6,880	-\$4,418
Public administration	0.4	\$104,978	\$27,613
Average	1.1	-\$57,485	-\$154,917

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately one job, -\$57,500 in output, and -\$154,900 in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Information*, primarily due to the expectation that data processing and hosting services will be required for tracking stationary sources subject to preconstruction reviews.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Prevention of Significant Deterioration* strategy can be found in Figure 13. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 13: Prevention of Significant Deterioration—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$70	\$9
Mining	0.0	\$770	\$115
Utilities	0.0	\$3,550	\$428
Construction	0.1	\$6,791	\$2,611
Manufacturing	0.0	\$4,176	\$721
Wholesale trade	0.0	\$4,028	\$1,510
Retail trade	0.1	\$3,145	\$1,588
Transportation and warehousing	0.0	\$2,754	\$966
Information	0.0	\$3,163	\$688
Finance and insurance	0.0	\$10,478	\$3,010
Real estate and rental and leasing	0.1	\$14,614	\$835
Professional, scientific, and technical services	0.1	\$13,840	\$6,603
Management of companies and enterprises	0.0	\$570	\$308
Administrative and support and waste management and remediation services	0.1	\$6,411	\$2,612
Educational services	0.0	\$799	\$447
Health care and social assistance	0.1	\$5,995	\$2,886
Arts, entertainment, and recreation	0.0	\$581	\$209
Accommodation and food services	0.0	\$2,289	\$796
Other services (except public administration)	0.0	\$2,619	\$1,046
Public administration	0.4	\$98,900	\$25,125
Total	1.0	\$185,542	\$52,513

Source: RESI

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan Final Draft

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As shown in the figure above, the strategy will support a total of one job, \$0.2 million in output, and \$0.1 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Public administration*, primarily due to the expectation that public administration will conduct the preconstruction reviews during operation of the strategy.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$2,495 on average per \$1 million for the investment phase and an annual total of \$309 for the operation phase.

3.1.6 Energy Efficiency in the Residential Sector

In an effort to reduce home energy costs for Maryland residents, MEA and other state agencies introduced EMPOWER Maryland. Offering a variety of energy efficiency programs, EMPOWER Maryland strives to reduce the per-capita energy consumption in Maryland by 15 percent by 2015. Revenue received from RGGI auctions and ARRA provide financial support for EMPOWER Maryland programs. Programs to assist in reduction of energy costs to Maryland homes include three residential programs proposed by MEA. These programs will create cost-reducing incentives to homeowners for energy efficient product replacements and residential retrofits.

Investment Phase

The total economic impacts of the investment phase of the *Energy Efficiency in the Residential Sector* strategy can be found in Figure 14. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Figure 14: Energy Efficiency in the Residential Sector—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$1,065	\$143
Mining	0.0	\$2,329	\$339
Utilities	0.1	\$50,017	\$7,001
Construction	1.3	\$172,864	\$56,162
Manufacturing	0.1	\$31,535	\$5,455
Wholesale trade	0.2	\$35,655	\$13,365
Retail trade	5.1	\$275,410	\$153,682
Transportation and warehousing	0.2	\$24,395	\$8,622
Information	0.1	\$43,601	\$9,609
Finance and insurance	0.4	\$93,842	\$26,235
Real estate and rental and leasing	0.5	\$151,074	\$7,384
Professional, scientific, and technical services	3.7	\$496,382	\$257,204
Management of companies and enterprises	0.0	\$8,219	\$4,442
Administrative and support and waste management and remediation services	0.6	\$47,560	\$21,853
Educational services	0.7	\$68,841	\$37,810
Health care and social assistance	0.8	\$88,809	\$42,748
Arts, entertainment, and recreation	0.2	\$8,427	\$3,021
Accommodation and food services	0.5	\$33,611	\$11,712
Other services (except public administration)	0.8	\$66,554	\$32,926
Public administration	0.5	\$120,173	\$32,947
Average	15.9	\$1,820,365	\$732,661

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 16 jobs, \$1.8 million in output, and \$0.7 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy is *Retail Trade*, primarily due to the expectation that newly created programs to promote energy efficiency within the residential sector start with the replacement of appliances for Energy Star equivalent. Households that receive grants provided by MEA will need to purchase materials from hardware stores for weatherization, or will seek out replacement appliances with the highest energy conservation ratings.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Energy Efficiency in the Residential Sector* strategy can be found in Figure 15. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 15: Energy Efficiency in the Residential Sector—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.5	\$44,709	\$5,600
Mining	0.2	\$39,097	\$3,903
Utilities	0.8	\$779,419	\$103,688
Construction	3.2	\$410,625	\$149,521
Manufacturing	2.2	\$987,498	\$144,812
Wholesale trade	6.3	\$1,302,349	\$488,177
Retail trade	38.3	\$2,333,055	\$1,175,078
Transportation and warehousing	5.5	\$624,775	\$215,691
Information	3.8	\$1,218,449	\$259,775
Finance and insurance	14.9	\$3,510,709	\$982,757
Real estate and rental and leasing	15.9	\$6,171,121	\$239,173
Professional, scientific, and technical services	10.9	\$1,498,994	\$670,297
Management of companies and enterprises	1.0	\$208,183	\$112,527
Administrative and support and waste management and remediation services	12.0	\$887,709	\$385,456
Educational services	8.8	\$671,618	\$374,509
Health care and social assistance	48.0	\$5,168,810	\$2,485,805
Arts, entertainment, and recreation	6.9	\$351,615	\$128,853
Accommodation and food services	22.1	\$1,431,164	\$499,248
Other services (except public administration)	19.7	\$1,433,153	\$611,554
Public administration	11.0	\$2,853,160	\$784,840
Total	231.9	\$31,926,210	\$9,821,266

Source: RESI

**Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan
Final Draft**

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As shown in the figure above, the strategy will support a total of approximately 232 jobs, \$31.9 million in output, and \$9.8 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy is *Health care and social assistance*, which is driven by indirect and induced job creation in healthcare associated with the relatively high job creation from *Retail trade* and other industries.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$112,818 on average per \$1 million for the investment phase and an annual total of \$1,015,366 for the operation phase.

3.1.7 Energy Efficiency in the Commercial and Industrial Sectors

In an effort to reduce energy consumption within Maryland, MEA extended EMPOWER Maryland to the commercial and industrial sectors operating within the state. Through an offering of numerous energy savings programs, the executive goal is to reduce GHG emissions as well as to promote carbon footprint reduction initiatives within the single largest energy-consuming sector. Overall, this sector consumes nearly 33 percent of Maryland's total annual electricity consumption. To date, MEA has provided approximately 100 local and municipal government entities with funds totaling \$9.593 million for energy audits and financing assistance for new energy projects. Four programs offered through MEA focus on energy efficiency within the commercial and industrial sector, including Maryland Save Energy Now, the Jane E. Lawton Conservation Loan Program, the Energy Efficiency and Conservation Block Grant Program, and Energy Workforce Training. Tax credits related to new buildings or retrofitting of buildings are under consideration in association with this strategy.

Investment Phase

The total economic impacts of the investment phase of the *Energy Efficiency in the Commercial and Industrial Sectors* strategy can be found in Figure 16. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 16: Energy Efficiency in the Commercial and Industrial Sectors—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$919	\$122
Mining	0.0	\$2,379	\$314
Utilities	0.1	\$65,222	\$9,264
Construction	1.1	\$150,220	\$56,919
Manufacturing	0.2	\$71,503	\$14,436
Wholesale trade	0.5	\$113,830	\$42,669
Retail trade	3.6	\$197,161	\$109,407
Transportation and warehousing	0.2	\$26,125	\$9,326
Information	0.1	\$44,104	\$9,612
Finance and insurance	0.4	\$92,580	\$25,732
Real estate and rental and leasing	0.4	\$144,012	\$7,123
Professional, scientific, and technical services	4.2	\$554,693	\$290,287
Management of companies and enterprises	0.0	\$10,408	\$5,626
Administrative and support and waste management and remediation services	0.7	\$49,691	\$23,076
Educational services	0.2	\$11,642	\$6,535
Health care and social assistance	0.8	\$86,388	\$41,584
Arts, entertainment, and recreation	0.2	\$8,372	\$3,004
Accommodation and food services	0.5	\$33,263	\$11,593
Other services (except public administration)	0.4	\$35,355	\$14,630
Public administration	0.5	\$118,610	\$32,636
Average	14.3	\$1,816,479	\$713,895

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 14 jobs, \$1.8 million in output, and \$0.7 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy is *Professional, scientific, and technical services*, primarily due to the expectation that energy efficiency technologies and improvements would be overseen by environmental consultants within this industry.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Energy Efficiency in the Commercial and Industrial Sectors* strategy can be found in Figure 17. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 17: Energy Efficiency in the Commercial and Industrial Sectors—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.4	\$29,657	\$3,834
Mining	0.1	\$20,184	\$1,157
Utilities	0.8	\$731,463	\$99,348
Construction	2.2	\$280,946	\$103,320
Manufacturing	3.1	\$941,916	\$197,877
Wholesale trade	5.2	\$1,074,185	\$402,651
Retail trade	25.6	\$1,561,925	\$786,803
Transportation and warehousing	5.3	\$602,152	\$206,483
Information	12.3	\$3,848,908	\$861,765
Finance and insurance	15.1	\$3,447,462	\$991,891
Real estate and rental and leasing	17.5	\$5,826,336	\$305,506
Professional, scientific, and technical services	35.1	\$4,772,840	\$2,196,999
Management of companies and enterprises	169.9	\$36,690,586	\$19,831,906
Administrative and support and waste management and remediation services	16.0	\$1,217,288	\$544,692
Educational services	5.6	\$413,272	\$231,635
Health care and social assistance	29.8	\$3,192,827	\$1,536,599
Arts, entertainment, and recreation	10.3	\$468,436	\$154,703
Accommodation and food services	18.3	\$1,185,026	\$413,075
Other services (except public administration)	17.9	\$1,378,316	\$624,710
Public administration	2.6	\$491,867	\$195,372
Total	393.0	\$68,175,594	\$29,690,325

Source: RESI

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

As shown in the figure above, the strategy will support a total of 393 jobs, \$68.2 million in output, and \$29.7 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy is *Management of companies and enterprises*, primarily due to the expectation that businesses in the commercial and industrial sectors will benefit from energy efficiency after implementation in the form of operation cost savings, among other benefits.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$112,768 on average per \$1 million for the investment phase and an annual total of \$563,839 for the operation phase.

3.1.8 Energy Efficiency—Appliances and Other Products

The encouragement of education, outreach, and incentive programs associated with the purchases of energy efficient appliances is another of EmPOWER Maryland's benefits to Maryland residents. Several types of energy efficient appliances and equipment offer rebate programs to consumers. In an effort to reduce the cost to residents for energy efficient products, MEA supports three programs: the State Energy Efficiency Appliance Rebate Program, the Maryland Home Energy Loan Program, and the Jane E. Lawton Conservation Loan Program. Programs are accessible to residential consumers and commercial industries seeking to lessen their carbon footprint. Benefits from purchases not only include the offset of some of the initial cost but also continued annual savings through the reduction of consumer electricity consumption.

Investment Phase

The total economic impacts of the investment phase of the *Energy Efficiency – Appliances and Other Products* strategy can be found in Figure 18. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 18: Energy Efficiency – Appliances and Other Products—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$829	\$122
Mining	0.0	\$1,286	\$148
Utilities	0.0	\$20,893	\$2,801
Construction	0.1	\$13,243	\$4,969
Manufacturing	0.1	\$24,420	\$4,615
Wholesale trade	1.3	\$262,106	\$98,249
Retail trade	9.2	\$490,928	\$277,140
Transportation and warehousing	0.3	\$32,176	\$12,286
Information	0.2	\$56,474	\$12,538
Finance and insurance	0.3	\$84,091	\$23,223
Real estate and rental and leasing	0.5	\$144,442	\$7,235
Professional, scientific, and technical services	2.4	\$292,891	\$110,233
Management of companies and enterprises	0.1	\$11,201	\$6,054
Administrative and support and waste management and remediation services	0.5	\$37,180	\$16,655
Educational services	0.2	\$11,221	\$6,280
Health care and social assistance	0.8	\$81,018	\$38,998
Arts, entertainment, and recreation	0.2	\$8,863	\$3,005
Accommodation and food services	0.4	\$27,963	\$9,740
Other services (except public administration)	0.4	\$28,964	\$12,267
Public administration	0.5	\$120,376	\$34,120
Average	17.3	\$1,750,567	\$680,680

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 17 jobs, \$1.8 million in output, and \$0.7 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Retail trade*, primarily due to the expectation that the industry will benefit from increased sales of appliances as a result of the rebate programs making such products more easily affordable for consumers.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Energy Efficiency – Appliances and Other Products* strategy can be found in Figure 19. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 19: Energy Efficiency – Appliances and Other Products—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.2	\$15,074	\$1,887
Mining	0.0	\$7,504	\$443
Utilities	0.3	\$244,093	\$32,829
Construction	0.7	\$89,193	\$31,373
Manufacturing	0.7	\$311,831	\$44,855
Wholesale trade	2.0	\$423,100	\$158,596
Retail trade	13.0	\$790,550	\$398,143
Transportation and warehousing	1.7	\$196,394	\$67,683
Information	1.2	\$400,696	\$85,315
Finance and insurance	4.9	\$1,143,590	\$319,508
Real estate and rental and leasing	5.1	\$2,040,664	\$76,940
Professional, scientific, and technical services	3.0	\$413,278	\$181,486
Management of companies and enterprises	0.3	\$68,224	\$36,876
Administrative and support and waste management and remediation services	3.6	\$259,045	\$113,853
Educational services	3.0	\$228,428	\$127,361
Health care and social assistance	16.3	\$1,759,231	\$846,038
Arts, entertainment, and recreation	2.3	\$118,283	\$43,379
Accommodation and food services	7.5	\$482,063	\$168,186
Public administration	1.0	\$205,594	\$73,211
Total	73.4	\$9,676,958	\$3,013,413

Source: RESI

As shown in the figure above, the strategy will support a total of 73 jobs, \$9.7 million in output, and \$3 million in wages annually once in operation. The industries experiencing the greatest

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan Final Draft

RESI of Towson University

positive economic impacts in terms of employment as a result of this strategy are those (such as *Health care and social assistance* and *Retail trade*) providing the goods and services which households will demand when efficiency cost savings of purchased appliances will allow for increased household spending.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$162,608 on average per \$1 million for the investment phase and an annual total of \$773,392 for the operation phase.

3.1.9 Energy Efficiency in the Power Sector – General

In association with the previous EmPOWER policies, MEA seeks to promote the reduction of GHG emissions from existing generating units in the power sector through energy efficiency. In particular, biomass fuels contain little to no sulfur content, therefore substituting biomass for coal will significantly reduce sulfur dioxide emissions. Nitrogen oxide is also reduced through the use of coal-firing biomass. Revenue from the sale of renewable energy credits in Maryland and the sale of these from other states will in turn economically benefit future programs for residents. For the best results, further understanding and research of the existing 16 coal-firing facilities operating machinery will be needed to achieve maximum reductions.

The total economic impacts of the investment phase of the *Energy Efficiency in the Power Sector – General* strategy can be found in Figure 20. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Investment Phase

The total economic impacts of the investment phase of the *Energy Efficiency in the Power Sector – General* strategy can be found in Figure 20. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 20: Energy Efficiency in the Power Sector – General—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$587	\$74
Mining	0.1	-\$33,452	-\$55
Utilities	0.5	-\$986,999	-\$101,432
Construction	0.2	-\$3,530	-\$1,687
Manufacturing	0.0	\$13,695	\$2,189
Wholesale trade	0.1	\$18,504	\$6,936
Retail trade	0.5	\$34,993	\$17,620
Transportation and warehousing	0.2	-\$1,271	\$924
Information	0.1	\$28,795	\$6,086
Finance and insurance	0.3	\$61,091	\$16,925
Real estate and rental and leasing	0.3	\$112,315	\$5,358
Professional, scientific, and technical services	3.0	\$971,607	\$535,788
Management of companies and enterprises	0.0	\$7,320	\$3,957
Administrative and support and waste management and remediation services	0.5	\$53,421	\$26,063
Educational services	0.1	\$8,655	\$4,875
Health care and social assistance	0.5	\$71,843	\$34,581
Arts, entertainment, and recreation	0.1	\$7,265	\$2,537
Accommodation and food services	0.4	\$22,057	\$7,682
Other services (except public administration)	0.3	\$32,134	\$12,240
Public administration	0.4	\$113,627	\$30,141
Average	7.6	\$532,656	\$610,801

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 8 jobs, \$532,700 in output, and \$610,800 in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Professional, scientific, and technical services*, primarily due to the expectation that the power sector will contract with professional consultants to implement energy efficiency improvements.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Energy Efficiency in the Power Sector – General* strategy can be found in Figure 21. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 21: Energy Efficiency in the Power Sector – General—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.1	\$12,056	\$1,522
Mining	0.9	\$223,760	\$2,616
Utilities	32.5	\$30,232,762	\$4,415,225
Construction	6.7	\$842,482	\$332,779
Manufacturing	0.9	\$357,745	\$56,528
Wholesale trade	2.4	\$500,274	\$187,524
Retail trade	9.6	\$587,917	\$296,570
Transportation and warehousing	5.4	\$1,084,118	\$318,302
Information	2.5	\$748,600	\$171,655
Finance and insurance	5.7	\$1,330,757	\$374,142
Real estate and rental and leasing	5.1	\$1,790,944	\$83,978
Professional, scientific, and technical services	9.5	\$1,488,726	\$585,121
Management of companies and enterprises	0.4	\$81,306	\$43,947
Administrative and support and waste management and remediation services	6.3	\$450,625	\$198,496
Educational services	2.1	\$156,253	\$87,976
Health care and social assistance	10.6	\$1,132,147	\$545,074
Arts, entertainment, and recreation	2.4	\$116,441	\$42,592
Accommodation and food services	11.3	\$726,823	\$253,771
Other services (except public administration)	5.3	\$388,403	\$171,284
Public administration	1.2	\$212,830	\$89,141
Total	120.8	\$42,464,967	\$8,258,243

Source: RESI



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan Final Draft

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As shown in the figure above, the strategy will support a total of 12one jobs, \$42.5 million in output, and \$8.3 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Utilities*, primarily due to the expectation that the energy efficiency improvements implemented during the investment phase will result in cost savings for power generating entities within the industry, which may then expand employment or operations. Other top gaining industries reflect the increased household spending resulting from new households established due to direct and indirect job creation.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately -\$38,978 on average per \$1 million for the investment phase and an annual total of \$5,119,838 for the operation phase.

3.1.10 EmPOWER – Utility Subprograms

In association with EmPOWER Maryland, the Public Service Commission requires each utility company which provides service to Maryland households to propose cost-effective energy efficiency and conservation programs and services. These programs and services should be designed in a way which achieves the predetermined target per-capita peak energy demand reduction of at least 5 percent by the end of 2011, 10 percent by 2013, and 15 percent by 2015. The five utility companies affected include Potomac Edison, Baltimore Gas and Electric, Delmarva Power and Light, the Potomac Electric Power Company, and the Southern Maryland Electric Cooperative. In order to generate savings for Maryland residents, these companies introduced energy efficiency and conservation portfolios based on a three-year planning cycle. Further information about the utility savings programs offered through these companies for residential and commercial customers can be found on the company's website, or through MEA's EmPOWER page.

Investment Phase

The total economic impacts of the investment phase of the *EmPOWER – Utility Subprograms* strategy can be found in Figure 22. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 22: EmPOWER – Utility Subprograms—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$574	\$84
Mining	0.0	-\$5,113	\$281
Utilities	0.2	-\$985,818	-\$144,235
Construction	1.2	\$135,490	\$53,801
Manufacturing	0.1	\$17,082	\$3,049
Wholesale trade	0.8	\$172,519	\$64,668
Retail trade	5.6	\$327,863	\$185,101
Transportation and warehousing	0.2	-\$7,719	-\$138
Information	0.1	\$19,956	\$4,102
Finance and insurance	0.4	\$47,718	\$12,980
Real estate and rental and leasing	0.4	\$87,114	\$4,479
Professional, scientific, and technical services	2.6	\$342,983	\$180,717
Management of companies and enterprises	0.0	\$7,863	\$4,250
Administrative and support and waste management and remediation services	0.6	\$30,200	\$14,126
Educational services	0.1	\$6,729	\$3,759
Health care and social assistance	0.8	\$49,703	\$23,921
Arts, entertainment, and recreation	0.2	\$4,284	\$1,520
Accommodation and food services	0.5	\$7,865	\$2,725
Other services (except public administration)	0.4	\$20,832	\$8,487
Public administration	0.5	\$112,263	\$30,219
Average	14.5	\$392,391	\$453,896

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 15 jobs, \$392,400 in output, and \$453,900 in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Retail trade*, primarily due to the expectation that electricity providers will have to adhere to energy efficiency and cost saving programs for ratepayers. As a result, providers will seek out retail merchants for energy efficient products in order to contract with them to provide rebates. These contracts will result in sales to consumers.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *EmPOWER – Utility Subprograms* strategy can be found in Figure 23. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 23: EmPOWER – Utility Subprograms—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	1.0	\$77,086	\$10,407
Mining	0.2	\$40,003	\$2,527
Utilities	1.5	\$1,323,817	\$191,801
Construction	4.1	\$487,844	\$186,054
Manufacturing	4.4	\$1,693,438	\$282,537
Wholesale trade	11.6	\$2,236,360	\$901,106
Retail trade	71.3	\$4,044,607	\$2,188,327
Transportation and warehousing	10.2	\$1,069,228	\$395,973
Information	10.1	\$2,970,064	\$697,350
Finance and insurance	28.5	\$6,208,344	\$1,874,919
Real estate and rental and leasing	30.4	\$10,980,462	\$473,458
Professional, scientific, and technical services	26.1	\$3,305,001	\$1,603,324
Management of companies and enterprises	57.5	\$11,349,941	\$6,714,147
Administrative and support and waste management and remediation services	22.6	\$1,537,627	\$731,129
Educational services	16.3	\$1,157,233	\$693,412
Health care and social assistance	89.0	\$8,915,412	\$4,605,511
Arts, entertainment, and recreation	14.6	\$675,801	\$261,158
Accommodation and food services	42.1	\$2,536,324	\$951,005
Other services (except public <i>administration</i>)	38.0	\$2,585,720	\$1,201,286
Public administration	5.7	\$1,077,638	\$419,098
Total	485.1	\$64,271,951	\$24,384,529

Source: RESI



**Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan
Final Draft**

RESI of Towson University

As shown in the figure above, the strategy will support a total of 485 jobs, \$64.3 million in output, and \$24.4 million in wages annually once in operation. The industries experiencing the greatest positive economic impacts in terms of employment as a result of this strategy are those reflecting increased household spending, primarily due to the expectation that households benefitting from energy efficiency improvements will have increased income to spend elsewhere.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately -\$173,905 on average per \$1 million for the investment phase and an annual total of \$4,877,892 for the operation phase.

3.1.11 Maryland Renewable Energy Portfolio Standard Subprogram

Under the RPS Subprogram, benefits associated with a variety of renewable energy sources were outlined, highlighting those which would aim to serve Maryland. Through this policy, retail suppliers of electricity would be required to meet a minimum of their energy supply needs with a mixture of renewable energy sources. Sources which must meet this requirement are those that have been classified through Tier 1 and Tier 2 of the RPS statute. Implementation of this policy is through the creation, sale, and transfer of Renewable Energy Credits. Through this policy, Maryland hopes to create a sustainable renewable energy sector. MEA hopes that the enforcement of this policy and other renewable energy source policies will help to drive down the demand for fossil fuel based energy by 2015.

Investment Phase

The total economic impacts of the investment phase of the *Maryland Renewable Energy Portfolio Standard Subprogram* strategy can be found in Figure 24. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 24: Maryland Renewable Energy Portfolio Standard Subprogram—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$1,028	\$129
Mining	0.0	\$2,970	\$513
Utilities	0.0	\$19,149	\$2,525
Construction	3.3	\$463,014	\$164,385
Manufacturing	0.1	\$41,471	\$7,088
Wholesale trade	0.2	\$39,972	\$14,983
Retail trade	0.8	\$48,434	\$24,487
Transportation and warehousing	0.2	\$23,192	\$7,961
Information	0.1	\$41,667	\$8,916
Finance and insurance	0.4	\$91,444	\$25,496
Real estate and rental and leasing	0.4	\$143,882	\$7,551
Professional, scientific, and technical services	4.5	\$575,946	\$309,392
Management of companies and enterprises	0.0	\$8,944	\$4,834
Administrative and support and waste management and remediation services	0.7	\$50,475	\$23,501
Educational services	0.2	\$11,633	\$6,541
Health care and social assistance	0.8	\$87,611	\$42,174
Arts, entertainment, and recreation	0.2	\$8,314	\$2,973
Accommodation and food services	0.5	\$32,148	\$11,205
Other services (except public administration)	0.5	\$40,342	\$16,538
Public administration	0.4	\$117,718	\$31,833
Average	13.5	\$1,849,354	\$713,026

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 14 jobs, \$1.9 million in output, and \$0.7 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Professional, scientific, and technical services*, primarily due to the expectation that those entities implementing renewable energy would contract with outside professionals in order to develop appropriate measures to do so.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Maryland Renewable Energy Portfolio Standard Subprogram* strategy can be found in Figure 25. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 25: Maryland Renewable Energy Portfolio Standard Subprogram—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.5	\$44,923	\$5,632
Mining	0.2	\$38,186	\$1,498
Utilities	3.1	\$2,881,099	\$412,408
Construction	2.5	\$326,902	\$117,844
Manufacturing	2.2	\$956,261	\$141,572
Wholesale trade	6.2	\$1,286,586	\$482,269
Retail trade	38.6	\$2,353,148	\$1,185,155
Transportation and warehousing	5.6	\$663,940	\$224,812
Information	4.4	\$1,404,065	\$302,303
Finance and insurance	14.9	\$3,507,868	\$981,915
Real estate and rental and leasing	15.7	\$6,198,922	\$239,925
Professional, scientific, and technical services	11.2	\$1,546,276	\$680,067
Management of companies and enterprises	10.9	\$2,348,795	\$1,269,565
Administrative and support and waste management and remediation services	11.4	\$830,810	\$365,749
Educational services	8.8	\$676,736	\$377,451
Health care and social assistance	48.4	\$5,207,382	\$2,504,410
Arts, entertainment, and recreation	7.3	\$367,874	\$133,904
Accommodation and food services	22.8	\$1,474,774	\$514,524
Other services (except public administration)	20.0	\$1,456,562	\$625,683
Public administration	3.0	\$621,261	\$223,364
Total	237.7	\$34,192,370	\$10,790,049

Source: RESI



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

As shown in the figure above, the strategy will support a total of 238 jobs, \$34.2 million in output, and \$10.8 million in wages annually once in operation. The industries experiencing the greatest positive economic impacts in terms of employment as a result of this strategy are those (such as *Health care and social assistance* and *Retail trade*) which provide goods and services which new households will demand. New households are likely to be created due to the development of a renewable energy industry in Maryland as a result of RPS.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$79,254 on average per \$1 million for the investment phase and an annual total of \$2,737,298 for the operation phase.

3.1.12 Incentives and Grant Subprograms to Support Renewable Energy

Many incentives and grant programs which are administered by MEA encourage the development of more renewable energy production in Maryland. Maryland's Renewable Energy Portfolio Standard Program attempts to reduce electricity consumption in Maryland by 20 percent by 2022. To promote community outreach and involvement in obtaining this goal, MEA has awarded thousands of grants to homeowners and businesses. Grants awarded by MEA through the Commercial Clean Energy Grant Program and Residential Clean Energy Grants program assist homeowners and businesses in covering the costs of new equipment or implementing energy reduction technologies.

Investment Phase

The total economic impacts of the investment phase of the *Incentives and Grant Subprograms to Support Renewable Energy* strategy can be found in Figure 26. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Figure 26: Incentives and Grant Subprograms to Support Renewable Energy—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$709	\$92
Mining	0.0	\$2,640	\$209
Utilities	0.2	\$178,805	\$25,868
Construction	0.4	\$48,720	\$19,146
Manufacturing	0.8	\$316,478	\$69,725
Wholesale trade	0.3	\$72,269	\$27,090
Retail trade	1.8	\$100,695	\$55,011
Transportation and warehousing	0.2	\$26,199	\$8,936
Information	0.1	\$38,959	\$8,551
Finance and insurance	0.3	\$77,595	\$21,809
Real estate and rental and leasing	0.4	\$119,393	\$5,850
Professional, scientific, and technical services	3.3	\$422,528	\$222,307
Management of companies and enterprises	0.1	\$12,718	\$6,874
Administrative and support and waste management and remediation services	0.6	\$46,052	\$21,346
Educational services	0.1	\$9,456	\$5,310
Health care and social assistance	0.7	\$70,725	\$34,044
Arts, entertainment, and recreation	0.1	\$7,004	\$2,514
Accommodation and food services	0.4	\$28,393	\$9,897
Other services (except public administration)	0.4	\$28,763	\$11,868
Public administration	0.4	\$116,269	\$31,625
Average	10.7	\$1,724,369	\$588,073

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 11 jobs, \$1.7 million in output, and \$0.6 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Professional, scientific, and technical services*, primarily due to the expectation that households and businesses will take advantage of the grant programs, and energy reduction technologies are a part of this industry.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Incentives and Grant Subprograms to Support Renewable Energy* strategy can be found in Figure 27. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 27: Incentives and Grant Subprograms to Support Renewable Energy—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.3	\$24,337	\$3,088
Mining	0.3	\$66,846	\$8,982
Utilities	0.7	\$641,729	\$83,034
Construction	5.0	\$633,682	\$240,160
Manufacturing	2.1	\$787,009	\$138,177
Wholesale trade	4.3	\$896,191	\$335,931
Retail trade	20.4	\$1,241,296	\$625,472
Transportation and warehousing	4.3	\$507,165	\$175,693
Information	4.9	\$1,537,744	\$339,494
Finance and insurance	11.0	\$2,534,055	\$721,457
Real estate and rental and leasing	12.6	\$4,141,316	\$199,027
Professional, scientific, and technical services	18.6	\$2,561,329	\$1,189,096
Management of companies and enterprises	44.6	\$9,632,897	\$5,206,750
Administrative and support and waste management and remediation services	12.4	\$979,973	\$418,353
Educational services	4.5	\$340,826	\$190,487
Health care and social assistance	24.4	\$2,615,946	\$1,258,508
Arts, entertainment, and recreation	5.3	\$254,795	\$88,690
Accommodation and food services	13.0	\$844,389	\$294,285
Other services (except public administration)	12.1	\$916,919	\$396,048
Public administration	27.2	\$7,450,569	\$1,927,220
Total	228.0	\$38,609,013	\$13,839,951

Source: RESI



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

As shown in the figure above, the strategy will support a total of 228 jobs, \$38.6 million in output, and \$13.8 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Management of companies and enterprises*, primarily due to the expectation that a wide variety of business will have taken advantage of the commercial grants and would therefore experience cost savings as a result. These cost savings could be used for business growth. Similar effects would be experienced by residential consumers under the residential programs, and household spending on a variety of goods and sectors would increase as a result.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$101,455 on average per \$1 million for the investment phase and an annual total of \$1,509,681 for the operation phase.

3.1.13 Offshore Wind Initiatives to Support Renewable Energy

The search for a reliable, renewable energy source often begins with looking towards a region's natural resources. Maryland is a prime candidate for offshore wind energy generation and could potentially offset up to 500 megawatts of consumed power over the next 5 years using this technology, according to MEA. Another positive outcome from this policy includes the decreased pollution from fossil fuel extraction within local bays and waterways. Key factors of this policy also include the potential for new jobs upon installation and upkeep of offshore windmills over the next five years and a continued decrease in the GHG emissions from energy generation.

Investment Phase

The total economic impacts of the investment phase of the *Offshore Wind Initiatives to Support Renewable Energy* strategy can be found in Figure 28. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 28: Offshore Wind Initiatives to Support Renewable Energy—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$586	\$74
Mining	0.0	\$3,319	\$165
Utilities	0.3	\$314,535	\$45,736
Construction	0.2	\$19,037	\$7,338
Manufacturing	0.6	\$330,639	\$61,936
Wholesale trade	0.2	\$31,700	\$11,883
Retail trade	0.5	\$30,624	\$15,435
Transportation and warehousing	0.2	\$25,967	\$8,406
Information	0.1	\$31,464	\$6,916
Finance and insurance	0.3	\$67,297	\$18,934
Real estate and rental and leasing	0.3	\$101,587	\$4,930
Professional, scientific, and technical services	3.0	\$385,838	\$205,015
Management of companies and enterprises	0.0	\$8,801	\$4,757
Administrative and support and waste management and remediation services	0.7	\$48,252	\$22,606
Educational services	0.1	\$8,114	\$4,561
Health care and social assistance	0.6	\$60,990	\$29,358
Arts, entertainment, and recreation	0.1	\$6,034	\$2,158
Accommodation and food services	0.4	\$25,893	\$9,028
Other services (except public administration)	0.3	\$24,997	\$10,207
Public administration	0.4	\$114,418	\$30,788
Average	8.4	\$1,640,089	\$500,231

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately less than 8 jobs, \$1.6 million in output, and \$0.5 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Professional, scientific, and technical services*, primarily due to the expectation that the expertise of environmental consultants and engineers would be in demand as offshore wind is established and in need of proper development and management.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Offshore Wind Initiatives to Support Renewable Energy* strategy can be found in Figure 29. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 29: Offshore Wind Initiatives to Support Renewable Energy—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$3,913	\$504
Mining	0.0	\$2,584	\$148
Utilities	0.1	\$92,832	\$12,599
Construction	0.3	\$35,524	\$13,023
Manufacturing	0.4	\$119,469	\$24,501
Wholesale trade	0.7	\$138,194	\$51,801
Retail trade	3.4	\$206,006	\$103,771
Transportation and warehousing	0.7	\$76,289	\$26,170
Information	1.5	\$462,953	\$103,528
Finance and insurance	1.9	\$437,328	\$125,552
Real estate and rental and leasing	2.2	\$742,218	\$38,050
Professional, scientific, and technical services	4.2	\$571,671	\$262,895
Management of companies and enterprises	19.9	\$4,304,863	\$2,326,854
Administrative and support and waste management and remediation services	2.0	\$150,239	\$67,167
Educational services	0.7	\$55,064	\$30,843
Health care and social assistance	4.0	\$425,245	\$204,638
Arts, entertainment, and recreation	1.3	\$58,352	\$19,396
Accommodation and food services	2.4	\$152,896	\$53,301
Other services (except public administration)	2.3	\$175,508	\$79,196
Public administration	0.3	\$63,621	\$25,027
Total	48.2	\$8,274,770	\$3,568,963

Source: RESI

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan Final Draft

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As shown in the figure above, the strategy will support a total of 48 jobs, \$8.3 million in output, and \$3.6 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Management of companies and enterprises*, primarily due to the expectation that a wide variety of businesses will benefit positively from the need for management and maintenance of offshore wind once implemented.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$97,953 on average per \$1 million for the investment phase and an annual total of \$424,731 for the operation phase.

3.1.14 Combined Heat and Power

Cogeneration, the combined production of heat and power, results in the generation of both power and thermal energy from a single fuel source. The produced thermal energy can be used in heating or cooling services, increasing overall energy generation efficiency through a single fuel source. Benefits to Maryland residents are numerous, including decreased energy costs to households. Conventional methods for producing thermal energy and power only have an efficiency rate of 45 percent. A combined heat and power system can produce energy with an effective rate of up to 80 percent efficiency levels. This policy will help EMPOWER Maryland reach previously stated goals of decreasing GHG emissions from energy generation and lowering residential energy costs. To promote combined heat and power systems, MEA supports direct subsidies, tax credits, and exemptions for purchasing, selling, or operating these systems.

Investment Phase

The total economic impacts of the investment phase of the *Combined Heat and Power* strategy can be found in Figure 30. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Figure 30: Combined Heat and Power—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$679	\$87
Mining	0.0	\$3,354	\$167
Utilities	0.3	\$315,812	\$45,923
Construction	0.2	\$19,535	\$7,507
Manufacturing	0.1	\$22,337	\$4,143
Wholesale trade	0.1	\$26,276	\$9,849
Retail trade	0.6	\$35,589	\$17,937
Transportation and warehousing	0.2	\$28,280	\$9,522
Information	0.2	\$54,058	\$11,966
Finance and insurance	0.3	\$78,380	\$21,917
Real estate and rental and leasing	0.4	\$125,016	\$6,309
Professional, scientific, and technical services	5.6	\$689,603	\$313,232
Management of companies and enterprises	0.0	\$7,383	\$3,991
Administrative and support and waste management and remediation services	0.6	\$42,650	\$19,759
Educational services	0.1	\$9,440	\$5,308
Health care and social assistance	0.7	\$70,763	\$34,064
Arts, entertainment, and recreation	0.2	\$9,095	\$3,021
Accommodation and food services	0.5	\$30,496	\$10,629
Other services (except public administration)	0.4	\$28,932	\$11,802
Public administration	0.4	\$117,049	\$32,086
Average	10.9	\$1,714,730	\$569,218

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 11 jobs, \$1.7 million in output, and \$0.6 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Professional, scientific, and technical services*, primarily due to the expectation that energy consultants knowledgeable in combined heat and power systems are in this industry and will be in demand as such systems are developed and implemented.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Combined Heat and Power* strategy can be found in Figure 31. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 31: Combined Heat and Power—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.1	\$10,917	\$1,397
Mining	0.3	\$65,458	\$995
Utilities	9.0	\$8,346,026	\$1,217,001
Construction	2.4	\$296,344	\$115,081
Manufacturing	1.0	\$328,139	\$62,446
Wholesale trade	1.9	\$403,909	\$151,403
Retail trade	9.2	\$561,998	\$283,206
Transportation and warehousing	2.8	\$440,621	\$136,679
Information	3.5	\$1,086,562	\$244,062
Finance and insurance	5.2	\$1,206,944	\$344,225
Real estate and rental and leasing	5.6	\$1,923,666	\$96,064
Professional, scientific, and technical services	10.6	\$1,492,866	\$659,514
Management of companies and enterprises	37.9	\$8,187,565	\$4,425,523
Administrative and support and waste management and remediation services	5.5	\$410,750	\$182,802
Educational services	2.0	\$150,247	\$84,272
Health care and social assistance	10.7	\$1,140,109	\$548,709
Arts, entertainment, and recreation	3.1	\$143,990	\$48,975
Accommodation and food services	7.6	\$493,917	\$172,292
Other services (except public administration)	5.9	\$445,362	\$199,713
Public administration	1.0	\$181,398	\$72,699
Total	125.2	\$27,316,786	\$9,047,056

Source: RESI

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

As shown in the figure above, the strategy will support a total of 125 jobs, \$27.3 million in output, and \$9.0 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Management of companies and enterprises*, primarily due to the expectation that the wide variety of businesses which implement combined heat and power systems will benefit from increased efficiency and reduced energy costs and will therefore have additional revenue for growth after implementation.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$108,890 on average per \$1 million for the investment phase and an annual total of \$2,200,662 for the operation phase.

3.1.15 Main Street

Reduction in energy consumption can begin at the local level in most cases, and the use of energy represents about 70 percent of GHG emissions. Specifically, buildings represent approximately 48 percent of the total energy consumed. Through a collaborative effort, the DHCD works with other state government agencies to support a variety of energy reduction initiatives. These programs include energy audits and energy efficiency retrofits for residential and commercial buildings, development and implementation of advanced building codes and inspections, and creation of financial incentive programs for energy efficiency. Funding for many of these initiatives pass through to local government agencies in the form of grants administered by DHCD, and combined state and federal initiatives. Overall goals strive to achieve energy consumption reductions on the local level and set a primary example for future Maryland residents and business leaders.

Investment Phase

The total economic impacts of the investment phase of the *Main Street* strategy can be found in Figure 32. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 32: Main Street—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$996	\$126
Mining	0.0	\$2,591	\$426
Utilities	0.0	\$18,662	\$2,466
Construction	2.9	\$373,102	\$143,992
Manufacturing	0.1	\$35,512	\$6,348
Wholesale trade	0.2	\$37,291	\$13,978
Retail trade	0.8	\$46,527	\$23,530
Transportation and warehousing	0.2	\$23,430	\$8,155
Information	0.2	\$50,982	\$11,034
Finance and insurance	0.4	\$88,593	\$24,638
Real estate and rental and leasing	0.4	\$139,850	\$7,172
Professional, scientific, and technical services	5.0	\$653,765	\$305,739
Management of companies and enterprises	0.0	\$8,521	\$4,606
Administrative and support and waste management and remediation services	0.6	\$45,684	\$21,193
Educational services	0.2	\$11,104	\$6,242
Health care and social assistance	0.8	\$83,398	\$40,145
Arts, entertainment, and recreation	0.2	\$9,086	\$3,141
Accommodation and food services	0.5	\$32,494	\$11,324
Other services (except public administration)	0.4	\$34,346	\$14,391
Public administration	0.5	\$117,780	\$32,203
Average	13.4	\$1,813,714	\$680,851

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 13 jobs, \$1.8 million in output, and \$0.7 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Professional, scientific, and technical services*, primarily due to the expectation that buildings in need of energy audits and energy efficiency retrofits will be audited and retrofitted by energy and environmental consultants within this industry. Another top-gaining sector is *Construction*, which is likely to experience increased demand from this policy due to repair and maintenance associated with retrofitting.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Main Street* strategy can be found in Figure 33. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 33: Main Street—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.4	\$33,538	\$4,297
Mining	0.1	\$21,100	\$1,217
Utilities	0.8	\$747,227	\$101,286
Construction	2.2	\$284,146	\$103,602
Manufacturing	2.9	\$960,656	\$188,881
Wholesale trade	5.5	\$1,137,810	\$426,501
Retail trade	29.0	\$1,764,231	\$888,657
Transportation and warehousing	5.4	\$612,282	\$210,168
Information	10.8	\$3,378,512	\$753,689
Finance and insurance	15.3	\$3,517,473	\$1,006,073
Real estate and rental and leasing	17.4	\$6,012,255	\$296,430
Professional, scientific, and technical services	30.4	\$4,137,174	\$1,898,915
Management of companies and enterprises	138.2	\$29,857,366	\$16,138,431
Administrative and support and waste management and remediation services	15.2	\$1,151,369	\$513,906
Educational services	6.4	\$478,857	\$267,975
Health care and social assistance	34.5	\$3,696,051	\$1,778,395
Arts, entertainment, and recreation	9.8	\$454,715	\$152,874
Accommodation and food services	19.5	\$1,264,800	\$440,976
Other services (except public administration)	18.7	\$1,420,652	\$636,282
Public administration	2.8	\$528,425	\$204,601
Total	365.3	\$61,458,638	\$26,013,155

Source: RESI

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan Final Draft

RESI of Towson University

As shown in the figure above, the strategy will support a total of 365 jobs, \$61.5 million in output, and \$26.0 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Management of companies and enterprises*, primarily due to the expectation that operation of this strategy will likely require management of funds distributed through the Energy Efficiency and Conservation Block Program. Another top-gaining industry is *Health care and social assistance*, which is driven by indirect and induced job creation in healthcare associated with the relatively high job creation from *Management of companies and enterprises* and other industries. The new employees and households directly associated with this policy as well as the indirect beneficiaries of the grant program will increase demand for healthcare.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$80,640 on average per \$1 million for the investment phase and an annual total of \$3,272,456 for the operation phase.

3.1.16 Weatherization and Energy Efficiency for Low-Income Houses

Energy reduction on the micro level includes the purchase of energy efficiency upgrades and modifications to existing features such as weatherization of buildings. The benefits from these initiatives usually result in lower utility bills, typically offsetting previously incurred costs during investment. For some households, implementation of these features can be costly when considered as a percentage of average weekly wages. In an effort to make energy efficiency upgrades and modifications more accessible, the DHCD works with other government agencies to incorporate energy efficiency into affordable rental housing developments and eligible low-income households. DHCD also provides education and training on the benefits of energy efficiency in affordable rental housing and assists eligible low-income households with energy audits and the installation of energy conservation materials in their dwelling units. Other collaborative projects include working with other state and federal agencies to support energy audits and retrofits within residential and commercial buildings.

Investment Phase

The total economic impacts of the investment phase of the *Weatherization and Energy Efficiency for Low-Income Houses* strategy can be found in Figure 34. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Figure 34: Weatherization and Energy Efficiency for Low-Income Houses—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$911	\$118
Mining	0.0	\$3,399	\$369
Utilities	0.2	\$196,499	\$28,476
Construction	1.5	\$197,026	\$64,154
Manufacturing	0.1	\$30,879	\$5,578
Wholesale trade	0.2	\$31,937	\$11,971
Retail trade	0.8	\$46,544	\$23,605
Transportation and warehousing	0.2	\$26,401	\$8,899
Information	0.2	\$48,242	\$10,578
Finance and insurance	0.3	\$82,710	\$23,057
Real estate and rental and leasing	0.4	\$127,842	\$6,331
Professional, scientific, and technical services	4.9	\$638,228	\$297,580
Management of companies and enterprises	0.0	\$7,712	\$4,168
Administrative and support and waste management and remediation services	0.6	\$43,801	\$20,299
Educational services	0.1	\$10,121	\$5,690
Health care and social assistance	0.7	\$75,569	\$36,378
Arts, entertainment, and recreation	0.2	\$8,532	\$2,936
Accommodation and food services	0.5	\$31,738	\$11,063
Other services (except public administration)	0.4	\$30,136	\$12,620
Public administration	0.4	\$117,004	\$31,940
Average	11.7	\$1,755,231	\$605,811

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 12 jobs, \$1.8 million in output, and \$0.6 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Professional, scientific, and technical services*, primarily due to the expectation that the policy will drive increased demand for energy auditing services, which are contained within this industry. Another top-gaining industry is *Construction*, which includes repair and maintenance associated with weatherization.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Operation Phase

The total economic impacts of the operation phase of the *Weatherization and Energy Efficiency for Low-Income Houses* strategy can be found in Figure 35. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 35: Weatherization and Energy Efficiency for Low-Income Houses—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$268	\$34
Mining	0.0	\$134	\$8
Utilities	0.0	\$4,344	\$584
Construction	0.0	\$1,587	\$558
Manufacturing	0.0	\$5,549	\$798
Wholesale trade	0.0	\$7,529	\$2,822
Retail trade	0.2	\$14,068	\$7,085
Transportation and warehousing	0.0	\$3,495	\$1,204
Information	0.0	\$7,131	\$1,518
Finance and insurance	0.1	\$20,351	\$5,686
Real estate and rental and leasing	0.1	\$36,315	\$1,369
Professional, scientific, and technical services	0.1	\$7,355	\$3,230
Management of companies and enterprises	0.0	\$1,214	\$656
Administrative and support and waste management and remediation services	0.1	\$4,610	\$2,026
Educational services	0.1	\$4,065	\$2,266
Health care and social assistance	0.3	\$31,307	\$15,056
Arts, entertainment, and recreation	0.0	\$2,105	\$772
Accommodation and food services	0.1	\$8,579	\$2,993
Other services (except public administration)	0.1	\$8,544	\$3,656
Public administration	0.0	\$3,659	\$1,303
Total	1.3	\$172,209	\$53,626

Source: RESI



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

As shown in the figure above, the strategy will support a total of one job, \$172,200 in output, and \$53,600 in wages annually once in operation. The industries experiencing the greatest positive economic impacts in terms of employment as a result of this strategy are *Health care and social assistance* and *Retail trade* (among others) primarily due to the expectation that households receiving weatherization services as a result of this policy will save on energy costs and experience an increase in disposable income, which will be spent on a wide variety of goods and services in such industries.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$97,127 on average per \$1 million for the investment phase and an annual total of \$13,763 for the operation phase.

1.2 Transportation

3.2.1 Maryland Clean Cars Subprogram

For new vehicles to be sold in the United States, manufacturers must first submit to a certification process. Vehicles can either be certified under the Tier 2 federal program or the California Clean Cars Program. In an effort to regulate GHG emissions from motor vehicles, the California Clean Cars program was the first program in the nation to establish a fleet-wide average GHG emissions standard. Through the Maryland Clean Cars Program Act of 2007, MDE was authorized to adopt regulations similar to those of the California Clean Cars Program. Program implementation began in 2011, and to date 13 other states have joined in the clean cars initiative to lower GHG emissions from motor vehicles. A federal mandate as of 2009 established new GHG and fuel economy standards for passenger vehicles and light-duty trucks. Vehicles produced in model year 2012 through 2016 should attain the standards previously outlined by the California Clean Cars Program.

Investment Phase

The total economic impacts of the investment phase of the *Maryland Clean Cars Subprogram* strategy can be found in Figure 36. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 36: Maryland Clean Cars Subprogram—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$595	\$79
Mining	0.0	\$1,199	\$144
Utilities	0.0	\$12,352	\$1,644
Construction	0.1	\$10,753	\$4,059
Manufacturing	0.7	-\$611,992	\$23,103
Wholesale trade	0.5	\$108,784	\$40,777
Retail trade	2.1	\$156,217	\$97,515
Transportation and warehousing	1.1	\$153,683	\$43,493
Information	0.1	\$27,099	\$5,900
Finance and insurance	0.2	\$59,020	\$16,583
Real estate and rental and leasing	0.3	\$88,933	\$4,200
Professional, scientific, and technical services	1.4	\$180,997	\$95,362
Management of companies and enterprises	0.0	\$238	\$129
Administrative and support and waste management and remediation services	0.5	\$33,058	\$15,404
Educational services	0.1	\$6,952	\$3,900
Health care and social assistance	0.5	\$51,412	\$24,747
Arts, entertainment, and recreation	0.1	\$4,765	\$1,708
Accommodation and food services	0.3	\$18,188	\$6,337
Other services (except public administration)	0.3	\$20,285	\$8,417
Public administration	0.5	\$118,283	\$33,269
Average	8.6	\$440,822	\$426,770

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 9 full-time equivalent jobs, approximately \$440,800 in output, and \$426,800 in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Retail Trade*, primarily due to the expectation that the demand for customer service representatives in the car industry will increase in the future months associated with households seeking to take advantage of new car technology and savings associated with gas savings. During the investment phase, employers will have time to train new employees on the types of cars that will be introduced during the operation phase

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

and potential sales tactics. The stricter regulations on miles per gallon will drive increased demand for cleaner, more efficient vehicles as gas prices rise during the operation phase.

Operation Phase

The total economic impacts of the operation phase of the *Maryland Clean Cars Subprogram* strategy can be found in Figure 37. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 37: Maryland Clean Cars Subprogram—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.2	\$17,810	\$2,215
Mining	0.0	\$8,887	\$515
Utilities	0.3	\$292,571	\$39,363
Construction	0.8	\$102,334	\$36,078
Manufacturing	0.8	\$371,077	\$53,102
Wholesale trade	2.4	\$507,209	\$190,124
Retail trade	14.8	\$903,608	\$455,084
Transportation and warehousing	2.0	\$225,986	\$78,085
Information	1.5	\$472,710	\$100,453
Finance and insurance	5.6	\$1,313,260	\$368,850
Real estate and rental and leasing	6.1	\$2,356,451	\$91,901
Professional, scientific, and technical services	3.5	\$482,297	\$211,700
Management of companies and enterprises	0.4	\$80,059	\$43,273
Administrative and support and waste management and remediation services	4.1	\$300,743	\$132,219
Educational services	3.3	\$254,268	\$140,861
Health care and social assistance	19.0	\$2,056,761	\$988,503
Arts, entertainment, and recreation	2.6	\$134,841	\$49,551
Accommodation and food services	8.7	\$561,277	\$195,813
Other services (except public administration)	7.5	\$547,692	\$233,772
Public administration	1.2	\$241,096	\$85,522
Total	84.9	\$11,230,937	\$3,496,984

Source: RESI

As shown in the figure above, the strategy will support a total of 85 jobs, \$11.2 million in output, and \$3.5 million in wages annually once in operation. The industries experiencing the greatest positive economic impacts in terms of employment as a result of this strategy are *Health care and social assistance* and *Retail trade*. As new car sales associates are hired to meet increased demand for new and efficient vehicles, these new employees and households will likely increase demand for healthcare and other services.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$70,559 on average per \$1 million for the investment phase and an annual total of \$896,255 for the operation phase.

3.2.2 Federal Medium- and Heavy-Duty GHG Standards

Currently, medium- and heavy-duty vehicles are the second largest contributor to oil consumption and GHG emissions. In an effort to minimize GHG emissions and improve fuel efficiency, the National Fuel Efficiency & Emission Standards for Medium- and Heavy-Duty Trucks program aims to enforce a nationwide mandate upon medium- and heavy-duty vehicles. A joint effort between the EPA and the National Highway Traffic Safety Administration attempts to reduce the GHG emissions associated with medium- and heavy-duty vehicles through collaborative policies and programs. This program will be federally enforced jointly by the EPA and the National Highway Transportation Safety Administration. Implementation and enforcement of this program will reflect that of the light-duty National GHG Emissions Standards.

Investment Phase

The total economic impacts of the investment phase of the *Federal Medium- and Heavy-Duty GHG Standards* strategy can be found in Figure 38. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 38: Federal Medium- and Heavy-Duty GHG Standards—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$511	\$70
Mining	0.0	\$1,004	\$138
Utilities	0.0	\$8,411	\$1,293
Construction	0.1	\$9,900	\$3,721
Manufacturing	0.0	-\$748,002	-\$16,651
Wholesale trade	0.6	\$117,991	\$44,228
Retail trade	2.3	\$177,924	\$111,585
Transportation and warehousing	1.3	\$177,589	\$50,057
Information	0.1	\$25,198	\$5,418
Finance and insurance	0.2	\$59,369	\$16,547
Real estate and rental and leasing	0.3	\$89,341	\$4,239
Professional, scientific, and technical services	1.6	\$199,791	\$106,167
Management of companies and enterprises	0.0	\$922	\$498
Administrative and support and waste management and remediation services	0.5	\$33,172	\$15,663
Educational services	0.1	\$6,983	\$3,917
Health care and social assistance	0.5	\$51,369	\$24,727
Arts, entertainment, and recreation	0.1	\$4,807	\$1,720
Accommodation and food services	0.3	\$18,295	\$6,374
Other services (except public administration)	0.3	\$19,913	\$8,220
Public administration	0.5	\$116,091	\$33,089
Average	8.6	\$370,578	\$421,020

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 9 jobs, \$370,600 in output, and \$421,000 in wages on average. The industries experiencing the greatest positive economic impacts in terms of employment as a result of this strategy are *Retail trade* and *Professional, scientific, and technical services*, primarily due to the expectation that the implementation of this policy will cause higher demand for development of fuel-saving technologies for medium- and heavy-duty vehicles as well as increased sales of the cleaner, more fuel-efficient medium- and heavy-duty vehicles on the market as a result of such technologies.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Federal Medium- and Heavy-Duty GHG Standards* strategy can be found in Figure 39. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 39: Federal Medium- and Heavy-Duty GHG Standards—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$1,411	\$175
Mining	0.0	\$704	\$41
Utilities	0.0	\$23,173	\$3,118
Construction	0.1	\$8,105	\$2,858
Manufacturing	0.1	\$29,391	\$4,206
Wholesale trade	0.2	\$40,173	\$15,059
Retail trade	1.2	\$71,570	\$36,045
Transportation and warehousing	0.2	\$17,899	\$6,185
Information	0.1	\$37,441	\$7,956
Finance and insurance	0.4	\$104,016	\$29,215
Real estate and rental and leasing	0.5	\$186,642	\$7,279
Professional, scientific, and technical services	0.3	\$38,200	\$16,768
Management of companies and enterprises	0.0	\$6,341	\$3,427
Administrative and support and waste management and remediation services	0.3	\$23,820	\$10,472
Educational services	0.3	\$20,139	\$11,157
Health care and social assistance	1.5	\$162,905	\$78,294
Arts, entertainment, and recreation	0.2	\$10,680	\$3,925
Accommodation and food services	0.7	\$44,456	\$15,509
Other services (except public administration)	0.6	\$43,380	\$18,516
Public administration	0.1	\$19,096	\$6,774
Total	6.7	\$889,541	\$276,977

Source: RESI

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan Final Draft

RESI of Towson University

As shown in the figure above, the strategy will support a total of 7 jobs, \$0.9 million in output, and \$0.3 million in wages annually once in operation. The industries experiencing the greatest positive economic impacts in terms of employment as a result of this strategy are *Healthcare and social assistance* and *Retail trade*, primarily due to the expectation that as a result of this policy, more efficient medium- and heavy-duty vehicles are being purchased and new sales associates are receiving healthcare benefits. The increased efficiency and fuel cost savings of these purchased commercial medium- and heavy-duty vehicles may even allow for employers to provide increased healthcare options to drivers.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$77,462 on average per \$1 million for the investment phase and an annual total of \$70,987 for the operation phase.

3.2.3 Clean Fuel Standard

In accordance with the Clean Fuel Standard program, regional fuel suppliers are required to reduce the average carbon intensity of fuels used in the region over time. Opportunities proposed to control costs include a credit trading system, which would allow suppliers to purchase credits from low-carbon fuel producers. These credits could then be averaged with higher carbon fuels which are delivered to consumers. As opposed to restrictions on specific fuel types, this approach allows suppliers the opportunity to choose among different fuels, based on cost effectiveness and environmental impact while meeting the carbon intensity reduction target outlined by the program. The Clean Fuel Standard is designed to ultimately reduce the carbon intensity from fuels used in transportation in the region by 5 percent to 15 percent over the next 10 to 15 years.

Investment Phase

The total economic impacts of the investment phase of the *Clean Fuel Standard* strategy can be found in Figure 40. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 40: Clean Fuel Standard—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$35	-\$3
Mining	-2.4	-\$755,424	-\$95,367
Utilities	0.0	-\$1,327	-\$62
Construction	0.0	-\$3,127	-\$1,465
Manufacturing	0.0	-\$14,626	-\$1,133
Wholesale trade	0.0	-\$2,165	-\$811
Retail trade	-3.1	-\$226,893	-\$85,339
Transportation and warehousing	0.0	-\$605	\$326
Information	0.1	\$19,150	\$4,150
Finance and insurance	0.2	\$45,708	\$11,570
Real estate and rental and leasing	0.2	\$41,035	\$1,379
Professional, scientific, and technical services	7.6	\$941,847	\$519,685
Management of companies and enterprises	-0.1	-\$14,127	-\$7,636
Administrative and support and waste management and remediation services	0.6	\$46,324	\$22,754
Educational services	0.1	\$6,287	\$3,542
Health care and social assistance	0.5	\$50,281	\$24,201
Arts, entertainment, and recreation	0.1	\$5,660	\$1,961
Accommodation and food services	0.3	\$21,086	\$7,353
Other services (except public administration)	0.3	\$25,712	\$9,343
Public administration	0.4	\$109,803	\$28,826
Average	4.8	\$294,636	\$443,277

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 5 full-time jobs, approximately \$294,600 in output, and \$448,300 in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Professional, scientific, and technical services*, primarily due to the expectation that such services will be in increased demand as this policy drives the need for cleaner fuel technologies to meet the standard. *Retail trade* and *Mining* are expected to experience some negative impacts due to the delay of new vehicle purchases based on consumer expectations of newer, cleaner technologies and vehicles being made available

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

within the short-term, as well as the decrease in demand for oil extraction due to cleaner fuel technologies being developed.

Operation Phase

The total economic impacts of the operation phase of the *Clean Energy Fuel Standard* strategy can be found in Figure 41. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 41: Clean Fuel Standard—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.1	\$8,405	\$1,045
Mining	0.0	\$4,194	\$243
Utilities	0.1	\$138,084	\$18,578
Construction	0.4	\$48,298	\$17,028
Manufacturing	0.4	\$175,136	\$25,062
Wholesale trade	1.2	\$239,385	\$89,732
Retail trade	7.0	\$426,472	\$214,784
Transportation and warehousing	1.0	\$106,658	\$36,854
Information	0.7	\$223,103	\$47,410
Finance and insurance	2.6	\$619,814	\$174,085
Real estate and rental and leasing	2.9	\$1,112,164	\$43,374
Professional, scientific, and technical services	1.7	\$227,628	\$99,915
Management of companies and enterprises	0.2	\$37,785	\$20,424
Administrative and support and waste management and remediation services	2.0	\$141,940	\$62,403
Educational services	1.5	\$120,006	\$66,482
Health care and social assistance	9.0	\$970,720	\$466,539
Arts, entertainment, and recreation	1.2	\$63,640	\$23,386
Accommodation and food services	4.1	\$264,903	\$92,417
Other services (except public administration)	3.5	\$258,492	\$110,332
Public administration	0.6	\$113,789	\$40,364
Total	40.1	\$5,300,615	\$1,650,456

Source: RESI

As shown in the figure above, the strategy will support a total of 40 jobs, \$5.3 million in output, and \$1.7 million in wages annually once in operation. The industries experiencing the greatest positive economic impacts in terms of employment as a result of this strategy are *Health care and social assistance* and *Retail trade*, primarily due to the expectation that after the initial implementation, cleaner fuel vehicles will be the market norm and consumers who withheld their purchases during the investment phase will purchase these vehicles to replace less efficient vehicles. The increased vehicle sales and employment will drive increased healthcare benefits, among other services.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately -\$14,203 on average per \$1 million for the investment phase and an annual total of \$423,002 for the operation phase.

3.2.4 Transportation and Climate Initiative

Recognizing that the transportation sector currently accounts for approximately 30 percent of GHG emissions in the Mid-Atlantic and Northeastern U.S., a regional effort between Maryland and 10 other Northeast and Mid-Atlantic states (including the District of Columbia) in the form of a collaborative committee sets GHG reduction standards within this sector. These initiatives include minimizing the sector's reliance on high-carbon fuels, promote sustainable growth to address the challenges of VMTs, and help build the clean energy economy across the region. The collaborative committee is also expected to advance current individual states efforts including reduction of traffic congestion; job growth and the flow of goods and services; the establishment of state and local land use strategies which increase commercial and residential housing density and encourage transit-friendly design; improved performance of existing highway, transit and other transportation modes while enhancing neighborhoods and urban centers; and the promotion of mixed-use development which supports viable alternatives to driving.

Investment Phase

The total economic impacts of the investment phase of the *Transportation and Climate Initiative* strategy can be found in Figure 42. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 42: Transportation and Climate Initiative—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$790	\$100
Mining	0.0	\$1,805	\$175
Utilities	0.0	\$17,294	\$2,275
Construction	0.1	\$18,275	\$7,001
Manufacturing	0.1	\$26,657	\$4,143
Wholesale trade	0.2	\$32,451	\$12,164
Retail trade	0.6	\$36,753	\$18,544
Transportation and warehousing	7.0	\$854,282	\$292,717
Information	0.1	\$35,997	\$7,693
Finance and insurance	0.4	\$97,845	\$27,427
Real estate and rental and leasing	0.4	\$128,828	\$8,163
Professional, scientific, and technical services	1.4	\$179,038	\$93,508
Management of companies and enterprises	0.0	\$10,153	\$5,488
Administrative and support and waste management and remediation services	0.7	\$50,084	\$22,707
Educational services	0.1	\$9,455	\$5,308
Health care and social assistance	0.7	\$71,047	\$34,198
Arts, entertainment, and recreation	0.2	\$7,207	\$2,475
Accommodation and food services	0.4	\$26,247	\$9,147
Other services (except public administration)	0.4	\$27,728	\$11,712
Public administration	0.5	\$130,717	\$39,874
Average	13.3	\$1,762,653	\$604,819

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 13 jobs, \$1.8 million in output, and \$0.6 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Transportation and warehousing*, primarily due to the expectation that transit-friendly design and other positive effects of the strategy will encourage expansion of and increased use of public transportation. To a lesser extent, *Professional, scientific, and technical services* will experience gains as transportation efficiency and other similar services are demanded as a result of this strategy.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Transportation and Climate Initiative* strategy can be found in Figure 43. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 43: Transportation and Climate Initiative—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$430	\$54
Mining	0.0	\$214	\$13
Utilities	0.0	\$6,963	\$937
Construction	0.0	\$2,544	\$895
Manufacturing	0.0	\$8,895	\$1,280
Wholesale trade	0.1	\$12,070	\$4,524
Retail trade	0.4	\$22,552	\$11,358
Transportation and warehousing	0.0	\$5,602	\$1,931
Information	0.0	\$11,430	\$2,434
Finance and insurance	0.1	\$32,623	\$9,114
Real estate and rental and leasing	0.1	\$58,213	\$2,195
Professional, scientific, and technical services	0.1	\$11,789	\$5,177
Management of companies and enterprises	0.0	\$1,946	\$1,052
Administrative and support and waste management and remediation services	0.1	\$7,390	\$3,248
Educational services	0.1	\$6,516	\$3,633
Health care and social assistance	0.5	\$50,185	\$24,134
Arts, entertainment, and recreation	0.1	\$3,374	\$1,237
Accommodation and food services	0.2	\$13,752	\$4,798
Other services (except public administration)	0.2	\$13,696	\$5,861
Public administration	0.0	\$5,865	\$2,088
Total	2.1	\$276,049	\$85,962

Source: RESI

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan Final Draft

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As shown in the figure above, the strategy will support a total of 2 jobs, \$0.3 million in output, and \$0.1 million in wages annually once in operation. The industries experiencing the greatest positive economic impacts in terms of employment as a result of this strategy are those with goods and services demanded by new employees and households directly related to the strategic efforts of TCI to reduce GHGs in the transportation sector.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$90,495 on average per \$1 million for the investment phase and an annual total of \$22,063 for the operation phase.

3.2.5 Public Transportation Initiatives

Increasing public transit in Maryland with the goal of reducing GHG emissions related to individual transportation is a key initiative within MDOT. Increased access and travel options within newly created or existing public transportation will become a key driver of these reductions. Programs associated with this strategy attempt to identify initiatives focused on land use planning and policy, pricing disincentives towards personal automobile use, and bike and pedestrian access improvements. Programs currently and potentially associated with this policy include the purchase of hybrid buses, free downtown route services seven days a week in Baltimore, funding of local transit systems within rural Maryland, and smart card fare technology which will increase ease for commuter fare collection. Other programs currently in place include carpooling initiatives through “Commuter Connections” and a “Guaranteed Ride Home” program, both of which are intended as a collaborative effort between states and employers for employees who utilize public transportation. A tax credit for employers who promote public transit programs is also offered by the State of Maryland. To date, the tax credit allows employers to claim an approximate \$52 credit per employee registered with public transit programs through their employer.

Investment Phase

The total economic impacts of the investment phase of the *Public Transportation Initiatives* strategy can be found in Figure 44. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Figure 44: Public Transportation Initiatives—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$863	\$106
Mining	0.0	\$2,313	\$296
Utilities	0.0	\$27,433	\$3,565
Construction	0.7	\$93,850	\$32,753
Manufacturing	0.2	\$106,156	\$11,263
Wholesale trade	0.3	\$61,242	\$22,956
Retail trade	0.7	\$41,292	\$20,883
Transportation and warehousing	3.7	\$186,309	\$84,694
Information	0.2	\$52,996	\$11,796
Finance and insurance	0.4	\$84,721	\$23,757
Real estate and rental and leasing	0.5	\$144,033	\$7,783
Professional, scientific, and technical services	3.3	\$417,137	\$171,539
Management of companies and enterprises	0.0	\$9,768	\$5,280
Administrative and support and waste management and remediation services	0.6	\$42,625	\$18,819
Educational services	1.8	\$183,510	\$100,582
Health care and social assistance	0.7	\$74,151	\$35,692
Arts, entertainment, and recreation	0.2	\$8,518	\$2,860
Accommodation and food services	0.4	\$27,559	\$9,594
Other services (except public administration)	0.4	\$29,626	\$12,530
Public administration	0.7	\$195,041	\$52,194
Average	14.7	\$1,789,143	\$628,943

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 15 jobs, \$1.8 million in output, and \$0.6 million in wages on average. The industries experiencing the greatest positive economic impacts in terms of employment as a result of this strategy are *Transportation and warehousing* and *Professional, scientific, and technical services*, primarily due to the expectation that development of new public transit technologies will be in demand as will the new transit vehicles available as a result of these new technologies. The expectation of increased ridership will likely drive much of this demand for transit-related goods and services.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Operation Phase

The total economic impacts of the operation phase of the *Public Transportation Initiatives* strategy can be found in Figure 45. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 45: Public Transportation Initiatives—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	40.6	\$93,090	\$11,650
Mining	3.9	\$86,583	\$8,904
Utilities	2.3	\$1,647,365	\$218,874
Construction	5.7	\$898,002	\$328,135
Manufacturing	10.8	\$2,082,702	\$306,958
Wholesale trade	12.1	\$2,736,396	\$1,025,721
Retail trade	76.4	\$4,827,672	\$2,431,562
Transportation and warehousing	10.3	\$1,311,831	\$453,152
Information	7.5	\$2,595,634	\$554,000
Finance and insurance	28.8	\$7,332,016	\$2,055,192
Real estate and rental and leasing	30.4	\$12,866,765	\$504,708
Professional, scientific, and technical services	18.2	\$3,263,076	\$1,463,189
Management of companies and enterprises	4.6	\$1,034,422	\$559,123
Administrative and support and waste management and remediation services	21.3	\$1,891,226	\$820,202
Educational services	17.4	\$1,382,330	\$770,055
Health care and social assistance	96.4	\$10,724,086	\$5,156,961
Arts, entertainment, and recreation	13.7	\$731,912	\$267,995
Accommodation and food services	44.1	\$2,976,952	\$1,038,446
Other services (except public administration)	39.1	\$2,976,731	\$1,269,761
Public administration	5.9	\$6,615,689	\$1,804,989
Total	489.5	\$68,074,479	\$21,049,577

Source: RESI

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan Final Draft

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As shown in the figure above, the strategy will support a total of 456 jobs, \$63.6 million in output, and \$19.5 million in wages annually once in operation. The industries experiencing the greatest positive economic impacts in terms of employment as a result of this strategy are *Health care and social assistance* and *Retail trade*, primarily due to the expectation that the indirect and induced effects from new employment and household spending driven by the development and expansion of public transportation will drive increased demand for necessary goods and services in these and other industries.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$77,553 on average per \$1 million for the investment phase and an annual total of \$7,206,693 for the operation phase.

3.2.6 Initiatives to Double Transit Ridership by 2020

To enhance GHG emissions reductions associated with the transportation sector in Maryland, MDOT created this initiative. This strategy is designed to ensure that Maryland meets the goal to double transit ridership by 2020, as designated by the O'Malley-Brown administration. Programs associated with this strategy include funding for new MARC stations, expansions of current transit routes, and investment in existing MARC infrastructure. Successful implementation of accessible public transit within the Maryland region through MARC has already resulted in ridership of nearly 30,000 commuters a day for travel between Washington's Union Station and most regions of Maryland. Continued funding and encouragement of public transit initiatives through this strategy should result in an annual reduction of GHG emissions from congestion associated with daily public commuting in the Maryland region and provide Maryland households with an annual savings from reduction of carbon-based fuel consumption.

Investment Phase

The total economic impacts of the investment phase of the *Initiatives to Double Transit Ridership by 2020* strategy can be found in Figure 46. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 46: Initiatives to Double Transit Ridership by 2020—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$966	\$123
Mining	0.0	\$2,703	\$452
Utilities	0.0	\$19,206	\$2,531
Construction	2.7	\$373,531	\$132,701
Manufacturing	0.3	\$102,635	\$19,636
Wholesale trade	0.5	\$102,701	\$38,497
Retail trade	0.7	\$45,507	\$23,008
Transportation and warehousing	0.2	\$24,612	\$8,590
Information	0.1	\$42,569	\$9,143
Finance and insurance	0.4	\$90,626	\$25,092
Real estate and rental and leasing	0.4	\$136,714	\$7,143
Professional, scientific, and technical services	3.9	\$548,691	\$271,483
Management of companies and enterprises	0.1	\$11,569	\$6,253
Administrative and support and waste management and remediation services	0.7	\$48,143	\$22,366
Educational services	0.1	\$11,027	\$6,196
Health care and social assistance	0.8	\$82,277	\$39,606
Arts, entertainment, and recreation	0.2	\$7,821	\$2,845
Accommodation and food services	0.5	\$33,302	\$11,608
Other services (except public administration)	0.4	\$34,719	\$14,794
Public administration	0.4	\$117,630	\$32,117
Average	12.5	\$1,836,950	\$674,185

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 13 jobs, \$1.8 million in output, and \$0.7 million in wages on average. The industries experiencing the greatest positive economic impacts in terms of employment as a result of this strategy are *Professional, scientific, and technical services* and *Construction*, primarily due to the expectation that increases in ridership will likely require the development and installation of new high-tech public transit technologies.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Initiatives to Double Transit Ridership by 2020* strategy can be found in Figure 47. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 47: Initiatives to Double Transit Ridership by 2020—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.4	\$30,080	\$3,766
Mining	0.1	\$14,973	\$884
Utilities	0.5	\$487,072	\$65,509
Construction	1.4	\$177,979	\$62,603
Manufacturing	1.4	\$622,240	\$89,506
Wholesale trade	4.1	\$844,271	\$316,470
Retail trade	25.9	\$1,577,495	\$794,470
Transportation and warehousing	3.5	\$391,892	\$135,056
Information	2.5	\$799,564	\$170,242
Finance and insurance	9.7	\$2,281,964	\$637,559
Real estate and rental and leasing	10.2	\$4,072,022	\$153,529
Professional, scientific, and technical services	6.0	\$824,672	\$362,144
Management of companies and enterprises	0.6	\$136,137	\$73,585
Administrative and support and waste management and remediation services	7.1	\$516,908	\$227,187
Educational services	5.9	\$455,814	\$254,142
Health care and social assistance	32.6	\$3,510,438	\$1,688,217
Arts, entertainment, and recreation	4.6	\$236,027	\$86,561
Accommodation and food services	14.9	\$961,928	\$335,606
Other services (except public administration)	13.2	\$958,057	\$409,960
Public administration	2.0	\$410,250	\$146,088
Total	146.5	\$19,309,783	\$6,013,083

Source: RESI



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan Final Draft

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As shown in the figure above, the strategy will support a total of 147 jobs, \$19.3 million in output, and \$6.0 million in wages annually once in operation. The industries experiencing the greatest positive economic impacts in terms of employment as a result of this strategy are those (such as *Health care and social assistance* and *Retail trade*) providing goods and services most likely to be in demand from transit riders experiencing increased access to these goods and services, and by extension, the potential new households associated with smart growth occurring around enhanced public transportation.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$85,219 on average per \$1 million for the investment phase and an annual total of \$1,543,259 for the operation phase.

3.2.7 Intercity Transportation Initiatives

Higher volumes of interstate commuters and commerce continue to increase congestion along the Interstate 95 corridor, resulting in greater emissions of GHGs associated with idling traffic. MDOT, in response to increased emissions from congestion along this major roadway, is implementing strategies which seek to reduce vehicle emissions through viable alternatives. Many of these alternatives are directed toward single-occupant vehicle use as well as improvements to the transportation system. To date, MDOT has sponsored programs which continue to develop and enhance Maryland's commuter and intercity rail systems through increased access and availability. Programs such as parking enhancements at regional MARC stations and updates to rail lines traveling through BWI have been outlined and have begun generating funding to move forward with implementation.

Investment Phase

The total economic impacts of the investment phase of the *Intercity Transportation Initiatives* strategy can be found in Figure 48. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 48: Intercity Transportation Initiatives—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$848	\$107
Mining	0.0	\$2,555	\$413
Utilities	0.0	\$18,878	\$2,493
Construction	1.9	\$255,594	\$95,308
Manufacturing	0.5	\$250,581	\$38,565
Wholesale trade	0.4	\$90,561	\$33,946
Retail trade	0.7	\$43,552	\$22,073
Transportation and warehousing	2.7	\$142,935	\$64,086
Information	0.1	\$37,219	\$8,012
Finance and insurance	0.3	\$81,206	\$22,676
Real estate and rental and leasing	0.4	\$119,328	\$6,152
Professional, scientific, and technical services	2.3	\$311,361	\$155,804
Management of companies and enterprises	0.1	\$13,447	\$7,268
Administrative and support and waste management and remediation services	0.5	\$39,832	\$18,137
Educational services	0.1	\$9,663	\$5,429
Health care and social assistance	0.7	\$72,579	\$34,936
Arts, entertainment, and recreation	0.1	\$6,748	\$2,422
Accommodation and food services	0.4	\$27,005	\$9,412
Other services (except public administration)	1.3	\$105,205	\$43,563
Public administration	0.4	\$116,665	\$31,652
Average	13.2	\$1,745,761	\$602,455

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 13 jobs, \$1.7 million in output, and \$0.6 million in wages on average. The industries experiencing the greatest positive economic impacts in terms of employment as a result of this strategy are *Transportation and warehousing* and *Professional, scientific, and technical services*, primarily due to the expectation that implementation of this policy will require the development and purchasing of new public transportation technologies. The installation of such technologies and vehicles will also likely positively impact *Construction*.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Intercity Transportation Initiatives* strategy can be found in Figure 49. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 49: Intercity Transportation Initiatives—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.8	\$68,994	\$8,700
Mining	1.7	\$378,369	\$54,929
Utilities	2.2	\$2,250,337	\$279,367
Construction	26.8	\$3,392,306	\$1,297,117
Manufacturing	6.7	\$2,706,949	\$445,875
Wholesale trade	14.0	\$2,906,621	\$1,089,528
Retail trade	55.5	\$3,381,266	\$1,704,677
Transportation and warehousing	14.7	\$1,762,872	\$615,229
Information	7.6	\$2,447,629	\$528,184
Finance and insurance	33.2	\$7,664,525	\$2,180,159
Real estate and rental and leasing	39.2	\$11,766,636	\$576,449
Professional, scientific, and technical services	53.5	\$7,473,386	\$3,527,629
Management of companies and enterprises	2.0	\$431,541	\$233,255
Administrative and support and waste management and remediation services	44.1	\$3,624,908	\$1,497,141
Educational services	12.3	\$925,671	\$517,026
Health care and social assistance	65.7	\$7,054,715	\$3,393,818
Arts, entertainment, and recreation	11.4	\$557,792	\$202,564
Accommodation and food services	34.4	\$2,235,634	\$778,584
Other services (except public administration)	30.9	\$2,384,927	\$985,734
Public administration	169.0	\$46,765,064	\$11,931,175
Total	625.8	\$110,180,141	\$31,847,142

Source: RESI

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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As shown in the figure above, the strategy will support a total of 626 jobs, \$110.2 million in output, and \$31.8 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Public administration*, primarily due to the expectation that this strategy will encourage increased ridership. Publicly managed transportation providers such as MARC will likely require increased staff to manage increased demand for these transit systems.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$84,049 on average per \$1 million for the investment phase and an annual total of \$2,012,972 for the operation phase.

3.2.8 Bike and Pedestrian Initiatives

Efforts to reduce GHG emissions from passenger vehicles are the key focus of many MDOT policies, and accessibility to these transit hubs is crucial for success. Through the construction and extension of previously existing pedestrian and bicycle facilities, MDOT hopes to encourage those who may consider public transportation but find that the commute to the local hub is almost as time consuming as the commute to their destination to use these transportation modes. The increased use of bicycles and sidewalks can help achieve GHG reduction goals by cutting down the number of short trips taken in motor vehicles. MDOT has considered and developed current and potential initiatives which seek to assist Maryland's bicyclists and pedestrians through updating facilities, increasing miles of trails and sidewalks, and installing fixtures which will ease a bicyclist's commute using public transportation.

Investment Phase

The total economic impacts of the investment phase of the *Bike and Pedestrian Initiatives* strategy can be found in Figure 50. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 50: Bike and Pedestrian Initiatives—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$756	\$96
Mining	0.0	\$2,712	\$399
Utilities	0.0	\$21,477	\$2,764
Construction	1.0	\$139,147	\$49,877
Manufacturing	0.4	\$279,728	\$56,799
Wholesale trade	0.7	\$155,216	\$58,182
Retail trade	0.6	\$37,186	\$18,766
Transportation and warehousing	0.2	\$26,338	\$9,393
Information	0.1	\$42,576	\$9,322
Finance and insurance	0.4	\$85,099	\$23,952
Real estate and rental and leasing	0.8	\$172,156	\$24,801
Professional, scientific, and technical services	2.8	\$371,530	\$183,535
Management of companies and enterprises	0.1	\$15,061	\$8,141
Administrative and support and waste management and remediation services	0.6	\$46,293	\$20,811
Educational services	0.1	\$9,534	\$5,353
Health care and social assistance	0.7	\$71,383	\$34,361
Arts, entertainment, and recreation	0.1	\$7,186	\$2,564
Accommodation and food services	0.4	\$27,561	\$9,602
Other services (except public administration)	0.4	\$29,512	\$12,290
Public administration	0.9	\$249,856	\$65,489
Average	10.4	\$1,790,308	\$596,495

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 10 jobs, \$1.8 million in output, and \$0.6 million in wages on average. The industries experiencing the greatest positive economic impacts in terms of employment as a result of this strategy are *Professional, scientific, and technical services* and *Construction*, primarily due to the expectation that development and creation of bike and pedestrian paths will likely require engineers, planners, and construction workers within these two industries.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Bike and Pedestrian Initiatives* strategy can be found in Figure 51. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 51: Bike and Pedestrian Initiatives—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.3	\$27,842	\$3,486
Mining	0.1	\$13,859	\$818
Utilities	0.5	\$450,829	\$60,635
Construction	1.3	\$164,736	\$57,945
Manufacturing	1.3	\$575,939	\$82,846
Wholesale trade	3.8	\$781,448	\$292,921
Retail trade	24.0	\$1,460,112	\$735,353
Transportation and warehousing	3.2	\$362,731	\$125,007
Information	2.3	\$740,068	\$157,574
Finance and insurance	9.0	\$2,112,162	\$590,118
Real estate and rental and leasing	9.4	\$3,769,020	\$142,105
Professional, scientific, and technical services	5.5	\$763,308	\$335,197
Management of companies and enterprises	0.6	\$126,007	\$68,109
Administrative and support and waste management and remediation services	6.6	\$478,445	\$210,282
Educational services	5.5	\$421,896	\$235,231
Health care and social assistance	30.2	\$3,249,225	\$1,562,596
Arts, entertainment, and recreation	4.3	\$218,464	\$80,120
Accommodation and food services	13.8	\$890,350	\$310,633
Other services (except public administration)	12.2	\$886,767	\$379,454
Public administration	1.8	\$379,723	\$135,217
Total	135.6	\$17,872,933	\$5,565,646

Source: RESI

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

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As shown in the figure above, the strategy will support a total of 136 jobs, \$17.9 million in output, and \$5.6 million in wages annually once in operation. The industries experiencing the greatest positive economic impacts in terms of employment as a result of this strategy are *Healthcare and social assistance* and *Retail trade*, primarily due to the expectation that one of the reasons households will increase use of bike and pedestrian paths is transportation cost savings, which would in turn increase household discretionary income. This discretionary income can then be spent purchasing goods and services from the aforementioned industries, among others.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$79,206 on average per \$1 million for the investment phase and an annual total of \$1,428,420 for the operation phase.

3.2.9 Pricing Initiatives

Travel demand for work and leisure throughout Maryland contributes to the daily congestion of Maryland roadways. This strategy attempts to minimize the GHG emissions associated with travel, specifically through focused initiatives addressing pricing and travel demand. Programs which are currently in existence or in development include electronic toll collection, development of HOT lanes, congestion pricing, parking fees, and employer commuter incentives. Each program seeks to reduce the emissions from a single-occupant vehicle through public transportation, or if one must use a passenger vehicle for work, through carpooling or shared commuting alternatives.

Investment Phase

The total economic impacts of the investment phase of the *Pricing Initiatives* strategy can be found in Figure 52. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 52: Pricing Initiatives—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$835	\$107
Mining	0.0	\$3,012	\$447
Utilities	0.0	\$22,123	\$2,857
Construction	0.9	\$123,226	\$46,490
Manufacturing	0.3	\$108,050	\$27,595
Wholesale trade	0.2	\$38,322	\$14,365
Retail trade	0.7	\$41,643	\$21,024
Transportation and warehousing	1.3	\$74,473	\$32,195
Information	0.2	\$53,744	\$11,782
Finance and insurance	0.4	\$95,823	\$26,704
Real estate and rental and leasing	0.5	\$144,170	\$7,519
Professional, scientific, and technical services	4.4	\$594,645	\$272,510
Management of companies and enterprises	0.1	\$11,603	\$6,272
Administrative and support and waste management and remediation services	0.7	\$54,460	\$24,833
Educational services	0.1	\$10,523	\$5,912
Health care and social assistance	0.7	\$78,769	\$37,917
Arts, entertainment, and recreation	0.2	\$8,895	\$3,054
Accommodation and food services	0.5	\$31,994	\$11,145
Other services (except public administration)	0.8	\$81,811	\$22,731
Public administration	1.0	\$273,245	\$71,584
Average	13.0	\$1,851,367	\$647,044

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 13 jobs, \$1.9 million in output, and \$0.6 million in wages on average. The industries experiencing the greatest positive economic impacts in terms of employment as a result of this strategy are *Professional, scientific, and technical services* and *Transportation and warehousing*, primarily due to the expectation that the new technologies associated with electronic toll collection, high occupancy toll lanes, and other subprograms of the strategy will need to be developed by engineers and other similar professionals associated with transportation technology development in these industries.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Operation Phase

The total economic impacts of the operation phase of the *Pricing Initiatives* strategy can be found in Figure 53. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 53: Pricing Initiatives—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	6.5	\$565,274	\$71,824
Mining	28.1	\$6,075,987	\$907,665
Utilities	27.6	\$28,239,563	\$3,405,751
Construction	424.3	\$53,607,126	\$20,605,925
Manufacturing	85.0	\$33,248,630	\$5,734,207
Wholesale trade	154.9	\$32,206,468	\$12,072,389
Retail trade	421.0	\$25,653,167	\$12,949,590
Transportation and warehousing	178.5	\$21,917,402	\$7,682,951
Information	78.5	\$25,362,460	\$5,518,696
Finance and insurance	366.1	\$83,820,919	\$24,071,689
Real estate and rental and leasing	458.9	\$117,398,169	\$6,663,260
Professional, scientific, and technical services	782.8	\$109,515,827	\$52,232,396
Management of companies and enterprises	21.1	\$4,567,551	\$2,468,842
Administrative and support and waste management and remediation services	601.7	\$50,800,232	\$20,709,494
Educational services	89.1	\$6,547,703	\$3,666,086
Health care and social assistance	460.1	\$49,175,204	\$23,667,712
Arts, entertainment, and recreation	100.7	\$4,712,148	\$1,694,438
Accommodation and food services	285.0	\$18,570,230	\$6,455,311
Other services (except public administration)	258.4	\$21,161,657	\$8,469,173
Public administration	2,806.6	\$779,549,370	\$198,064,661
Total	7,635.0	\$1,472,695,087	\$417,112,058

Source: RESI

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

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As shown in the figure above, the strategy will support a total of 7,600 jobs, \$1.5 billion in output, and \$417.1 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Public administration*, primarily due to the expectation that the operation and maintenance as well as the administration associated with congestion-reducing technologies will drive job creation in publicly managed transportation. It is important to note that after the initial job creation associated with operation of this strategy, some of the positive job impact will represent job retention rather than new job creation.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$71,404 on average per \$1 million for the investment phase and an annual total of \$8,963,596 for the operation phase.

3.2.10 Transportation Technology Initiatives

Highway construction, traffic flow, and freight transportation are large contributors to the increased emissions from motor vehicles. In an effort to combat these emissions, MDOT has reviewed a set of programs under this strategy which seek to reduce emissions from these areas by 2020. Reduced idling time for vehicles is a main factor in regard to many of the policies, as idling in a car not only costs the consumer in terms of wasted fuel but also expends large amounts of GHGs during a single commute. In a larger capacity, MDOT hopes to reduce the emissions from larger vehicles during periods of idling while not on roadways through creation of welcome stations and truck stop electrification.

Investment Phase

The total economic impacts of the investment phase of the *Transportation Technology Initiatives* strategy can be found in Figure 54. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Figure 54: Transportation Technology Initiatives—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$619	\$81
Mining	-0.5	-\$166,075	-\$21,033
Utilities	0.1	\$91,668	\$13,170
Construction	0.1	\$13,442	\$5,060
Manufacturing	1.1	\$472,282	\$81,444
Wholesale trade	0.3	\$71,564	\$26,825
Retail trade	0.6	\$34,530	\$18,420
Transportation and warehousing	0.2	\$24,015	\$8,507
Information	0.2	\$48,176	\$10,814
Finance and insurance	0.3	\$78,800	\$21,758
Real estate and rental and leasing	0.4	\$116,368	\$5,643
Professional, scientific, and technical services	4.7	\$627,569	\$303,438
Management of companies and enterprises	-0.1	-\$11,846	-\$6,403
Administrative and support and waste management and remediation services	0.8	\$67,301	\$28,124
Educational services	0.1	\$9,497	\$5,335
Health care and social assistance	0.7	\$71,363	\$34,349
Arts, entertainment, and recreation	0.2	\$7,829	\$2,753
Accommodation and food services	0.5	\$30,436	\$10,608
Other services (except public administration)	0.4	\$28,119	\$11,672
Public administration	0.5	\$139,439	\$37,637
Average	10.6	\$1,755,096	\$598,200

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 11 jobs, \$1.8 million in output, and \$0.6 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Professional, scientific, and technical services*, primarily due to the expectation that the transportation technologies associated with this strategy will need to be developed by engineers and other similar professionals. *Manufacturing* will also experience positive gains as high-tech instruments and machinery will first need to be produced in order to implement the strategy.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Operation Phase

The total economic impacts of the operation phase of the *Transportation Technology Initiatives* strategy can be found in Figure 55. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 55: Transportation Technology Initiatives—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	1.9	\$157,501	\$19,962
Mining	1.0	\$235,107	\$19,006
Utilities	3.3	\$3,201,195	\$424,447
Construction	14.6	\$1,865,517	\$689,765
Manufacturing	50.5	\$19,311,405	\$3,412,656
Wholesale trade	33.6	\$6,991,410	\$2,620,686
Retail trade	145.8	\$8,886,194	\$4,486,686
Transportation and warehousing	568.0	\$78,997,323	\$21,824,334
Information	18.5	\$6,119,284	\$1,306,249
Finance and insurance	66.5	\$16,132,262	\$4,457,294
Real estate and rental and leasing	66.7	\$24,050,322	\$1,023,159
Professional, scientific, and technical services	94.9	\$13,344,368	\$6,250,253
Management of companies and enterprises	8.6	\$1,852,189	\$1,001,141
Administrative and support and waste management and remediation services	107.8	\$7,483,381	\$3,616,251
Educational services	30.8	\$2,324,270	\$1,300,167
Health care and social assistance	165.0	\$17,706,228	\$8,518,316
Arts, entertainment, and recreation	26.0	\$1,312,684	\$477,738
Accommodation and food services	82.0	\$5,312,086	\$1,852,343
Other services (except public administration)	77.1	\$5,746,467	\$2,442,727
Public administration	69.4	\$15,562,865	\$5,179,958
Total	1,632.2	\$236,592,059	\$70,923,137

Source: RESI

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan Final Draft

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As shown in the figure above, the strategy will support a total of 1,632 jobs, \$236.6 million in output, and \$70.9 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Transportation and warehousing*, primarily due to the expectation that, once implemented, the strategy will encourage increased and efficient use of various modes of transportation. The potential for increased discretionary household spending associated with transportation and fuel cost savings from teleworking and other elements of the strategy will drive increased demand and sales in industries such as *Retail trade*.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$83,107 on average per \$1 million for the investment phase and an annual total of \$11,948,405 for the operation phase.

3.2.11 Electric Vehicle Initiatives

Electric vehicle use by consumers can help reduce mobile emissions throughout the state. In an effort to support drivers of electric vehicles, programs which encourage infrastructure improvements will be supported by MDOT under this strategy. Electric vehicles reduce GHG emissions through the use of battery power for propulsion rather than an internal combustion engine. Electric vehicle use may also benefit local jurisdictions which seek to offset operations-related electricity consumption. Through vehicle-to-grid technology, commuters can plug into a battery charging station offered in local parking areas. While in charging mode, the local energy grid can offset area energy needs using the reserved power stored in the parked vehicle. The cycle effect helps to reduce GHG emissions from passenger vehicles and overall energy consumption within the region.

Investment Phase

The total economic impacts of the investment phase of the *Electric Vehicle Initiatives* strategy can be found in Figure 56. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 56: Electric Vehicle Initiatives—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$712	\$92
Mining	0.0	\$2,422	\$269
Utilities	0.1	\$107,713	\$15,476
Construction	1.1	\$149,629	\$53,423
Manufacturing	0.7	\$318,857	\$40,147
Wholesale trade	0.5	\$100,703	\$37,748
Retail trade	0.9	\$56,723	\$26,998
Transportation and warehousing	0.2	\$26,272	\$9,040
Information	0.1	\$38,741	\$8,486
Finance and insurance	0.3	\$73,182	\$20,479
Real estate and rental and leasing	0.4	\$113,056	\$5,794
Professional, scientific, and technical services	2.7	\$367,636	\$179,746
Management of companies and enterprises	0.1	\$14,101	\$7,622
Administrative and support and waste management and remediation services	0.7	\$53,785	\$22,308
Educational services	0.1	\$8,776	\$4,930
Health care and social assistance	0.6	\$65,461	\$31,510
Arts, entertainment, and recreation	0.1	\$6,649	\$2,369
Accommodation and food services	0.4	\$26,434	\$9,213
Other services (except public administration)	0.9	\$72,006	\$29,801
Public administration	0.4	\$115,748	\$31,413
Average	10.4	\$1,718,606	\$536,863

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 10 jobs, \$1.7 million in output, and \$0.5 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Professional, scientific, and technical services*, primarily due to the expectation that the development and enhancement of electric vehicles and related technologies such as charging stations will be driven by transportation technology engineers and other similar experts within the industry.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Electric Vehicle Initiatives* strategy can be found in Figure 57. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 57: Electric Vehicle Initiatives—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.1	\$5,271	\$664
Mining	0.1	\$30,826	\$4,450
Utilities	0.2	\$216,938	\$27,746
Construction	2.2	\$274,188	\$104,926
Manufacturing	0.5	\$213,145	\$35,237
Wholesale trade	1.1	\$227,229	\$85,175
Retail trade	4.2	\$255,616	\$128,880
Transportation and warehousing	1.2	\$139,694	\$48,704
Information	0.6	\$190,424	\$41,122
Finance and insurance	2.6	\$595,736	\$169,687
Real estate and rental and leasing	3.1	\$907,927	\$45,181
Professional, scientific, and technical services	4.3	\$598,659	\$282,743
Management of companies and enterprises	0.2	\$33,541	\$18,130
Administrative and support and waste management and remediation services	3.5	\$288,564	\$119,036
Educational services	0.9	\$69,339	\$38,690
Health care and social assistance	5.0	\$532,755	\$256,269
Arts, entertainment, and recreation	0.9	\$42,475	\$15,420
Accommodation and food services	2.6	\$170,964	\$59,533
Other services (except public administration)	2.3	\$182,120	\$75,085
Public administration	13.7	\$3,790,217	\$966,546
Total	49.2	\$8,765,629	\$2,523,226

Source: RESI

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan Final Draft

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As shown in the figure above, the strategy will support a total of 49 jobs, \$8.8 million in output, and \$2.5 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Public administration*, primarily due to the expectation that public administration and maintenance of the recharging stations and vehicle-to-grid technologies associated with the strategy will occur in the operation phase. Increased household spending on goods and services in other industries is likely to be made possible by fuel cost savings associated with electric vehicles (once households recoup the initial cost of purchasing such vehicles).

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$78,690 on average per \$1 million for the investment phase and an annual total of \$160,804 for the operation phase.

3.2.12 Low-Emitting Vehicles Initiatives

Through the encouragement of low emitting vehicles, MDOT and other state agencies hope to reduce air emissions, including the emissions of GHGs attributed to internal combustion engines. For example, the use of hybrid vehicles for car-sharing can reduce the number of personal cars on the road. The addition of rental facilities at commuter rail stations will further encourage such behaviors. Cars rented from such facilities are often used for a few hours to a day at the most and are returned either to the station of arrival or a partner location. Encouragement of programs such as car-sharing entices those who may wish to use public transportation but have distances to travel which may not be practical through these means. Public transit officials are also considering the replacement of heavy diesel vehicles with hybrid alternatives.

Investment Phase

The total economic impacts of the investment phase of the *Low-Emitting Vehicles Initiatives* strategy can be found in Figure 58. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 58: Low-Emitting Vehicles Initiatives—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$520	\$67
Mining	0.0	\$1,275	\$155
Utilities	0.0	\$17,868	\$2,310
Construction	0.1	\$11,802	\$4,485
Manufacturing	1.4	\$688,857	\$90,774
Wholesale trade	1.0	\$216,729	\$81,239
Retail trade	0.6	\$35,047	\$17,844
Transportation and warehousing	0.2	\$27,235	\$9,635
Information	0.1	\$30,901	\$6,820
Finance and insurance	0.2	\$56,286	\$15,876
Real estate and rental and leasing	0.3	\$87,870	\$4,452
Professional, scientific, and technical services	0.9	\$123,873	\$58,813
Management of companies and enterprises	0.1	\$22,631	\$12,233
Administrative and support and waste management and remediation services	0.4	\$29,166	\$12,978
Educational services	0.1	\$6,582	\$3,692
Health care and social assistance	0.5	\$49,090	\$23,629
Arts, entertainment, and recreation	0.1	\$4,755	\$1,720
Accommodation and food services	0.3	\$18,254	\$6,360
Other services (except public administration)	1.0	\$83,728	\$34,586
Public administration	0.4	\$114,150	\$30,907
Total	7.8	\$1,626,619	\$418,574

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 8 jobs, \$1.6 million in output, and \$0.4 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Manufacturing*, primarily due to the expectation that low-emitting vehicles with diesel oxidation catalysts, closed crankcase ventilation filtration systems, or similar technologies will be produced for purchase. *Wholesale trade* will also likely be positively affected as these vehicles being manufactured will then be sold in order to implement this strategy.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Low-Emitting Vehicles Initiatives* strategy can be found in Figure 59. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 59: Low-Emitting Vehicles Initiatives—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$12	\$2
Mining	0.0	\$137	\$20
Utilities	0.0	\$630	\$76
Construction	0.0	\$1,204	\$463
Manufacturing	0.0	\$741	\$128
Wholesale trade	0.0	\$714	\$268
Retail trade	0.0	\$558	\$282
Transportation and warehousing	0.0	\$488	\$171
Information	0.0	\$561	\$122
Finance and insurance	0.0	\$1,858	\$534
Real estate and rental and leasing	0.0	\$2,592	\$148
Professional, scientific, and technical services	0.0	\$2,455	\$1,171
Management of companies and enterprises	0.0	\$101	\$55
Administrative and support and waste management and remediation services	0.0	\$1,137	\$463
Educational services	0.0	\$142	\$79
Health care and social assistance	0.0	\$1,063	\$512
Arts, entertainment, and recreation	0.0	\$103	\$37
Accommodation and food services	0.0	\$406	\$141
Other services (except public administration)	0.0	\$464	\$186
Public administration	0.1	\$17,540	\$4,456
Total	0.2	\$32,907	\$9,313

Source: RESI

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan Final Draft

RESI of Towson University

As shown in the figure above, the strategy will support less than one full-time equivalent job, \$33,000 in output, and \$9,300 in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Public administration*, primarily due to the expectation that there will be some administration required to oversee the ongoing purchasing of low-emitting fleet vehicles. While emissions reductions associated with replacing diesel fleet vehicles with hybrid alternatives are significant, it is important to note that differences in diesel fuel costs and hybrid charging costs for such vehicles is relatively small. As a result, impacts are similarly small.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$81,035 on average per \$1 million for the investment phase and an annual total of \$55 for the operation phase.

3.2.13 Evaluating the GHG Emissions Impacts from Major Projects and Plans

In accordance with the Governor's GHG reduction commitment, this strategy established evaluation of GHG emissions for all state and local major projects. Through this policy, MDOT will develop guidance for state and other major project sponsors to use for future projects and emissions of GHGs. Three strategies which are currently under consideration include active participation in framing National GHG Emissions Evaluation Policies, Evaluation of GHG Emissions through the National Environmental Policy Act Process, and Evaluation of GHG Emissions through Statewide/Regional Planning. MDOT is considering a formal program which could provide future incentives for different regions of Maryland if those regions develop a sustainability plan which aims to meet future GHG targets within the transportation sector. A process for addressing GHGs is currently being considered along with other options on a national level. MDOT believes that before the State establishes a formal evaluation process for transportation GHGs, it should wait and see what is proposed on a national level.

At this time, RESI has not been asked to quantify this strategy as the current ruling is still under review. The impacts of this strategy are likely to be estimated in future refinement of the current analysis.

3.2.14 Airport Initiatives

Through the support of the Maryland Aviation Administration, BWI initiatives to reduce GHG emissions and associated mixed pollutants are included in this strategy. To evaluate the potential reduction in energy consumption and fleet vehicle fuel use, the Maryland Aviation Administration is conducting an energy audit in 2011 which will help design a more energy efficient framework and provide fuel conservation concepts for BWI. Programs which are currently being considered include the use of compressed natural gas buses, the use of alternative

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

fuels for fleet vehicles, and periodic air quality assessments to gauge the success of these programs. Other programs being considered include reduction in fuel loss associated with flight and increased accessibility to BWI through public transportation.

Investment Phase

The total economic impacts of the investment phase of the *Airport Initiatives* strategy can be found in Figure 60. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 60: Airport Initiatives—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$785	\$100
Mining	0.0	\$8,229	\$229
Utilities	0.2	\$212,495	\$25,136
Construction	0.3	\$34,897	\$13,631
Manufacturing	0.6	\$197,132	\$38,277
Wholesale trade	0.3	\$70,043	\$26,255
Retail trade	0.6	\$37,741	\$19,054
Transportation and warehousing	0.4	\$89,819	\$27,530
Information	0.1	\$37,892	\$8,241
Finance and insurance	0.3	\$81,699	\$22,930
Real estate and rental and leasing	0.4	\$122,916	\$6,186
Professional, scientific, and technical services	4.1	\$517,587	\$277,803
Management of companies and enterprises	0.1	\$11,418	\$6,172
Administrative and support and waste management and remediation services	0.6	\$45,640	\$21,064
Educational services	0.1	\$9,636	\$5,412
Health care and social assistance	0.7	\$71,446	\$34,392
Arts, entertainment, and recreation	0.1	\$7,193	\$2,567
Accommodation and food services	0.5	\$29,210	\$10,182
Other services (except public administration)	0.4	\$30,844	\$12,518
Public administration	0.4	\$117,079	\$31,729
Total	10.4	\$1,733,703	\$589,410

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 10 jobs, \$1.7 million in output, and \$0.6 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Professional, scientific, and technical services*, primarily due to the expectation that the programs involved in this strategy will require a number of services in this industry, including engineering, energy auditing, and others. Engineers developing the enhanced and efficient vehicles, equipment, and operations needed to implement this strategy are also included in this industry.



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Airport Initiatives* strategy can be found in Figure 61. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 61: Airport Initiatives—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.3	\$28,753	\$3,550
Mining	0.1	\$30,047	\$2,960
Utilities	0.2	\$198,974	\$26,822
Construction	7.1	\$885,894	\$350,398
Manufacturing	1.3	\$567,375	\$81,474
Wholesale trade	3.7	\$769,502	\$288,443
Retail trade	8.9	\$539,244	\$272,250
Transportation and warehousing	51.2	\$17,385,816	\$4,497,391
Information	1.9	\$610,242	\$133,536
Finance and insurance	12.6	\$3,023,839	\$850,075
Real estate and rental and leasing	8.2	\$2,480,056	\$279,158
Professional, scientific, and technical services	12.4	\$1,656,363	\$805,433
Management of companies and enterprises	0.6	\$136,356	\$73,703
Administrative and support and waste management and remediation services	9.0	\$702,790	\$292,734
Educational services	2.0	\$148,378	\$82,956
Health care and social assistance	9.6	\$1,025,861	\$493,759
Arts, entertainment, and recreation	7.0	\$218,858	\$68,829
Accommodation and food services	5.6	\$363,667	\$126,755
Other services (except public administration)	5.7	\$440,131	\$196,327
Public administration	1.4	\$234,594	\$98,184
Total	148.8	\$31,446,741	\$9,024,737

Source: RESI

**Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan
Final Draft**

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As shown in the figure above, the strategy will support a total of 149 jobs, \$31.4 million in output, and \$9.0 million in wages annually once in operation. The industries experiencing the greatest positive economic impacts in terms of employment as a result of this strategy are *Transportation and warehousing* and *Professional, scientific, and technical services*, primarily due to the expectation that enhancements in the former industry from energy efficiency and cost savings as well as increased accessibility may drive increased consumption. Potential reductions in emissions related to pre-takeoff taxiing and other operational activities which include the use of fleet vehicles for terminal management and aircraft maintenance may lower air travel costs to consumers. Professionals in the latter industry will likely be required to carry out the periodic air quality assessments included in the strategy, among other services associated with ongoing operations.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$89,779 on average per \$1 million for the investment phase and an annual total of \$1,398,124 for the operation phase.

3.2.15 Port Initiatives

Initiatives through the Maryland Port Administration's Environmental Management System aim to reduce the GHG emissions and environmental footprint associated with Maryland's deep-water seaports. Emission reduction initiatives coinciding with MDOT's goal to reduce harmful pollutant emissions (including GHGs) are supported under this strategy. Reduction efforts for Maryland seaports include the use of cleaner diesel fuel for port fleet vehicles, the use of diesel-operated equipment retrofitted to reduce the emission of GHGs, and the use of clean diesel port fleet vehicles. Initiatives to reduce truck emissions through turn time and idle reductions are currently being planned to help decrease harmful air pollutants associated with Maryland port projects.

Investment Phase

The total economic impacts of the investment phase of the *Port Initiatives* strategy can be found in Figure 62. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Figure 62: Port Initiatives—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$558	\$72
Mining	0.0	\$1,291	\$153
Utilities	0.0	\$18,156	\$2,337
Construction	0.1	\$12,070	\$4,574
Manufacturing	1.3	\$625,472	\$86,693
Wholesale trade	0.8	\$175,899	\$65,935
Retail trade	0.5	\$32,966	\$16,702
Transportation and warehousing	0.2	\$25,087	\$8,869
Information	0.1	\$33,432	\$7,320
Finance and insurance	0.3	\$63,960	\$18,005
Real estate and rental and leasing	0.3	\$97,566	\$4,902
Professional, scientific, and technical services	2.2	\$297,758	\$151,636
Management of companies and enterprises	0.1	\$20,008	\$10,815
Administrative and support and waste management and remediation services	0.5	\$35,440	\$16,153
Educational services	0.1	\$7,453	\$4,182
Health care and social assistance	0.5	\$55,828	\$26,872
Arts, entertainment, and recreation	0.1	\$5,560	\$2,005
Accommodation and food services	0.3	\$21,718	\$7,568
Other services (except public administration)	0.3	\$22,650	\$9,482
Public administration	0.4	\$114,939	\$31,223
Average	8.3	\$1,667,813	\$475,497

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 8 jobs, \$1.7 million in output, and \$0.5 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Professional, scientific, and technical services*, primarily due to the expectation that the port continues to pursue energy efficiency improvements, which will likely require contracting professionals in the industry knowledgeable in engineering as well as building, equipment, and vehicle retrofitting, among other services. *Manufacturing* is also likely to see positive impacts as production of energy efficiency-related technologies may also be needed.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Port Initiatives* strategy can be found in Figure 63. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 63: Port Initiatives—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$26	\$3
Mining	0.0	\$36	\$3
Utilities	0.0	\$923	\$124
Construction	0.0	\$343	\$127
Manufacturing	0.0	\$1,229	\$239
Wholesale trade	0.0	\$1,119	\$419
Retail trade	0.0	\$1,377	\$694
Transportation and warehousing	0.2	\$62,441	\$12,460
Information	0.0	\$1,883	\$410
Finance and insurance	0.0	\$4,572	\$1,355
Real estate and rental and leasing	0.0	\$7,276	\$438
Professional, scientific, and technical services	0.0	\$2,311	\$1,042
Management of companies and enterprises	0.0	\$630	\$341
Administrative and support and waste management and remediation services	0.0	\$2,871	\$1,161
Educational services	0.0	\$365	\$205
Health care and social assistance	0.0	\$2,759	\$1,328
Arts, entertainment, and recreation	0.0	\$246	\$88
Accommodation and food services	0.0	\$934	\$324
Other services (except public administration)	0.0	\$944	\$398
Public administration	0.0	\$3,143	\$1,550
Total	0.4	\$95,426	\$22,710

Source: RESI

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

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As shown in the figure above, the strategy will support a total of less than one full-time equivalent job, \$95,400 in output, and \$22,700 in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Transportation and warehousing*. The impact, however, is small due to the fact that meeting requirements associated with this strategy is not likely to encourage significant job creation beyond that of what may be needed for compliance with this strategy. Some occasional maintenance and upkeep will likely be required.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$74,151 on average per \$1 million for the investment phase and an annual total of \$5,023 for the operation phase.

3.2.16 Freight and Freight Rail Strategies

Through a collaborative effort between freight transportation providers and MDOT, MDE, and MEA initiatives are underway to reduce the GHG emissions associated with the freight and rail transportation sector. Improvements to infrastructure and technology, including the expansion of bottleneck truck and rail corridors to cut down on idling time, are highlighted within this strategy. Under this strategy, initiatives regarding the replacement of locomotives and installations of auxiliary power units for those locomotives currently in use within the freight transportation are supported. Auxiliary power units will lower overall costs to suppliers through the eliminated fuel loss during periods of idling by shutting down the main engine. Other programs associated with this strategy support the replacement of shipyard locomotives with new hybrid locomotives to cut down on GHG emissions resulting from older models as well as methods to reduce emissions from heavy-duty trucks.

Investment Phase

The total economic impacts of the investment phase of the *Freight and Freight Rail Strategies* strategy can be found in Figure 64. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Figure 64: Freight and Freight Rail Strategies—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$712	\$91
Mining	0.0	\$1,369	\$154
Utilities	0.0	\$19,269	\$2,542
Construction	0.1	\$12,834	\$4,837
Manufacturing	0.5	\$286,436	\$30,006
Wholesale trade	0.8	\$171,411	\$64,252
Retail trade	0.7	\$40,338	\$20,411
Transportation and warehousing	4.1	\$276,064	\$140,705
Information	0.1	\$40,464	\$8,816
Finance and insurance	0.3	\$80,382	\$22,485
Real estate and rental and leasing	0.4	\$117,740	\$5,864
Professional, scientific, and technical services	1.9	\$246,176	\$118,626
Management of companies and enterprises	0.1	\$14,462	\$7,817
Administrative and support and waste management and remediation services	0.6	\$41,587	\$18,897
Educational services	0.1	\$9,452	\$5,307
Health care and social assistance	0.7	\$71,151	\$34,249
Arts, entertainment, and recreation	0.1	\$7,094	\$2,459
Accommodation and food services	0.4	\$25,219	\$8,788
Other services (except public administration)	1.5	\$148,856	\$68,951
Public administration	0.5	\$120,959	\$34,598
Average	13.0	\$1,731,975	\$599,856

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 13 jobs, \$1.7 million in output, and \$0.6 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment as a result of this strategy is *Transportation and warehousing*, primarily due to infrastructure and technology investments for multimodal freight.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Freight and Freight Rail Strategies* strategy can be found in Figure 65. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 65: Freight and Freight Rail Strategies—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.4	\$38,103	\$4,784
Mining	0.2	\$42,386	\$3,198
Utilities	0.6	\$575,064	\$77,237
Construction	6.3	\$788,344	\$306,834
Manufacturing	2.3	\$982,119	\$150,193
Wholesale trade	6.1	\$1,259,014	\$471,933
Retail trade	23.3	\$1,419,169	\$715,887
Transportation and warehousing	413.8	\$36,495,385	\$15,885,262
Information	3.8	\$1,253,794	\$268,289
Finance and insurance	17.8	\$4,286,423	\$1,203,290
Real estate and rental and leasing	13.3	\$4,562,229	\$323,755
Professional, scientific, and technical services	17.1	\$2,322,061	\$1,093,017
Management of companies and enterprises	1.6	\$351,050	\$189,748
Administrative and support and waste management and remediation services	21.1	\$1,583,343	\$705,052
Educational services	5.0	\$371,874	\$208,593
Health care and social assistance	25.9	\$2,770,212	\$1,333,355
Arts, entertainment, and recreation	8.4	\$331,413	\$108,013
Accommodation and food services	13.7	\$890,136	\$310,358
Other services (except public administration)	14.9	\$1,073,163	\$470,781
Public administration	5.5	\$844,354	\$433,080
Total	601.3	\$62,239,636	\$24,262,661

Source: RESI

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan Final Draft

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As shown in the figure above, the strategy will support a total of 601 jobs, \$62.2 million in output, and \$24.3 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy is *Transportation and warehousing*. Typically, transportation by freight train has been more cost-effective than trucking for companies with larger inventories. New hybrid locomotives are able to use less fuel per ton-mile, allowing for savings to be potentially passed on to companies in the form of reduction of price per ton-mile. Increased distribution and availability of goods and services in other industries due to enhanced rail transportation is likely to produce further positive impacts.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$101,079 on average per \$1 million for the investment phase and an annual total of \$3,751,468 for the operation phase.

3.2.17 Renewable Fuels Standard

Regulated by EPA, the Renewable Fuel Standard establishes the first renewable fuel volume mandate in the U.S. The mandate requires that 7.5 billion gallons of renewable fuel are to be blended into gasoline by 2012, but has been expanded to include new legislation regarding diesel fuel. Under this new legislation diesel fuel may act as a medium, and the share of renewable fuel in the mix is to increase from 7.5 billion to 36 billion gallons by 2012. The Renewable Fuels Standard aims to reduce the nation's need of foreign oil and simultaneously reduce the emissions of GHGs. By 2022, the estimated decrease in gasoline pricing associated with the increase in renewable fuels will range from \$0.024 per gallon for regular unleaded to \$0.121 per gallon of diesel fuel. Potential national savings associated with this strategy could amount to approximately \$12 billion annually.

Investment Phase

The total economic impacts of the investment phase of the *Renewable Fuels Standard* strategy can be found in Figure 66. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Figure 66: Renewable Fuels Standard—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$873	\$110
Mining	1.7	\$545,794	\$68,904
Utilities	0.0	\$22,480	\$2,851
Construction	0.2	\$20,746	\$8,011
Manufacturing	0.1	\$39,045	\$5,748
Wholesale trade	0.2	\$36,550	\$13,701
Retail trade	0.5	\$32,548	\$16,421
Transportation and warehousing	0.2	\$21,511	\$7,107
Information	0.1	\$45,014	\$9,863
Finance and insurance	0.4	\$78,385	\$23,016
Real estate and rental and leasing	0.4	\$139,280	\$7,340
Professional, scientific, and technical services	2.2	\$289,769	\$151,417
Management of companies and enterprises	0.9	\$200,072	\$108,142
Administrative and support and waste management and remediation services	0.5	\$36,462	\$16,407
Educational services	0.1	\$8,356	\$4,694
Health care and social assistance	0.6	\$63,079	\$30,363
Arts, entertainment, and recreation	0.1	\$7,030	\$2,463
Accommodation and food services	0.4	\$23,927	\$8,336
Other services (except public administration)	0.3	\$27,005	\$11,520
Public administration	0.4	\$115,049	\$30,668
Average	9.4	\$1,752,974	\$527,081

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately nine jobs, \$1.8 million in output, and \$0.5 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy is *Professional, scientific, and technical services*, primarily due to the expectation that development of renewable fuel technologies will require such services. *Mining* may also experience some positive impacts during implementation, but likely only in regard to the blending of renewable and fossil fuels under this strategy.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Renewable Fuel Standard* strategy can be found in Figure 67. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 67: Renewable Fuels Standard—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.2	\$16,298	\$2,040
Mining	0.0	\$8,113	\$479
Utilities	0.3	\$263,900	\$35,493
Construction	0.7	\$96,431	\$33,919
Manufacturing	0.7	\$337,135	\$48,495
Wholesale trade	2.2	\$457,433	\$171,466
Retail trade	14.0	\$854,700	\$430,451
Transportation and warehousing	1.9	\$212,331	\$73,175
Information	1.3	\$433,210	\$92,238
Finance and insurance	5.3	\$1,236,388	\$345,435
Real estate and rental and leasing	5.5	\$2,206,256	\$83,183
Professional, scientific, and technical services	3.2	\$446,814	\$196,213
Management of companies and enterprises	0.3	\$73,760	\$39,869
Administrative and support and waste management and remediation services	3.9	\$280,065	\$123,092
Educational services	3.2	\$246,964	\$137,696
Health care and social assistance	17.7	\$1,901,985	\$914,691
Arts, entertainment, and recreation	2.5	\$127,881	\$46,899
Accommodation and food services	8.1	\$521,181	\$181,834
Other services (except public administration)	7.2	\$519,083	\$222,120
Public administration	1.1	\$222,277	\$79,152
Total	79.3	\$10,462,205	\$3,257,939

Source: RESI

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

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As shown in the figure above, the strategy will support a total of 79 jobs, \$10.5 million in output, and \$3.3 million in wages annually once in operation. The industries experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy are *Healthcare and social assistance* and *Retail trade*. The availability of renewable and efficient fuels drives down costs for both commercial and residential consumers, which in turn drives increased discretionary income for households, which then spend on goods and services in such industries. Other service-based industries will also benefit from the same effects.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$37,942 on average per \$1 million for the investment phase and an annual total of \$836,150 for the operation phase.

3.2.18 CAFÉ Standards: Model Years 2008-2011

CAFÉ is the fuel economy standard relating to the sales-weighted fuel economy average for a vehicle manufacturer for the current model year. Vehicles which are subject to CAFÉ standards include those with a gross vehicle weight rating of 8,500 pounds or less as well as passenger vehicles and light-duty trucks. Depending on the vehicle type, CAFÉ standards have increased at different rates. Despite these standards increases over the years, CAFÉ standards needs to continue until the fuel efficiency miles per gallon standard reaches the 2007 mandate of 35 miles per gallon.

Investment Phase

The total economic impacts of the investment phase of the *CAFÉ Standards: Model Years 2008-2011* strategy can be found in Figure 68. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Figure 68: CAFÉ Standards: Model Years 2008-2011—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$556	\$75
Mining	0.0	\$1,214	\$143
Utilities	0.0	\$12,536	\$1,663
Construction	0.1	\$10,787	\$4,066
Manufacturing	0.2	-\$701,052	-\$4,732
Wholesale trade	0.6	\$127,415	\$47,761
Retail trade	2.3	\$179,384	\$112,322
Transportation and warehousing	1.3	\$177,860	\$50,222
Information	0.1	\$28,285	\$6,152
Finance and insurance	0.3	\$62,234	\$17,367
Real estate and rental and leasing	0.3	\$93,304	\$4,429
Professional, scientific, and technical services	1.6	\$203,200	\$107,721
Management of companies and enterprises	0.0	\$840	\$454
Administrative and support and waste management and remediation services	0.5	\$35,526	\$16,670
Educational services	0.1	\$7,352	\$4,124
Health care and social assistance	0.5	\$54,146	\$26,064
Arts, entertainment, and recreation	0.1	\$5,024	\$1,797
Accommodation and food services	0.3	\$19,159	\$6,675
Other services (except public administration)	0.3	\$21,572	\$8,918
Public administration	0.5	\$117,574	\$33,560
Average	9.1	\$456,915	\$445,453

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately nine jobs, \$456,900 in output, and \$445,500 in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy is *Retail trade*, primarily due to the expectation that consumers will purchase more fuel-efficient vehicles as they become available and affordable. *Professional, scientific, and technical services* also benefits as continuing fuel efficiency improvements require technological development in this industry.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *CAFÉ Standards: Model Years 2008-2011* strategy can be found in Figure 69. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 69: CAFÉ Standards: Model Years 2008-2011—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.1	\$7,575	\$948
Mining	0.0	\$3,771	\$223
Utilities	0.1	\$122,656	\$16,497
Construction	0.3	\$44,819	\$15,765
Manufacturing	0.3	\$156,694	\$22,540
Wholesale trade	1.0	\$212,606	\$79,694
Retail trade	6.5	\$397,249	\$200,065
Transportation and warehousing	0.9	\$98,687	\$34,010
Information	0.6	\$201,348	\$42,871
Finance and insurance	2.4	\$574,650	\$160,552
Real estate and rental and leasing	2.6	\$1,025,426	\$38,662
Professional, scientific, and technical services	1.5	\$207,671	\$91,196
Management of companies and enterprises	0.2	\$34,282	\$18,530
Administrative and support and waste management and remediation services	1.8	\$130,169	\$57,211
Educational services	1.5	\$114,784	\$63,999
Health care and social assistance	8.2	\$884,007	\$425,131
Arts, entertainment, and recreation	1.2	\$59,437	\$21,798
Accommodation and food services	3.7	\$242,235	\$84,513
Other services (except public administration)	3.3	\$241,260	\$103,237
Public administration	0.5	\$103,310	\$36,788
Total	36.9	\$4,862,636	\$1,514,229

Source: RESI

**Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan
Final Draft**

RESI of Towson University

As shown in the figure above, the strategy will support a total of 37 jobs, \$4.9 million in output, and \$1.5 million in wages annually once in operation. The industries experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy are *Healthcare and social assistance* and *Retail trade*, primarily due to the expectation that households will save on transportation fuel costs and will therefore spend discretionary funds elsewhere in the economy.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$78,992 on average per \$1 million for the investment phase and an annual total of \$388,627 for the operation phase.

3.2.19 Promoting Hybrid and Electric Vehicles

The promotion of hybrid and electric vehicles will have many environmental and economic benefits. To meet Maryland's air quality and Chesapeake Bay conservation initiatives, transportation initiatives include replacing petroleum-based mobile fuels with alternative fuels. This effort will reduce the emissions generated from various vehicles' exhaust systems. The incorporation of hybrid and electric vehicles will provide many jobs for Maryland. Jobs include those in the research and manufacturing sector as well as the actual sale, installation, and maintenance of plug-in vehicles and charging stations.

Investment Phase

The total economic impacts of the investment phase of the *Promoting Hybrid and Electric Vehicles* strategy can be found in Figure 70. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Figure 70: Promoting Hybrid and Electric Vehicles—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$626	\$80
Mining	0.0	\$1,543	\$195
Utilities	0.0	\$19,195	\$2,447
Construction	0.5	\$68,554	\$24,594
Manufacturing	0.6	\$397,533	\$42,728
Wholesale trade	1.6	\$341,827	\$128,132
Retail trade	0.6	\$34,214	\$17,313
Transportation and warehousing	0.3	\$30,075	\$11,078
Information	0.1	\$38,643	\$8,548
Finance and insurance	0.3	\$69,365	\$19,235
Real estate and rental and leasing	0.3	\$106,688	\$5,559
Professional, scientific, and technical services	1.4	\$184,965	\$92,377
Management of companies and enterprises	0.1	\$17,198	\$9,296
Administrative and support and waste management and remediation services	1.0	\$93,748	\$34,068
Educational services	0.1	\$8,129	\$4,559
Health care and social assistance	0.6	\$60,280	\$29,013
Arts, entertainment, and recreation	0.1	\$6,090	\$2,186
Accommodation and food services	0.4	\$22,964	\$8,002
Other services (except public administration)	1.0	\$80,993	\$33,423
Public administration	0.5	\$117,227	\$32,555
Average	9.5	\$1,699,857	\$505,388

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate less than approximately 10 jobs, \$1.7 million in output, and \$0.5 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy is *Wholesale trade*, primarily due to the expectation that the investment phase of promoting hybrid and electric vehicles will involve car manufacturers purchasing parts wholesale and car dealerships purchasing hybrid and electric cars wholesale as well. *Professional, scientific, and technical services* will also see some gain as

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

enhanced technologies associated with hybrid and electric vehicles are developed, refined, and implemented.

Operation Phase

The total economic impacts of the operation phase of the *Promoting Hybrid and Electric Vehicles* strategy can be found in Figure 71. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 71: Promoting Hybrid and Electric Vehicles—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.3	\$23,683	\$2,966
Mining	0.1	\$12,330	\$704
Utilities	0.4	\$385,482	\$51,845
Construction	1.1	\$141,409	\$49,789
Manufacturing	1.1	\$495,452	\$71,069
Wholesale trade	3.2	\$674,709	\$252,910
Retail trade	20.5	\$1,246,071	\$627,614
Transportation and warehousing	7.1	\$914,625	\$272,379
Information	2.0	\$639,547	\$136,090
Finance and insurance	7.7	\$1,822,512	\$508,695
Real estate and rental and leasing	8.1	\$3,219,759	\$121,918
Professional, scientific, and technical services	4.8	\$663,242	\$291,642
Management of companies and enterprises	0.5	\$112,276	\$60,687
Administrative and support and waste management and remediation services	6.1	\$436,820	\$194,621
Educational services	4.7	\$358,761	\$200,057
Health care and social assistance	25.6	\$2,761,720	\$1,328,168
Arts, entertainment, and recreation	3.6	\$186,220	\$68,271
Accommodation and food services	11.7	\$758,700	\$264,698
Other services (except public administration)	10.5	\$759,259	\$324,812
Public administration	1.7	\$340,119	\$127,260
Total	120.8	\$15,952,694	\$4,956,197

Source: RESI

As shown in the figure above, the strategy will support a total of 121 jobs, \$16.0 million in output, and \$5.0 million in wages annually once in operation. The industries experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy are those industries (such as *Health care and social assistance* and *Retail trade*) offering goods and services which will be in demand by households which experience increased fuel cost savings (and discretionary income) associated with driving hybrid and electric vehicles. New households established due to job creation in both phases will also contribute to positive impacts in these industries.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

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Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$105,771 on average per \$1 million for the investment phase and an annual total of \$317,312 for the operation phase.

3.2.20 PAYD Insurance in Maryland

MIA has led the effort to promote PAYD insurance as a voluntary program which ties consumer insurance costs to actual motor-vehicle travel. In previous studies, PAYD insurance has often resulted in more efficient driving patterns induced by potential cost savings. In addition, participating vehicles report an annual reduction in average mileage resulting in GHG emissions reduction. Main beneficiaries of this strategy include those who tend to drive shorter distances annually, including those within metropolitan areas who may only use personal vehicles for occasional trips. Indirect benefits of this strategy also include decreases in traffic fatalities and increases in mass transit since policy holders will choose to maintain a low-cost policy and a lower total mileage on an annual basis.

Investment Phase

The total economic impacts of the investment phase of the *PAYD Insurance in Maryland* strategy can be found in Figure 72. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Figure 72: PAYD Insurance in Maryland—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$732	\$93
Mining	0.0	\$1,207	\$146
Utilities	0.0	\$16,384	\$2,160
Construction	0.1	\$12,319	\$4,606
Manufacturing	0.1	\$20,620	\$3,508
Wholesale trade	0.1	\$26,185	\$9,815
Retail trade	0.7	\$39,670	\$19,987
Transportation and warehousing	0.2	\$17,428	\$6,249
Information	0.1	\$43,418	\$9,302
Finance and insurance	3.8	\$800,021	\$273,641
Real estate and rental and leasing	0.4	\$137,042	\$6,763
Professional, scientific, and technical services	3.0	\$384,423	\$205,730
Management of companies and enterprises	0.0	\$7,318	\$3,955
Administrative and support and waste management and remediation services	0.8	\$56,666	\$27,362
Educational services	0.1	\$10,524	\$5,914
Health care and social assistance	0.7	\$80,026	\$38,520
Arts, entertainment, and recreation	0.2	\$7,626	\$2,760
Accommodation and food services	0.4	\$28,998	\$10,101
Other services (except public administration)	0.4	\$32,502	\$13,342
Public administration	0.4	\$116,429	\$31,434
Average	11.7	\$1,839,536	\$675,389

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate less than approximately 12 jobs, \$1.8 million in output, and \$0.7 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy is *Finance and insurance*, primarily due to the expectation that the availability of PAYD will attract consumers and result in insurance sales, allowing for growth within the industry.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Operation Phase

The total economic impacts of the operation phase of the *PAYD* strategy can be found in Figure 73. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 73: PAYD Insurance in Maryland—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$2,634	\$330
Mining	0.0	\$1,311	\$77
Utilities	0.0	\$42,646	\$5,736
Construction	0.1	\$15,583	\$5,481
Manufacturing	0.1	\$54,481	\$7,837
Wholesale trade	0.4	\$73,921	\$27,709
Retail trade	2.3	\$138,120	\$69,561
Transportation and warehousing	0.3	\$34,313	\$11,825
Information	0.2	\$70,007	\$14,906
Finance and insurance	0.8	\$199,800	\$55,822
Real estate and rental and leasing	0.9	\$356,531	\$13,442
Professional, scientific, and technical services	0.5	\$72,205	\$31,708
Management of companies and enterprises	0.1	\$11,920	\$6,443
Administrative and support and waste management and remediation services	0.6	\$45,259	\$19,892
Educational services	0.5	\$39,909	\$22,252
Health care and social assistance	2.9	\$307,361	\$147,814
Arts, entertainment, and recreation	0.4	\$20,666	\$7,579
Accommodation and food services	1.3	\$84,223	\$29,384
Other services (except public administration)	1.2	\$83,884	\$35,895
Public administration	0.2	\$35,920	\$12,791
Total	12.8	\$1,690,694	\$526,484

Source: RESI

**Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan
Final Draft**

RESI of Towson University

As shown in the figure above, the strategy will support a total of 13 jobs, \$1.7 million in output, and \$0.6 million in wages annually once in operation. The industries experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy are those (such as *Health care and social assistance* and *Retail trade*) associated with the spending patterns of households experiencing increased income. This is due to those households taking advantage of PAYD as the policyholders tend to drive less than the average Maryland resident.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately -\$19,069 on average per \$1 million for the investment phase and an annual total of \$135,122 for the operation phase.

3.3 Agriculture and Forestry

3.3.1 Managing Forests to Capture Carbon

Enhanced productivity from enrolling forests into a forestry management system has the potential to yield increased rates of carbon dioxide sequestration in forest biomass. Durable wood products can be harvested to provide a renewable biomass for energy production within the state. DNR, in association with various state and local government agencies, will implement this strategy with the goal of managing 30,000 acres of privately owned land annually by 2020. In an effort to continue support for the Forestry for the Bay program, best management guidelines for forest harvests associated with biomass markets are being developed.

Investment Phase

The total economic impacts of the investment phase of the *Managing Forests to Capture Carbon* strategy can be found in Figure 74. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Figure 74: Managing Forests to Capture Carbon—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	10.1	\$556,520	\$156,042
Mining	0.0	\$1,400	\$157
Utilities	0.0	\$20,541	\$2,693
Construction	0.1	\$13,501	\$5,084
Manufacturing	0.7	\$189,386	\$30,142
Wholesale trade	0.2	\$49,905	\$18,706
Retail trade	0.6	\$38,908	\$19,608
Transportation and warehousing	0.2	\$29,016	\$9,716
Information	0.1	\$38,952	\$8,686
Finance and insurance	0.4	\$85,969	\$24,942
Real estate and rental and leasing	0.4	\$128,039	\$6,290
Professional, scientific, and technical services	1.8	\$228,080	\$119,689
Management of companies and enterprises	0.0	\$8,005	\$4,327
Administrative and support and waste management and remediation services	0.5	\$39,363	\$17,512
Educational services	0.2	\$14,099	\$7,633
Health care and social assistance	0.7	\$77,557	\$37,329
Arts, entertainment, and recreation	0.2	\$7,479	\$2,669
Accommodation and food services	0.4	\$27,594	\$9,614
Other services (except public administration)	1.9	\$182,492	\$91,083
Public administration	0.4	\$117,074	\$31,741
Average	19.1	\$1,853,879	\$603,663

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 19 jobs, \$1.9 million in output, and \$0.6 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy is *Agriculture, forestry, fishing, and hunting*, primarily due to the expectation that sustainable forest management will be carried out by professionals in this industry. To a lesser extent, environmental consultants within the *Professional, scientific, and technical services* industry will likely be needed to determine and advise on best practices in sustainable forest management.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Operation Phase

The total economic impacts of the operation phase of the *Managing Forests to Capture Carbon* strategy can be found in Figure 75. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 75: Managing Forests to Capture Carbon—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$844	\$109
Mining	0.0	\$575	\$33
Utilities	0.0	\$20,822	\$2,828
Construction	0.1	\$7,997	\$2,941
Manufacturing	0.1	\$26,813	\$5,633
Wholesale trade	0.1	\$30,578	\$11,462
Retail trade	0.7	\$44,462	\$22,397
Transportation and warehousing	0.2	\$17,141	\$5,878
Information	0.3	\$109,563	\$24,531
Finance and insurance	0.4	\$98,135	\$28,235
Real estate and rental and leasing	0.5	\$165,853	\$8,697
Professional, scientific, and technical services	1.0	\$135,864	\$62,540
Management of companies and enterprises	4.8	\$1,044,435	\$564,535
Administrative and support and waste management and remediation services	0.5	\$34,651	\$15,505
Educational services	0.2	\$11,764	\$6,594
Health care and social assistance	0.8	\$90,887	\$43,741
Arts, entertainment, and recreation	0.3	\$13,335	\$4,404
Accommodation and food services	0.5	\$33,733	\$11,759
Other services (except public administration)	0.5	\$39,235	\$17,783
Public administration	0.1	\$14,001	\$5,561
Total	11.2	\$1,940,687	\$845,165

Source: RESI

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan Final Draft

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As shown in the figure above, the strategy will support a total of 11 jobs, \$1.9 million in output, and \$0.9 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy is *Management of companies and enterprises*, primarily due to the expectation that the implementation of sustainable forest management is likely to have ripple effects for a wide variety of businesses which may be contracted to facilitate management.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$81,302 on average per \$1 million for the investment phase and an annual total of \$97,673 for the operation phase.

3.3.2 Creating Ecosystem Markets to Encourage GHG Emissions Reductions

Benefits and cost efficiencies associated with ecosystem markets have captured the focus of various state government agencies in regard to GHG emissions reductions. Maryland's Forest Conservation Act and Critical Area Act mandates mitigation of natural resource impacts which are generated through land development. Mitigation banking is an option to address these requirements. Benefits would fall into two categories: avoidance/minimization benefits and net environmental enhancements. The following is a list of ecosystem markets currently being considered under this policy: Wetlands, Streams and Waterways, Forests, Critical Areas, Species and Habitats, Nutrients, Carbon: RGGI and Maryland CO₂ Budget Trading Program Offsets, Carbon: GHG Emissions Reduction Act of 2009 – Offsets and Early Reductions, Carbon: GHG Emissions Reduction Act of 2009 – Nutrient Trading with Carbon Co-Benefits, and Biomass. The revenues from these markets could be used to fund future state initiatives relating to energy reduction.

Investment Phase

The total economic impacts of the investment phase of the *Creating Ecosystem Markets to Encourage GHG Emissions Reductions* strategy can be found in Figure 76. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

**Figure 76: Creating Ecosystem Markets to Encourage GHG Emissions Reductions—
Investment Phase**

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	62.1	\$1,896,126	\$1,056,875
Mining	0.1	\$26,003	\$3,526
Utilities	3.0	\$1,520,017	\$276,929
Construction	14.1	\$1,857,891	\$701,392
Manufacturing	0.0	\$157,312	\$6,054
Wholesale trade	0.5	\$112,069	\$42,008
Retail trade	1.4	\$82,686	\$42,258
Transportation and warehousing	0.6	\$91,050	\$29,735
Information	-1.8	-\$558,388	-\$127,798
Finance and insurance	0.1	\$52,648	\$7,887
Real estate and rental and leasing	-0.2	-\$51,841	-\$8,643
Professional, scientific, and technical services	28.8	\$3,671,619	\$2,013,847
Management of companies and enterprises	-41.5	-\$8,972,370	-\$4,849,723
Administrative and support and waste management and remediation services	2.2	\$148,627	\$72,426
Educational services	0.3	\$22,600	\$12,588
Health care and social assistance	0.8	\$87,291	\$42,112
Arts, entertainment, and recreation	-0.9	-\$34,308	-\$8,994
Accommodation and food services	0.5	\$35,482	\$12,382
Other services (except public administration)	1.4	\$144,104	\$59,238
Public administration	3.8	\$1,054,517	\$270,007
Average	75.3	\$1,343,136	-\$345,894

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 75 jobs, \$1.3 million in output, and -\$0.3 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy is *Agriculture, forestry, hunting, and fishing*, primarily due to the expectation that trained experts in this industry will implement and manage the various ecosystem markets. *Professional, scientific, and technical services* will also likely experience a positive impact as environmental consultants may be needed to help manage such programs.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

Management of companies and enterprises will experience negative impacts as companies from a wide variety of industries will be subject to compliance with ecosystem markets. Productivity and wages in this and other losing industries are typically higher than for the industries experiencing gains under this strategy, so the net total output and wage impacts are negative even when the net total employment impact is positive.

Operation Phase

The total economic impacts of the operation phase of the *Creating Ecosystem Markets to Encourage GHG Emissions Reductions* strategy can be found in Figure 77. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

**Figure 77: Creating Ecosystem Markets to Encourage GHG Emissions Reductions—
Operation Phase**

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	4.4	\$354,160	\$45,714
Mining	2.5	\$565,260	\$64,248
Utilities	9.8	\$9,557,082	\$1,273,597
Construction	48.1	\$6,105,807	\$2,296,300
Manufacturing	38.5	\$12,129,532	\$2,478,247
Wholesale trade	64.9	\$13,503,415	\$5,061,669
Retail trade	302.3	\$18,417,963	\$9,279,401
Transportation and warehousing	67.5	\$7,792,107	\$2,681,478
Information	138.2	\$43,327,240	\$9,692,080
Finance and insurance	184.5	\$42,238,247	\$12,150,674
Real estate and rental and leasing	216.7	\$69,995,947	\$3,701,037
Professional, scientific, and technical services	426.4	\$58,178,156	\$26,884,377
Management of companies and enterprises	1,850.7	\$399,755,121	\$216,074,661
Administrative and support and waste management and remediation services	208.3	\$16,130,551	\$7,102,843
Educational services	66.1	\$4,858,374	\$2,722,892
Health care and social assistance	350.2	\$37,454,474	\$18,025,678
Arts, entertainment, and recreation	117.5	\$5,361,396	\$1,778,222
Accommodation and food services	214.9	\$13,930,170	\$4,854,736
Other services (except public administration)	209.6	\$16,182,452	\$7,271,418
Public administration	188.2	\$49,729,699	\$13,400,349
Total	4,709.2	\$825,567,152	\$346,839,622

Source: RESI

As shown in the figure above, the strategy will support a total of 4,709 jobs, \$825.6 million in output, and \$346.8 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy is *Management of companies and enterprises*, primarily due to the expectation that a wide variety of business types will be motivated by market compliance to engage in best practices which benefit both the environment and their bottom line. *Professional, scientific, and technical*

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

services is also likely to experience a noticeable positive impact as consultants within this industry may be contracted to determine best practices and environmental enhancements.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately -\$5,387 on average per \$1 million for the investment phase and an annual total of \$37,498,758 for the operation phase.

3.3.3 Increasing Urban Trees to Capture Carbon

In an effort to maintain and improve the health and longevity of trees in urban areas, DNR is working with state and local agencies to increase the urban tree canopy cover throughout Maryland. Trees in urban areas assist in GHG emissions reductions for power production, vehicles, and the operation and maintenance of the surrounding environment. Reduced heat due to urban tree cover ultimately slows the formation of ground-level ozone as well as the evaporation of fuel from motor vehicles. Urban communities, typically lacking in tree population, will become the main focus of this program to achieve the highest reduction of potential GHG emissions within these areas.

Investment Phase

The total economic impacts of the investment phase of the *Increasing Urban Trees to Capture Carbon* strategy can be found in Figure 78. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 78: Increasing Urban Trees to Capture Carbon—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	2.0	\$189,715	\$64,296
Mining	0.0	\$2,912	\$169
Utilities	0.2	\$198,916	\$28,747
Construction	0.1	\$17,280	\$6,597
Manufacturing	0.1	\$26,175	\$3,885
Wholesale trade	1.0	\$217,082	\$81,372
Retail trade	0.6	\$38,084	\$19,201
Transportation and warehousing	0.2	\$28,720	\$10,083
Information	0.1	\$43,179	\$9,327
Finance and insurance	0.3	\$81,923	\$22,699
Real estate and rental and leasing	0.4	\$127,711	\$6,736
Professional, scientific, and technical services	2.0	\$255,161	\$134,052
Management of companies and enterprises	0.0	\$9,701	\$5,244
Administrative and support and waste management and remediation services	3.4	\$221,130	\$81,069
Educational services	0.1	\$10,492	\$5,879
Health care and social assistance	0.7	\$74,751	\$35,986
Arts, entertainment, and recreation	0.1	\$7,138	\$2,575
Accommodation and food services	0.4	\$28,509	\$9,937
Other services (except public administration)	0.4	\$30,746	\$12,806
Public administration	0.5	\$117,622	\$32,205
Average	12.9	\$1,726,945	\$572,864

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 13 jobs, \$1.7 million in output, and \$0.6 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy is *Administrative and support and waste management and remediation services*, primarily due to the expectation that implementation of this strategy will require cooperation between local community organizers and governments in planning and implementation, and funds will be passed through to this industry for administration purposes. *Agriculture, forestry, fishing, and hunting* and *Professional, scientific, and technical services*

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

will also benefit as professionals knowledgeable in environmental conservation and tree management may be contracted as layouts are planned and trees are planted during investment and implementation.

Operation Phase

The total economic impacts of the operation phase of the *Increasing Urban Trees to Capture Carbon* strategy can be found in Figure 79. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 79: Increasing Urban Trees to Capture Carbon—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	2.8	\$222,851	\$28,807
Mining	0.6	\$151,665	\$8,691
Utilities	5.7	\$5,496,383	\$746,521
Construction	16.5	\$2,111,096	\$776,366
Manufacturing	23.2	\$7,077,771	\$1,486,894
Wholesale trade	38.8	\$8,071,668	\$3,025,613
Retail trade	192.6	\$11,736,662	\$5,912,219
Transportation and warehousing	39.6	\$4,524,711	\$1,551,557
Information	92.3	\$28,921,573	\$6,475,501
Finance and insurance	113.1	\$25,905,013	\$7,453,299
Real estate and rental and leasing	131.7	\$43,780,415	\$2,295,641
Professional, scientific, and technical services	263.7	\$35,864,205	\$16,508,753
Management of companies and enterprises	1,276.4	\$275,701,415	\$149,021,455
Administrative and support and waste management and remediation services	120.3	\$9,146,977	\$4,092,938
Educational services	42.3	\$3,105,423	\$1,740,557
Health care and social assistance	224.3	\$23,991,631	\$11,546,354
Arts, entertainment, and recreation	77.2	\$3,519,938	\$1,162,473
Accommodation and food services	137.4	\$8,904,558	\$3,103,941
Other services (except public administration)	134.8	\$10,356,984	\$4,694,211
Public administration	19.7	\$3,695,999	\$1,468,071
Total	2,953.1	\$512,286,938	\$223,099,866

Source: RESI

As shown in the figure above, the strategy will support a total of 2,953 jobs, \$512.3 million in output, and \$223.1 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy is *Management of companies and enterprises*, primarily due to the expectation that a wide variety of businesses in the urban areas where trees are being planted will experience benefits in terms of building operation costs as carbon capture lowers ambient temperature. *Professional, scientific, and technical services* may also experience benefits as professionals within this industry are contracted to help assess and manage the urban tree canopy.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$138,780 on average per \$1 million for the investment phase and an annual total of \$25,782,841 for the operation phase.

3.3.4 Creating and Protecting Wetlands and Waterway Borders to Capture Carbon

Prevention of property damage from natural disasters and maintenance of healthy environments is a continual challenge for Maryland. Wetlands and marshlands are key resources which will allow the state to achieve these goals for coastal regions. As the sea level rises, current wetlands need to be moved inland if wetland buffers are to be ensured for future generations. If inland areas did not exist for migration, bay regions such as the Chesapeake Bay would suffer the harmful effects caused by rising bay waters. Another benefit of wetland protection is the resulting storage of carbon during long periods of rain. Highly saturated wetlands are capable of holding large amounts of carbon in peat. Working closely with the General Assembly and other state agencies, DNR will set a goal to establish or restore 16,678 acres of wetlands in Maryland by 2020.

Investment Phase

The total economic impacts of the investment phase of the *Creating and Protecting Wetlands and Waterway Borders to Capture Carbon* strategy can be found in Figure 80. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

**Figure 80: Creating and Protecting Wetlands and Waterway Borders to Capture Carbon—
Investment Phase**

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	28.4	\$141,506	\$82,506
Mining	0.1	\$2,945	\$464
Utilities	2.5	\$135,773	\$32,609
Construction	10.5	\$247,584	\$93,446
Manufacturing	3.6	\$270,411	\$31,311
Wholesale trade	1.2	\$44,651	\$16,737
Retail trade	3.9	\$42,820	\$21,662
Transportation and warehousing	1.2	\$27,270	\$9,131
Information	0.7	\$39,426	\$8,667
Finance and insurance	2.0	\$82,443	\$23,714
Real estate and rental and leasing	2.2	\$127,060	\$6,463
Professional, scientific, and technical services	9.0	\$212,250	\$109,096
Management of companies and enterprises	0.3	\$10,957	\$5,923
Administrative and support and waste management and remediation services	2.9	\$38,404	\$17,065
Educational services	1.0	\$12,476	\$6,796
Health care and social assistance	4.0	\$75,958	\$36,559
Arts, entertainment, and recreation	0.8	\$6,963	\$2,532
Accommodation and food services	2.3	\$27,140	\$9,456
Other services (except public administration)	8.5	\$144,399	\$71,489
Public administration	2.5	\$116,894	\$31,636
Average	87.4	\$1,807,330	\$617,261

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 87 jobs, \$1.8 million in output, and \$0.6 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment due to this strategy is *Agriculture, forestry, hunting, and fishing*, primarily due to the expectation that creating and protecting wetland and waterway borders will require planning and supervision from experts knowledgeable in land management. *Professional, scientific, and technical services* is also expected to experience some gains as environmental consultants in this industry may be

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

contracted to provide input in the planning and implementation of this strategy to maximize carbon capture.

Operation Phase

The total economic impacts of the operation phase of the *Creating and Protecting Wetlands and Waterway Borders to Capture Carbon* strategy can be found in Figure 81. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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**Figure 81: Creating and Protecting Wetlands and Waterway Borders to Capture Carbon—
Operation Phase**

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	2.9	\$242,714	\$30,386
Mining	0.5	\$120,818	\$7,130
Utilities	4.1	\$3,930,150	\$528,589
Construction	11.1	\$1,436,104	\$505,141
Manufacturing	11.2	\$5,020,813	\$722,217
Wholesale trade	32.8	\$6,812,364	\$2,553,571
Retail trade	208.9	\$12,728,697	\$6,410,526
Transportation and warehousing	28.1	\$3,162,151	\$1,089,761
Information	20.0	\$6,451,626	\$1,373,669
Finance and insurance	78.3	\$18,413,016	\$5,144,422
Real estate and rental and leasing	81.9	\$32,856,867	\$1,238,812
Professional, scientific, and technical services	48.4	\$6,654,223	\$2,922,119
Management of companies and enterprises	5.1	\$1,098,482	\$593,749
Administrative and support and waste management and remediation services	57.6	\$4,170,897	\$1,833,157
Educational services	47.9	\$3,677,931	\$2,050,653
Health care and social assistance	262.9	\$28,325,488	\$13,622,112
Arts, entertainment, and recreation	37.2	\$1,904,487	\$698,452
Accommodation and food services	120.0	\$7,761,731	\$2,707,979
Other services (except public administration)	106.7	\$7,730,495	\$3,307,937
Public administration	16.1	\$3,310,281	\$1,178,774
Total	1,181.7	\$155,809,336	\$48,519,158

Source: RESI

As shown in the figure above, the strategy will support a total of 1,182 jobs, \$115.8 million in output, and \$48.5 million in wages annually once in operation. The industries experiencing the greatest positive economic impacts in terms of employment due to this strategy are mostly service-based sectors such as *Healthcare and social assistance* and *Retail trade*, primarily due to the expectation that the job creation resulting from implementation of this strategy will create new households and increase overall household spending on a variety of both necessary and desired services (healthcare, retail, food, etc.) as a result.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$77,305 on average per \$1 million for the investment phase and an annual total of \$12,452,444 for the operation phase.

3.3.5 Geological Opportunities to Store Carbon

In the past, naturally occurring geologic reservoirs have held oil, natural gas, water, and even carbon dioxide for millions of years with minimal or no leakage. Utilizing these same natural geologic systems, the short- and long-term opportunities for future injection and storage of man-made carbon dioxide emissions are significant. Areas under consideration for implementation of this policy include old gas fields, unmineable coal seams, and deep saline aquifers. The Midwest Regional Carbon Sequestration Partnership is analyzing potential geological carbon sequestration. Over time, the group will examine and measure the initial injection of gas into geologic formations. Before proceeding forward, lawmakers will need to consider regulations regarding subsurface injections of carbon dioxide. A noted benefit within the state of Maryland would be the potential use of this strategy in regard to enhanced oil and gas recovery, particularly shale gas.

Investment Phase

The total economic impacts of the investment phase of the *Geological Opportunities to Store Carbon* strategy can be found in Figure 82. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 82: Geological Opportunities to Store Carbon—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$1,256	\$214
Mining	0.4	\$242,344	\$29,150
Utilities	0.0	\$21,602	\$2,783
Construction	0.1	\$17,211	\$6,544
Manufacturing	0.1	\$38,027	\$5,448
Wholesale trade	0.2	\$36,740	\$13,772
Retail trade	0.7	\$42,352	\$21,346
Transportation and warehousing	0.2	\$22,904	\$7,912
Information	0.1	\$44,887	\$9,974
Finance and insurance	0.4	\$98,756	\$27,755
Real estate and rental and leasing	0.5	\$150,105	\$7,448
Professional, scientific, and technical services	5.9	\$835,235	\$415,205
Management of companies and enterprises	0.1	\$12,335	\$6,667
Administrative and support and waste management and remediation services	0.9	\$63,071	\$28,597
Educational services	0.2	\$11,239	\$6,316
Health care and social assistance	0.8	\$84,333	\$40,595
Arts, entertainment, and recreation	0.2	\$8,306	\$2,999
Accommodation and food services	0.5	\$34,736	\$12,106
Other services (except public administration)	0.5	\$35,808	\$15,115
Public administration	0.5	\$118,523	\$32,296
Average	12.1	\$1,919,771	\$692,243

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 12 jobs, \$1.9 million in output, and \$0.7 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment due to this strategy is *Professional, scientific, and technical services*, primarily due to the expectation that environmental and geological consultants within this industry will be needed to help with development, planning, and implementation of carbon sequestration associated with this strategy.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Geological Opportunities to Store Carbon* strategy can be found in Figure 83. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 83: Geological Opportunities to Store Carbon—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.7	\$53,969	\$6,976
Mining	0.2	\$36,729	\$2,105
Utilities	1.4	\$1,331,077	\$180,787
Construction	4.0	\$511,251	\$188,015
Manufacturing	5.6	\$1,714,047	\$360,086
Wholesale trade	9.4	\$1,954,742	\$732,723
Retail trade	46.7	\$2,842,306	\$1,431,782
Transportation and warehousing	9.6	\$1,095,764	\$375,746
Information	22.4	\$7,004,032	\$1,568,193
Finance and insurance	27.4	\$6,273,502	\$1,804,990
Real estate and rental and leasing	31.9	\$10,602,446	\$555,943
Professional, scientific, and technical services	63.9	\$8,685,352	\$3,997,979
Management of companies and enterprises	309.1	\$66,767,514	\$36,089,014
Administrative and support and waste management and remediation services	29.1	\$2,215,153	\$991,200
Educational services	10.2	\$752,050	\$421,516
Health care and social assistance	54.3	\$5,810,132	\$2,796,218
Arts, entertainment, and recreation	18.7	\$852,435	\$281,520
Accommodation and food services	33.3	\$2,156,446	\$751,692
Other services (except public administration)	32.6	\$2,508,185	\$1,136,812
Public administration	4.8	\$895,072	\$355,528
Total	715.2	\$124,062,205	\$54,028,825

Source: RESI

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan Final Draft

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As shown in the figure above, the strategy will support a total of 715 jobs, \$124.1 million in output, and \$54.0 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment due to this strategy is *Management of companies and enterprises*, primarily due to the expectation that companies will attempt to harness carbon sequestration associated with natural geologic reservoirs because carbon dioxide injections into these reservoirs and the resulting creation, extraction, and consumption of shale and natural gas could potentially offset higher costs associated with energy generation. Savings resulting from decreased energy costs should be passed on to consumers, who will then have more disposable income to spend on a variety of goods and services in many other industries.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$79,024 on average per \$1 million for the investment phase and an annual total of \$6,243,915 for the operation phase.

3.3.6 Planting Forests in Maryland

This strategy promotes the implementation and practice of planting forests for carbon sequestration. Initiatives which will be included within this strategy include soil preparation, erosion control, and supplemental planting to ensure optimum conditions to support forest growth. Included in this strategy is the identification of prime areas, including wetlands, in need of physical intervention to return forest habitats to peak conditions. Additional areas for policy initiatives include linking islands of fragmented forests in an effort to restore optimal function, recovering severely disrupted lands, and working toward reversing the effects of continued toxicity to disturbed lands. In a partnership with the General Assembly and other state agencies, DNR will work to achieve a goal of afforestation of 43,030 acres by 2020.

Investment Phase

The total economic impacts of the investment phase of the *Planting Forests in Maryland* strategy can be found in Figure 84. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Figure 84: Planting Forests in Maryland—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	5.6	\$230,842	\$109,000
Mining	0.0	\$2,708	\$433
Utilities	0.4	\$122,729	\$29,245
Construction	1.7	\$221,766	\$83,684
Manufacturing	0.5	\$141,835	\$22,795
Wholesale trade	0.7	\$146,192	\$54,799
Retail trade	0.7	\$45,488	\$22,987
Transportation and warehousing	0.3	\$29,590	\$10,266
Information	0.1	\$42,246	\$9,283
Finance and insurance	0.4	\$88,740	\$25,312
Real estate and rental and leasing	0.4	\$137,765	\$6,932
Professional, scientific, and technical services	1.5	\$195,860	\$100,227
Management of companies and enterprises	0.0	\$9,375	\$5,068
Administrative and support and waste management and remediation services	0.5	\$39,449	\$17,591
Educational services	0.2	\$13,389	\$7,334
Health care and social assistance	0.8	\$83,299	\$40,095
Arts, entertainment, and recreation	0.2	\$7,559	\$2,750
Accommodation and food services	0.4	\$29,126	\$10,149
Other services (except public administration)	1.4	\$133,379	\$65,700
Public administration	0.5	\$118,469	\$32,492
Average	16.4	\$1,839,804	\$656,141

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 16 jobs, \$1.8 million in output, and \$0.7 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment due to this strategy is *Agriculture, forestry, hunting, and fishing*, primarily due to the expectation that the implementation of this strategy will require planning from experts in forestry-related areas such as soil preparation, erosion control, and supplemental planting. *Construction* will also gain as areas must be developed and constructed for the purpose of effectively planting trees to maximize environmental benefits.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Planting Forests in Maryland* strategy can be found in Figure 85. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 85: Planting Forests in Maryland—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$3,069	\$384
Mining	0.0	\$1,528	\$90
Utilities	0.1	\$49,698	\$6,684
Construction	0.1	\$18,160	\$6,388
Manufacturing	0.1	\$63,490	\$9,133
Wholesale trade	0.4	\$86,145	\$32,291
Retail trade	2.6	\$160,959	\$81,063
Transportation and warehousing	0.4	\$39,987	\$13,780
Information	0.3	\$81,583	\$17,371
Finance and insurance	1.0	\$232,839	\$65,053
Real estate and rental and leasing	1.0	\$415,487	\$15,665
Professional, scientific, and technical services	0.6	\$84,145	\$36,951
Management of companies and enterprises	0.1	\$13,891	\$7,508
Administrative and support and waste management and remediation services	0.7	\$52,743	\$23,181
Educational services	0.6	\$46,509	\$25,931
Health care and social assistance	3.3	\$358,186	\$172,257
Arts, entertainment, and recreation	0.5	\$24,083	\$8,832
Accommodation and food services	1.5	\$98,150	\$34,243
Other services (except public administration)	1.3	\$97,755	\$41,830
Public administration	0.2	\$41,860	\$14,906
Total	14.9	\$1,970,266	\$613,542

Source: RESI

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

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As shown in the figure above, the strategy will support a total of 15 jobs, \$2.0 million in output, and \$0.6 million in wages annually once in operation. The industries experiencing the greatest positive economic impacts in terms of employment due to this strategy are those (such as *Health care and social assistance* and *Retail trade*) providing goods and services in demand by households, primarily due to the expectation that private landowners will experience economic benefits from effective management and operation of this strategy, which will encourage increased household spending as a result.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$95,072 on average per \$1 million for the investment phase and an annual total of \$157,465 for the operation phase.

3.3.7 Biomass for Energy Production

In an effort to promote the use of locally produced woody biomass, Maryland will review initiatives using woody biomass in the generation of thermal energy and electricity. Energy derived from forestry by-products can be used to offset fossil fuel-based energy production and associated GHG emissions. Many end users could potentially benefit from this program, such as those consumers who tend to heat or cool large areas over an extended period of time. A feedstock, woody biomass can be used in numerous energy applications. For example, wood chips, forest thinning remnants, and urban wood waste are all included within the category of woody biomass. All of these products can be used to generate thermal power (heat and cooling), electric power, or liquid fuels. Various representatives of state agencies, universities, nonprofits, and businesses comprise the Maryland Wood Energy Coalition. The group's main goal is to increase adoption of high efficiency and low emission yielding wood energy technologies.

Investment Phase

The total economic impacts of the investment phase of the *Biomass for Energy Production* strategy can be found in Figure 86. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 86: Biomass for Energy Production—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	6.8	\$281,416	\$110,670
Mining	0.0	\$3,580	\$450
Utilities	0.2	\$146,014	\$21,055
Construction	2.1	\$273,173	\$102,933
Manufacturing	0.1	\$41,404	\$5,799
Wholesale trade	0.2	\$38,775	\$14,534
Retail trade	0.7	\$43,820	\$22,158
Transportation and warehousing	0.2	\$23,545	\$7,783
Information	0.1	\$34,539	\$7,456
Finance and insurance	0.3	\$82,150	\$22,874
Real estate and rental and leasing	0.4	\$123,207	\$6,043
Professional, scientific, and technical services	2.6	\$355,100	\$180,335
Management of companies and enterprises	0.0	\$7,050	\$3,811
Administrative and support and waste management and remediation services	0.5	\$37,670	\$17,106
Educational services	0.2	\$11,380	\$6,388
Health care and social assistance	0.7	\$78,678	\$37,875
Arts, entertainment, and recreation	0.1	\$7,278	\$2,598
Accommodation and food services	0.5	\$29,787	\$10,386
Other services (except public administration)	0.4	\$31,956	\$13,454
Public administration	0.4	\$116,023	\$31,141
Average	16.5	\$1,766,546	\$624,849

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 17 jobs, \$1.8 million in output, and \$624,900 in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment due to this strategy is *Agriculture, forestry, hunting, and fishing*, primarily due to the expectation that the creation of woody biomass will be carried out by professionals in this industry. Environmental consultants in *Professional, scientific, and technical services* will also likely be contracted to provide guidance in the implementation of sustainable woody biomass production.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Biomass for Energy Production* strategy can be found in Figure 87. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 87: Biomass for Energy Production—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$409	\$52
Mining	0.0	\$7,595	\$89
Utilities	1.1	\$1,026,122	\$149,856
Construction	0.2	\$28,594	\$11,295
Manufacturing	0.0	\$12,142	\$1,919
Wholesale trade	0.1	\$16,980	\$6,365
Retail trade	0.3	\$19,954	\$10,066
Transportation and warehousing	0.2	\$36,796	\$10,803
Information	0.1	\$25,408	\$5,826
Finance and insurance	0.2	\$45,167	\$12,699
Real estate and rental and leasing	0.2	\$60,786	\$2,850
Professional, scientific, and technical services	0.3	\$50,528	\$19,859
Management of companies and enterprises	0.0	\$2,760	\$1,492
Administrative and support and waste management and remediation services	0.2	\$15,295	\$6,737
Educational services	0.1	\$5,303	\$2,986
Health care and social assistance	0.4	\$38,426	\$18,500
Arts, entertainment, and recreation	0.1	\$3,952	\$1,446
Accommodation and food services	0.4	\$24,669	\$8,613
Other services (except public administration)	0.2	\$13,183	\$5,813
Public administration	0.0	\$7,224	\$3,026
Total	4.1	\$1,441,292	\$280,291

Source: RESI



**Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan
Final Draft**

RESI of Towson University

As shown in the figure above, the strategy will support a total of 4 jobs, \$1.4 million in output, and \$0.3 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment due to this strategy is *Utilities*, primarily due to the expectation that the use of woody biomass which was produced during implementation of this strategy will benefit energy-producing entities which switch to this type of fuel as it is more energy efficient. Other industries will experience slight gains from the energy cost savings passed on by utilities, and residential consumers also experiencing these energy cost savings will spend more on other goods and services.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$93,154 on average per \$1 million for the investment phase and an annual total of \$173,771 for the operation phase.

3.3.8 Conservation of Agricultural Land for GHG Benefits

MDA is working toward the preservation of agricultural lands and wetlands to promote pollutant emissions reductions. The benefits associated with the creation of protected lands and open space encourage the growth of natural wildlife habitats and reduce sediment and nutrient loss. With over 2,000,000 acres of land in Maryland registered as farm land, the agricultural sector remains one of the state's largest industries. To continue preservation and working toward GHG emissions reduction goals, MDA will work with various agencies to establish a network of conservation practices, strategies, and programs.

Investment Phase

The total economic impacts of the investment phase of the *Conservation of Agricultural Land for GHG Benefits* strategy can be found in Figure 88. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 88: Conservation of Agricultural Land for GHG Benefits—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	6.5	\$151,731	\$105,541
Mining	0.0	\$2,949	\$493
Utilities	0.0	\$20,258	\$2,651
Construction	2.4	\$313,767	\$118,130
Manufacturing	0.1	\$45,745	\$6,678
Wholesale trade	0.2	\$41,139	\$15,421
Retail trade	0.8	\$51,424	\$26,002
Transportation and warehousing	0.2	\$25,750	\$8,914
Information	0.2	\$47,525	\$10,496
Finance and insurance	0.4	\$99,899	\$28,759
Real estate and rental and leasing	0.5	\$151,851	\$7,661
Professional, scientific, and technical services	3.1	\$414,586	\$211,118
Management of companies and enterprises	0.0	\$8,187	\$4,425
Administrative and support and waste management and remediation services	0.7	\$48,716	\$22,267
Educational services	0.2	\$15,463	\$8,402
Health care and social assistance	0.9	\$92,819	\$44,673
Arts, entertainment, and recreation	0.2	\$8,645	\$3,159
Accommodation and food services	0.5	\$34,740	\$12,106
Other services (except public administration)	2.0	\$186,775	\$93,007
Public administration	0.5	\$118,900	\$32,551
Average	19.3	\$1,880,867	\$762,454

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 19 jobs, \$1.9 million in output, and \$0.8 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment due to this strategy is *Agriculture, Forestry, Fishing, and Hunting* primarily due to the expectation that as companies seek to decrease costs in energy production, those in the field of agriculture will understand the land the best. Their knowledge and expertise will become vital during the investment stages for companies seeking agricultural land.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Conservation of Agricultural Land for GHG Benefits* strategy can be found in Figure 89. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 89: Conservation of Agricultural Land for GHG Benefits—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	8.3	\$692,953	\$86,752
Mining	1.4	\$344,936	\$20,357
Utilities	11.7	\$11,220,651	\$1,509,132
Construction	31.8	\$4,100,104	\$1,442,187
Manufacturing	31.9	\$14,334,515	\$2,061,943
Wholesale trade	93.5	\$19,449,427	\$7,290,494
Retail trade	596.5	\$36,340,667	\$18,302,171
Transportation and warehousing	80.2	\$9,028,001	\$3,111,288
Information	57.2	\$18,419,511	\$3,921,850
Finance and insurance	223.4	\$52,569,504	\$14,687,421
Real estate and rental and leasing	233.9	\$93,806,967	\$3,536,832
Professional, scientific, and technical services	138.1	\$18,997,931	\$8,342,705
Management of companies and enterprises	14.5	\$3,136,186	\$1,695,163
Administrative and support and waste management and remediation services	164.4	\$11,907,989	\$5,233,697
Educational services	136.8	\$10,500,561	\$5,854,653
Health care and social assistance	750.7	\$80,869,795	\$38,891,384
Arts, entertainment, and recreation	106.1	\$5,437,345	\$1,994,094
Accommodation and food services	342.6	\$22,159,887	\$7,731,331
Other services (except public administration)	304.8	\$22,070,708	\$9,444,223
Public administration	46.0	\$9,450,912	\$3,365,421
Total	3,373.8	\$444,838,551	\$138,523,097

Source: RESI

**Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan
Final Draft**

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As shown in the figure above, the strategy will support a total of 3,374 jobs, \$444.9 million in output, and \$138.5 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment due to this strategy is *Health care and social assistance*, primarily due to the new hires associated with this strategy and health care options available to them.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$83,339 on average per \$1 million for the investment phase and an annual total of \$35,551,959 for the operation phase.

3.3.9 Buy Local for GHG Benefits

Local agriculture is one of the largest sectors of Maryland's economy. Through a "Buy Local" program created by MDA, local farms statewide receive support promoting them as preferred food sources for Marylanders. This program assists agricultural producers who are native to Maryland in marketing their products directly to supermarkets, food service, institutional buyers, and other wholesale buyers within the state. The sale and consumption of locally grown products can provide a variety of environmental and health benefits. MDA will work alongside other agencies to continue encouraging Maryland residential and commercial buyers to buy locally.

Investment Phase

The total economic impacts of the investment phase of the *Buy Local for GHG Benefits* strategy can be found in Figure 90. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Figure 90: Buy Local for GHG Benefits—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$1,068	\$126
Mining	0.0	\$1,339	\$152
Utilities	0.0	\$22,846	\$3,062
Construction	0.1	\$13,711	\$5,154
Manufacturing	0.1	\$30,111	\$5,325
Wholesale trade	0.9	\$188,763	\$70,757
Retail trade	3.0	\$191,028	\$97,918
Transportation and warehousing	0.3	\$27,776	\$10,291
Information	0.2	\$53,921	\$11,988
Finance and insurance	0.4	\$98,579	\$27,509
Real estate and rental and leasing	0.5	\$149,619	\$7,630
Professional, scientific, and technical services	3.0	\$377,915	\$171,960
Management of companies and enterprises	0.1	\$12,119	\$6,550
Administrative and support and waste management and remediation services	0.6	\$43,090	\$19,463
Educational services	0.2	\$11,853	\$6,544
Health care and social assistance	0.8	\$81,147	\$39,055
Arts, entertainment, and recreation	0.2	\$9,881	\$3,296
Accommodation and food services	2.8	\$179,913	\$62,915
Other services (except public administration)	2.3	\$181,306	\$108,392
Public administration	0.5	\$121,146	\$34,338
Average	15.9	\$1,797,131	\$692,425

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 16 jobs, \$1.8 million in output, and \$0.7 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment due to this strategy is *Professional, scientific, and technical services*, primarily due to the expectation that as popularity for buying local continues, the state of Maryland may need to reevaluate sites and assist farmers in expanding their local farms to accommodate demand. *Retail trade* will also benefit as encouragement to buy local will benefit local retail entities within this industry.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Buy Local for GHG Benefits* strategy can be found in Figure 91. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 91: Buy Local for GHG Benefits—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	2.4	\$192,202	\$24,603
Mining	0.6	\$157,743	\$7,852
Utilities	5.2	\$5,019,007	\$680,922
Construction	13.9	\$1,770,360	\$649,664
Manufacturing	19.5	\$6,346,441	\$1,213,537
Wholesale trade	1,385.8	\$288,218,039	\$108,036,691
Retail trade	167.2	\$10,186,039	\$5,135,783
Transportation and warehousing	129.5	\$13,516,508	\$5,328,659
Information	48.4	\$15,222,523	\$3,383,091
Finance and insurance	91.4	\$22,874,067	\$6,188,581
Real estate and rental and leasing	112.8	\$35,470,215	\$1,826,285
Professional, scientific, and technical services	138.7	\$19,103,826	\$8,531,524
Management of companies and enterprises	29.2	\$6,309,365	\$3,410,323
Administrative and support and waste management and remediation services	165.9	\$11,671,604	\$5,377,273
Educational services	37.7	\$2,780,949	\$1,556,168
Health care and social assistance	188.4	\$20,120,324	\$9,684,751
Arts, entertainment, and recreation	40.2	\$2,030,326	\$734,292
Accommodation and food services	109.3	\$7,087,135	\$2,469,492
Other services (except public administration)	103.0	\$7,906,118	\$3,341,262
Public administration	37.9	\$5,659,145	\$3,044,371
Total	2,827.0	\$481,641,936	\$170,625,123

Source: RESI

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

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As shown in the figure above, the strategy will support a total of 2,827 jobs, \$481.6 million in output, and \$170.6 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy is *Wholesale trade*, primarily due to the expectation that, as buying locally continues to be encouraged, more retailers will require more wholesale goods to meet increased demand.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$133,571 on average per \$1 million for the investment phase and an annual total of \$58,449,711 for the operation phase.

3.3.10 Nutrient Trading for GHG Benefits

Carbon credits and enhanced nutrient credits could potentially be stacked as tradable commodities within the Maryland Nutrient Trading Program. Through the sale of credits, MDA seeks to reduce GHG emissions, improve water quality, reduce fertilizer use and soil erosion, restore wetlands and wildlife habitats, and provide supplemental income to farmers and foresters. Other strategy goals include promoting Smart Growth initiatives which preserve agricultural and forested lands. The development of a marketplace for nutrient and carbon trading will create new employment opportunities for individuals and companies seeking to gain a competitive advantage in a newly defined industry.

Investment Phase

The total economic impacts of the investment phase of the *Nutrient Trading for GHG Benefits* strategy can be found in Figure 92. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Figure 92: Nutrient Trading for GHG Benefits—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	5.5	\$130,121	\$90,472
Mining	0.0	\$2,978	\$511
Utilities	0.5	\$148,478	\$36,390
Construction	2.1	\$280,687	\$105,911
Manufacturing	0.0	\$41,638	\$6,065
Wholesale trade	0.0	\$38,694	\$14,504
Retail trade	0.1	\$47,110	\$23,820
Transportation and warehousing	0.1	\$23,666	\$8,201
Information	-0.2	\$39,561	\$8,454
Finance and insurance	0.0	\$91,798	\$25,385
Real estate and rental and leasing	-0.1	\$136,286	\$6,840
Professional, scientific, and technical services	1.8	\$370,001	\$187,659
Management of companies and enterprises	-4.6	\$9,234	\$4,991
Administrative and support and waste management and remediation services	0.9	\$183,866	\$59,024
Educational services	0.0	\$11,748	\$6,599
Health care and social assistance	0.0	\$84,886	\$40,863
Arts, entertainment, and recreation	-0.1	\$7,797	\$2,831
Accommodation and food services	0.0	\$31,672	\$11,040
Other services (except public administration)	0.0	\$35,437	\$14,837
Public administration	0.4	\$118,700	\$32,332
Average	6.2	\$1,834,359	\$686,730

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 6 jobs, \$1.8 million in output, and \$0.7 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment due to this strategy is *Agriculture, forestry, fishing, and hunting*, primarily due to the expectation that, through nutrient trading markets, more land appraisers and similar professionals will be necessary prior to the beginning of nutrient trading. The second largest gain, in *Construction*, can be attributed to an establishment of a physical onsite sewage disposal system location for the complying firm's potential for gaining extra nutrient credits if costs are relatively lower for the

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

construction of a system for that firm. Erosion control and other complicated environmental restoration will likely require some environmentally appropriate construction.

Operation Phase

The total economic impacts of the operation phase of the *Nutrient Trading for GHG Benefits* strategy can be found in Figure 93. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 93: Nutrient Trading for GHG Benefits—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.5	\$36,579	\$4,728
Mining	0.1	\$24,895	\$1,427
Utilities	0.9	\$902,182	\$122,535
Construction	2.7	\$346,517	\$127,434
Manufacturing	3.8	\$1,161,753	\$244,060
Wholesale trade	6.4	\$1,324,892	\$496,627
Retail trade	31.6	\$1,926,468	\$970,438
Transportation and warehousing	6.5	\$742,691	\$254,674
Information	15.2	\$4,747,217	\$1,062,895
Finance and insurance	18.6	\$4,252,075	\$1,223,392
Real estate and rental and leasing	21.6	\$7,186,162	\$376,809
Professional, scientific, and technical services	43.3	\$5,886,787	\$2,709,764
Management of companies and enterprises	209.5	\$45,253,913	\$24,460,535
Administrative and support and waste management and remediation services	19.7	\$1,501,394	\$671,819
Educational services	6.9	\$509,727	\$285,697
Health care and social assistance	36.8	\$3,938,011	\$1,895,230
Arts, entertainment, and recreation	12.7	\$577,766	\$190,810
Accommodation and food services	22.6	\$1,461,603	\$509,484
Other services (except public administration)	22.1	\$1,700,006	\$770,513
Public administration	3.2	\$606,665	\$240,971
Total	484.7	\$84,087,304	\$36,619,841

Source: RESI

As shown in the figure above, the strategy will support a total of 485 jobs, \$84.1 million in output, and \$36.6 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy is *Management of companies and other enterprises*, primarily due to the expectation that, as nutrient markets continue to grow in popularity, many participants will seek to hire their own managers for these markets. In addition, various businesses and enterprises will benefit from this strategy in the long-term as the goals inherent in the strategy target prevention, which is

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

generally less costly than clean-up after the fact, at least in the long-term after upfront costs are regained.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately -\$6,006 on average per \$1 million for the investment phase and an annual total of \$4,232,022 for the operation phase.

3.4 Recycling

3.4.1 Recycling and Source Reduction

In an effort to save energy, reduce GHGs and other pollutants generated in the manufacturing process and landfills, save natural resources, and reduce the amount of waste disposed annually, Maryland is seeking goals which promote waste diversion through this strategy. Continued promotion and encouragement of waste diversion will require the collaborative efforts of Maryland's jurisdictions and the public and private sectors. Through cooperation among various state agencies within Maryland, efforts to oversee the creation of a developed market for recyclable materials to increase diversion of waste from landfills will be undertaken. The main waste generation goal supported by MDE through this strategy is to maintain a maximum 1.36 tons per person per year of waste generation by increasing the source reduction credit rate achieved from 3.55 percent in 2006 to 3.98 percent in 2012, 4.20 percent in 2015, and 4.56 percent in 2020.

Investment Phase

The total economic impacts of the investment phase of the *Recycling and Source Reduction* strategy can be found in Figure 94. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 94: Recycling and Source Reduction—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$753	\$96
Mining	0.0	\$1,942	\$309
Utilities	1.2	\$319,447	\$81,402
Construction	0.3	\$36,893	\$14,411
Manufacturing	0.1	\$23,744	\$3,967
Wholesale trade	0.1	\$30,280	\$11,350
Retail trade	0.6	\$39,153	\$19,743
Transportation and warehousing	0.2	\$23,583	\$8,524
Information	0.1	\$42,050	\$9,004
Finance and insurance	0.4	\$94,950	\$26,164
Real estate and rental and leasing	0.4	\$132,557	\$6,709
Professional, scientific, and technical services	3.2	\$414,080	\$219,730
Management of companies and enterprises	0.1	\$10,858	\$5,869
Administrative and support and waste management and remediation services	2.4	\$377,862	\$114,501
Educational services	0.1	\$10,198	\$5,733
Health care and social assistance	0.7	\$76,854	\$36,995
Arts, entertainment, and recreation	0.2	\$7,871	\$2,841
Accommodation and food services	0.5	\$30,441	\$10,606
Other services (except public administration)	0.4	\$35,467	\$14,398
Public administration	0.5	\$120,511	\$33,271
Average	11.5	\$1,829,493	\$625,625

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 12 jobs, \$1.8 million in output, and \$0.6 million in wages on average. The industries experiencing the greatest positive economic impacts in terms of employment due to this strategy are *Professional, scientific, and technical services* and *Administrative and support and waste management and remediation services*. Services provided in the former industry include those that would be related to planning and implementing source reduction, whereas the waste management industry would include incinerators, landfills, and recycling services associated with waste reduction.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Recycling and Source Reduction* strategy can be found in Figure 95. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 95: Recycling and Source Reduction—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.5	\$42,105	\$5,400
Mining	1.1	\$236,416	\$33,960
Utilities	1.6	\$1,565,256	\$196,927
Construction	17.1	\$2,161,533	\$827,504
Manufacturing	5.4	\$1,902,018	\$354,772
Wholesale trade	9.4	\$1,958,030	\$733,955
Retail trade	33.9	\$2,067,402	\$1,042,423
Transportation and warehousing	10.4	\$1,240,206	\$431,367
Information	12.0	\$3,775,489	\$839,668
Finance and insurance	24.4	\$5,579,652	\$1,604,099
Real estate and rental and leasing	29.6	\$8,540,260	\$467,532
Professional, scientific, and technical services	54.6	\$7,533,412	\$3,534,512
Management of companies and enterprises	127.3	\$27,486,509	\$14,856,941
Administrative and support and waste management and remediation services	33.7	\$2,749,581	\$1,156,654
Educational services	7.3	\$537,492	\$301,146
Health care and social assistance	38.4	\$4,101,270	\$1,973,876
Arts, entertainment, and recreation	11.2	\$516,016	\$175,287
Accommodation and food services	23.7	\$1,540,679	\$536,390
Other services (except public administration)	22.5	\$1,779,245	\$765,972
Public administration	104.3	\$28,800,469	\$7,369,088
Total	568.3	\$104,113,041	\$37,207,473

Source: RESI

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

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As shown in the figure above, the strategy will support a total of 568 jobs, \$104.1 million in output, and \$37.2 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment due to this strategy is *Management of companies and enterprises*, primarily due to the expectation that successful recycling and source reduction will increase reuse of materials, which will then result in less waste and reduced spending on disposable materials in the long run.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$98,504 on average per \$1 million for the investment phase and an annual total of \$2,643,996 for the operation phase.

3.5 Multi-Sector

3.5.1 Greenhouse Gas Emissions Inventory Development

To create a starting point for GHG emissions reductions, Maryland needs to establish a system which identifies the overall GHG emissions in the state. Maryland will also benefit from identification of emissions levels and sources. The identification of all sources which emit GHGs within the state and the total annual amount of GHG emissions will be greatly beneficial for future reduction strategies. The charge of reviewing and publishing annual statewide GHG emissions inventories falls with MDE. MDE is required to publish an inventory for calendar year 2011 and every three calendar years thereafter. Recorded impacts of GHG reduction programs implemented after the 2006 baseline will appear in the 2011 calendar year inventory.

At this time this policy is still under review, and RESI will look into future analysis of investment and operation.

3.5.2 Subprogram Analysis, Goals, and Overall Implementation

The continued growth of the state's carbon footprint relative to Maryland's size is an ongoing concern among leading officials. The growth of total and per capita GHG emissions in Maryland has outpaced that for the U.S. As a result, there is a need for statewide goals and targets to address this emissions growth. Through a scientific-based, consensus-building stakeholder process, statewide goals and targets were developed for consideration by the Maryland Commission on Climate Change. The Maryland Commission on Climate Change suggested the following goals in regard to GHG emissions for Maryland: 25 percent to 50 percent below 2006 levels by 2020; 90 percent below 2006 levels by 2050, a non-regulatory goal to drive climate neutral technology innovations; interim targets of 10 percent by 2012 and 15 percent by 2015 to spur early actions; and science-based review of the goals every four years.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

Further analysis of this strategy has not been scheduled at this time. The impacts of this strategy are likely to be estimated in future refinement of the current analysis.

3.5.3 Outreach and Public Education

Outreach and educational initiatives undertaken by state-sponsored forums create the essential foundation for behavioral and lifestyle changes necessary to reduce GHG emissions. This strategy is designed to encourage existing efforts and facilitate new actions throughout the state of Maryland. A combination of efforts from various agencies will insure that scientifically based factual information is made available to the general public through education and outreach efforts. Many of these activities are already underway to reach goals predetermined by state agencies to promote GHG reduction initiatives.

Investment Phase

The total economic impacts of the investment phase of the *Outreach and Public Education* strategy can be found in Figure 96. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Figure 96: Outreach and Public Education—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$724	\$93
Mining	0.0	\$1,219	\$147
Utilities	0.0	\$16,794	\$2,222
Construction	0.1	\$12,613	\$4,728
Manufacturing	0.1	\$27,053	\$5,500
Wholesale trade	0.1	\$29,062	\$10,894
Retail trade	0.6	\$38,701	\$19,501
Transportation and warehousing	0.2	\$25,380	\$9,310
Information	2.8	\$545,812	\$179,028
Finance and insurance	0.3	\$80,296	\$22,270
Real estate and rental and leasing	0.5	\$142,630	\$7,112
Professional, scientific, and technical services	4.4	\$544,522	\$248,059
Management of companies and enterprises	0.0	\$10,600	\$5,729
Administrative and support and waste management and remediation services	0.6	\$46,773	\$22,072
Educational services	0.1	\$10,275	\$5,776
Health care and social assistance	0.7	\$77,644	\$37,375
Arts, entertainment, and recreation	0.2	\$9,440	\$3,256
Accommodation and food services	0.5	\$29,544	\$10,289
Other services (except public administration)	0.4	\$30,074	\$12,387
Public administration	0.5	\$118,832	\$33,228
Average	12.3	\$1,797,988	\$638,975

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 12 jobs, \$1.8 million in output, and \$0.7 million in wages on average. The industries experiencing the greatest positive economic impacts in terms of employment due to this strategy are *Professional, scientific, and technical services* and *Information*, primarily due to the expectation that preparation of public outreach materials and awareness will involve education provided by professionals knowledgeable in climate change, conservation, operations, transportation, and other subject areas as well as the expectation that hosting and publishing services will be needed to develop outreach materials.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Outreach and Public Education* strategy can be found in Figure 97. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 97: Outreach and Public Education—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$305	\$38
Mining	0.0	\$152	\$9
Utilities	0.0	\$4,946	\$665
Construction	0.0	\$1,807	\$636
Manufacturing	0.0	\$6,318	\$909
Wholesale trade	0.0	\$8,572	\$3,213
Retail trade	0.3	\$16,017	\$8,067
Transportation and warehousing	0.0	\$3,979	\$1,371
Information	0.0	\$8,118	\$1,729
Finance and insurance	0.1	\$23,170	\$6,474
Real estate and rental and leasing	0.1	\$41,346	\$1,559
Professional, scientific, and technical services	0.1	\$8,373	\$3,677
Management of companies and enterprises	0.0	\$1,382	\$747
Administrative and support and waste management and remediation services	0.1	\$5,248	\$2,307
Educational services	0.1	\$4,628	\$2,580
Health care and social assistance	0.3	\$35,644	\$17,141
Arts, entertainment, and recreation	0.0	\$2,397	\$879
Accommodation and food services	0.2	\$9,767	\$3,408
Other services (except public administration)	0.1	\$9,728	\$4,163
Public administration	0.0	\$4,166	\$1,483
Total	1.5	\$196,064	\$61,054

Source: RESI

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan Final Draft

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As shown in the figure above, the strategy will support a total of 2 jobs, \$0.2 million in output, and \$0.1 million in wages annually once in operation. The industries experiencing the greatest positive economic impacts in terms of employment due to this strategy are primarily those industries (such as *Health care and social assistance* and *Retail trade*) which will experience increased consumption of goods and services as successful outreach and education create some change in consumption behavior and spending patterns for both businesses and consumers.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$79,705 on average per \$1 million for the investment phase and an annual total of \$15,669 for the operation phase.

3.6 Buildings

3.6.1 Green Building Initiatives

Authorized in 2007 by the Maryland Green Building Council, this strategy involves the design and evaluation of current high performance building technologies. DGS implemented Maryland's green building policy to upgrade existing state government buildings. Implementation of these policies will result in increased energy efficiency and reduced energy consumption. Commercial and public buildings are heavy consumers of various resources, including energy. As a result, reduction of their GHG emissions will result in a variety of environmental benefits. In addition to reducing Maryland's regional GHG emissions through the promotion and construction of green buildings, over time the state as a whole will experience reduced waste output and water usage.

Investment Phase

The total economic impacts of the investment phase of the *Green Building Initiatives* strategy can be found in Figure 98. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 98: Green Building Initiatives—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$1,141	\$143
Mining	0.0	\$4,406	\$818
Utilities	0.0	\$18,763	\$2,469
Construction	4.6	\$612,759	\$230,735
Manufacturing	0.1	\$44,275	\$7,416
Wholesale trade	0.2	\$41,455	\$15,539
Retail trade	0.9	\$52,066	\$26,413
Transportation and warehousing	0.2	\$23,936	\$8,051
Information	0.1	\$38,865	\$8,276
Finance and insurance	0.4	\$85,802	\$23,895
Real estate and rental and leasing	0.4	\$136,212	\$7,319
Professional, scientific, and technical services	3.3	\$417,561	\$222,126
Management of companies and enterprises	0.0	\$7,860	\$4,248
Administrative and support and waste management and remediation services	0.6	\$43,003	\$19,743
Educational services	0.2	\$11,127	\$6,256
Health care and social assistance	0.8	\$83,802	\$40,340
Arts, entertainment, and recreation	0.2	\$7,640	\$2,747
Accommodation and food services	0.5	\$29,855	\$10,407
Other services (except public administration)	0.5	\$38,201	\$15,819
Public administration	0.4	\$116,766	\$31,410
Average	13.3	\$1,815,494	\$684,170

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 13 jobs, \$1.8 million in output, and \$0.7 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment due to this strategy is *Construction*, primarily due to the expectation that this strategy will require repair and maintenance services in the form of retrofitting, weatherization, and optimization of building operation. Architects and engineers in *Professional, scientific, and technical services* will also be involved in implementation of this strategy as careful and effective planning, design, and engineering will be needed to create truly green buildings.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan
Final Draft
 RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Green Building Initiatives* strategy can be found in Figure 99. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 99: Green Building Initiatives—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$1,187	\$153
Mining	0.0	\$808	\$46
Utilities	0.0	\$29,281	\$3,977
Construction	0.1	\$11,247	\$4,136
Manufacturing	0.1	\$37,706	\$7,921
Wholesale trade	0.2	\$43,001	\$16,119
Retail trade	1.0	\$62,526	\$31,497
Transportation and warehousing	0.2	\$24,105	\$8,266
Information	0.5	\$154,077	\$34,498
Finance and insurance	0.6	\$138,006	\$39,707
Real estate and rental and leasing	0.7	\$233,235	\$12,230
Professional, scientific, and technical services	1.4	\$191,063	\$87,949
Management of companies and enterprises	6.8	\$1,468,770	\$793,896
Administrative and support and waste management and remediation services	0.6	\$48,730	\$21,805
Educational services	0.2	\$16,544	\$9,273
Health care and social assistance	1.2	\$127,813	\$61,512
Arts, entertainment, and recreation	0.4	\$18,752	\$6,193
Accommodation and food services	0.7	\$47,438	\$16,536
Other services (except public administration)	0.7	\$55,176	\$25,008
Public administration	0.1	\$19,690	\$7,821
Total	15.7	\$2,729,153	\$1,188,540

Source: RESI

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan Final Draft

RESI of Towson University

As shown in the figure above, the strategy will support a total of 16 jobs, \$2.7 million in output, and \$1.2 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment due to this strategy is *Management of companies and enterprises*, primarily due to the expectation that the reduced operation costs resulting from green building will provide an economic benefit to those businesses using high performance buildings.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$77,693 on average per \$1 million for the investment phase and an annual total of \$137,356 for the operation phase.

3.6.2 Building Codes

The adoption of statewide building codes for Maryland Building Performance Standards is the responsibility of DHCD. DHCD amends and proposes state and/or local building codes to include minimum energy efficiency requirements and updates energy efficiency codes which provide long-term GHG savings. Maryland's core building codes are based on two International Code Council publications per mandatory statute. These publications are the International Business Code and the International Residential Code. In an effort to promote energy efficiency, the adoption of the latest statewide building codes will apply to new and renovated buildings. Through the most recent adoption of standards, energy efficiency improvements are estimated to achieve a 15 percent consumption reduction over previous 2006 standards.

Investment Phase

The total economic impacts of the investment phase of the *Building Codes* strategy can be found in Figure 100. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 100: Building Codes—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$947	\$119
Mining	0.0	\$3,851	\$437
Utilities	0.2	\$196,930	\$28,527
Construction	2.9	\$377,075	\$145,595
Manufacturing	0.1	\$33,294	\$5,698
Wholesale trade	0.2	\$36,014	\$13,500
Retail trade	0.7	\$43,547	\$22,030
Transportation and warehousing	0.2	\$25,032	\$8,241
Information	0.1	\$38,486	\$8,294
Finance and insurance	0.3	\$83,423	\$23,241
Real estate and rental and leasing	0.4	\$125,562	\$6,328
Professional, scientific, and technical services	3.5	\$467,978	\$238,963
Management of companies and enterprises	0.0	\$7,406	\$4,003
Administrative and support and waste management and remediation services	0.6	\$41,924	\$19,342
Educational services	0.1	\$10,313	\$5,798
Health care and social assistance	0.7	\$77,177	\$37,151
Arts, entertainment, and recreation	0.1	\$7,345	\$2,661
Accommodation and food services	0.5	\$31,676	\$11,043
Other services (except public administration)	0.4	\$31,706	\$13,353
Public administration	0.4	\$115,997	\$31,253
Total	11.6	\$1,755,685	\$625,578

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 12 jobs, \$1.8 million in output, and \$0.6 million in wages on average. The industries experiencing the greatest positive economic impacts in terms of employment due to this strategy are *Professional, scientific, and technical services* and *Construction*, primarily due to the expectation that implementation of new building codes will result in the need for new training associated with repair and maintenance and new construction projects which will require building code inspectors, construction workers, site managers, architects, engineers, and other building professionals in these two industries.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Building Codes* strategy can be found in Figure 101. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 101: Building Codes—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.1	\$4,752	\$595
Mining	0.0	\$2,367	\$140
Utilities	0.1	\$77,006	\$10,357
Construction	0.2	\$28,142	\$9,900
Manufacturing	0.2	\$98,378	\$14,167
Wholesale trade	0.6	\$133,432	\$50,016
Retail trade	4.1	\$249,203	\$125,506
Transportation and warehousing	0.6	\$61,962	\$21,353
Information	0.4	\$127,064	\$27,065
Finance and insurance	1.5	\$360,784	\$100,807
Real estate and rental and leasing	1.6	\$643,716	\$24,291
Professional, scientific, and technical services	1.0	\$131,253	\$57,663
Management of companies and enterprises	0.1	\$30,524	\$16,499
Administrative and support and waste management and remediation services	1.1	\$81,832	\$35,969
Educational services	0.9	\$71,997	\$40,143
Health care and social assistance	5.1	\$554,488	\$266,661
Arts, entertainment, and recreation	0.7	\$37,344	\$13,691
Accommodation and food services	2.4	\$152,017	\$53,037
Other services (except public administration)	2.1	\$151,454	\$64,817
Public administration	0.3	\$64,830	\$23,091
Total	23.2	\$3,062,545	\$955,766

Source: RESI

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

As shown in the figure above, the strategy will support a total of 23 jobs, \$3.1 million in output, and \$1.0 million in wages annually once in operation. The industries experiencing the greatest positive economic impacts in terms of employment due to this strategy are those (such as *Health care and social assistance* and *Retail trade*) associated with goods and services which will be in demand by existing households which have increased their income due to the new job training required during implementation of this strategy as well as new households associated with job creation during implementation.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$94,369 on average per \$1 million for the investment phase and an annual total of \$244,265 for the operation phase.

3.7 Land Use

3.7.1 Reducing Transportation Issues through Smart Growth

Through a collaborative effort of MDP, other state agencies, and the Sustainable Growth Commission, strategies and suggestions are being developed to reduce Marylanders' dependence on motor vehicle travel. Specifically, the development of incentives and requirements for future development projects and regional land use patterns with an overall goal to achieve transportation-related land use and location efficiency will help reduce single-occupant travel. The combination of development projects and land use patterns will result in shorter trip lengths; reduced reliance on automobile and truck travel; and increased use of alternative transportation modes to reach employment, shopping, recreation, education, and religious and commercial destinations. This strategy's goal is to reduce VMTs and consumption of fossil fuels, thus reducing GHG emissions.

Investment Phase

The total economic impacts of the investment phase of the *Reducing Transportation Issues through Smart Growth* strategy can be found in Figure 102. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 102: Reducing Transportation Issues through Smart Growth—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$947	\$120
Mining	0.0	\$1,710	\$237
Utilities	0.0	\$19,703	\$2,605
Construction	0.8	\$113,631	\$40,532
Manufacturing	0.0	\$29,311	\$4,919
Wholesale trade	0.1	\$35,277	\$13,223
Retail trade	0.5	\$49,353	\$24,885
Transportation and warehousing	0.1	\$22,243	\$7,870
Information	1.1	\$46,934	\$10,158
Finance and insurance	0.3	\$104,201	\$29,030
Real estate and rental and leasing	0.2	\$159,660	\$7,790
Professional, scientific, and technical services	5.2	\$925,542	\$497,082
Management of companies and enterprises	0.0	\$10,212	\$5,520
Administrative and support and waste management and remediation services	0.7	\$64,152	\$30,392
Educational services	0.1	\$12,878	\$7,240
Health care and social assistance	-1.3	\$97,109	\$46,745
Arts, entertainment, and recreation	0.1	\$9,835	\$3,500
Accommodation and food services	0.4	\$38,093	\$13,277
Other services (except public administration)	0.3	\$42,779	\$17,207
Public administration	0.4	\$119,548	\$32,745
Average	9.3	\$1,903,120	\$795,076

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 9 jobs, \$1.9 million in output, and \$0.8 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment due to this strategy is *Professional, scientific, and technical services*, primarily due to the expectation that areas receiving funding to promote Smart Growth strategies will need to assistance of skilled engineers and consultants familiar with transportation.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Reducing Transportation Issues through Smart Growth* strategy can be found in Figure 103. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 103: Reducing Transportation Issues through Smart Growth—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	6.5	\$31,667	\$4,038
Mining	0.0	\$19,085	\$1,105
Utilities	0.0	\$666,738	\$90,267
Construction	2.5	\$252,005	\$91,398
Manufacturing	0.1	\$856,339	\$161,415
Wholesale trade	0.3	\$1,036,983	\$388,706
Retail trade	1.7	\$1,664,753	\$838,523
Transportation and warehousing	0.5	\$544,800	\$187,118
Information	3.2	\$2,717,447	\$604,495
Finance and insurance	0.9	\$3,136,278	\$893,838
Real estate and rental and leasing	0.7	\$5,397,041	\$256,090
Professional, scientific, and technical services	13.3	\$3,294,948	\$1,508,875
Management of companies and enterprises	0.1	\$22,547,225	\$12,187,171
Administrative and support and waste management and remediation services	1.9	\$977,861	\$435,714
Educational services	0.4	\$457,712	\$255,943
Health care and social assistance	-3.9	\$3,531,198	\$1,698,891
Arts, entertainment, and recreation	0.4	\$392,945	\$133,634
Accommodation and food services	1.2	\$1,157,683	\$403,677
Other services (except public administration)	2.5	\$1,274,406	\$566,728
Public administration	1.3	\$485,444	\$185,257
Total	33.7	\$50,442,556	\$20,892,882

Source: RESI

**Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan
Final Draft**

RESI of Towson University

As shown in the figure above, the strategy will support a total of 34 jobs, \$50.4 million in output, and \$20.9 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment due to this strategy is *Professional, scientific, and technical services*, primarily due to the expectation that as programs continue through year one, localities will wish to move into new phases of design and further integration of other initiatives associated with Smart Growth.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$215,652 on average per \$1 million for the investment phase and an annual total of \$2,795,003 for the operation phase.

3.7.2 GHG Targets for Local Government's Transportation and Land Use Planning

Local governments within Maryland are seeking to implement land use policies which will support compact, transit-oriented development in suburban cores. These policies will reduce VMTs, preserve natural areas which serve to sequester carbon, and create more compact, energy-efficient buildings. Support for this strategy aims for dense, transit-oriented, and sustainable development in local and municipal core growth areas. Overall, job growth under this policy will primarily result from the construction sector and transit vehicle manufacturing sector.

Investment Phase

The total economic impacts of the investment phase of the *GHG Targets for Local Government's Transportation and Land Use Planning* strategy can be found in Figure 104. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 104: GHG Targets for Local Government's Transportation and Land Use Planning—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$995	\$126
Mining	0.0	\$2,472	\$402
Utilities	0.0	\$19,259	\$2,541
Construction	2.3	\$313,644	\$111,456
Manufacturing	0.1	\$36,633	\$6,220
Wholesale trade	0.2	\$37,936	\$14,220
Retail trade	0.8	\$48,092	\$24,289
Transportation and warehousing	0.2	\$22,585	\$7,843
Information	0.1	\$44,505	\$9,566
Finance and insurance	0.4	\$97,832	\$27,138
Real estate and rental and leasing	0.5	\$148,214	\$7,554
Professional, scientific, and technical services	5.5	\$733,843	\$377,677
Management of companies and enterprises	0.0	\$9,643	\$5,212
Administrative and support and waste management and remediation services	0.8	\$55,288	\$25,971
Educational services	0.2	\$12,004	\$6,748
Health care and social assistance	0.8	\$89,995	\$43,321
Arts, entertainment, and recreation	0.2	\$8,759	\$3,159
Accommodation and food services	0.6	\$36,266	\$12,641
Other services (except public administration)	0.5	\$38,763	\$16,152
Public administration	0.5	\$118,312	\$32,251
Average	13.5	\$1,875,040	\$734,487

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 14 jobs, \$1.9 million in output, and \$0.7 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment due to this strategy is *Professional, scientific, and technical services*, primarily due to the expectation that in searching for GHG reduction techniques, local transit systems will need to hire various engineers, architects and environmental consultants to implement new energy-efficient designs will also be positively impacted as transit-oriented efficient developments are built.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *GHG Targets for Local Government's Transportation and Land Use Planning* strategy can be found in Figure 105. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 105: GHG Targets for Local Government's Transportation and Land Use Planning—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.1	\$7,742	\$984
Mining	0.4	\$85,614	\$12,800
Utilities	0.4	\$394,668	\$47,545
Construction	6.0	\$754,999	\$290,258
Manufacturing	1.2	\$464,294	\$80,213
Wholesale trade	2.2	\$447,864	\$167,879
Retail trade	5.7	\$349,700	\$176,541
Transportation and warehousing	2.5	\$306,203	\$107,355
Information	1.1	\$351,644	\$76,544
Finance and insurance	5.1	\$1,164,957	\$334,690
Real estate and rental and leasing	6.4	\$1,624,812	\$92,824
Professional, scientific, and technical services	11.0	\$1,538,830	\$734,171
Management of companies and enterprises	0.3	\$63,389	\$34,263
Administrative and support and waste management and remediation services	8.4	\$712,761	\$290,440
Educational services	1.2	\$88,844	\$49,752
Health care and social assistance	6.2	\$666,568	\$320,825
Arts, entertainment, and recreation	1.4	\$64,653	\$23,235
Accommodation and food services	3.9	\$254,546	\$88,475
Other services (except public administration)	3.5	\$291,140	\$116,312
Public administration	39.6	\$10,996,046	\$2,793,504
Total	106.6	\$20,629,272	\$5,838,610

Source: RESI



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan Final Draft

RESI of Towson University

As shown in the figure above, the strategy will support a total of 107 jobs, \$20.6 million in output, and \$5.8 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment due to this strategy is *Public administration*, primarily due to the expectation that local government employees will be needed on an ongoing basis as transit-oriented developments continue to be planned and maintained. *Professional, scientific, and technical services* and *Construction* will also experience ongoing positive impacts as such planning efforts continue. Other industries benefitting from operation of this strategy are those positively impacted by new household spending by households within the residential portions of new transit-oriented developments.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$81,478 on average per \$1 million for the investment phase and an annual total of \$34,364 for the operation phase.

3.7.3 Land Use Planning GHG Benefits

Population growth continues to produce traffic congestion, greater demand on resources, loss of green spaces, and other undesirable consequences throughout the state of Maryland. Through properly managed growth, communities can work toward mitigation of the negative effects associated with expansion in order to reduce GHG emissions. MDP's Smart Growth outlines four goals: support for existing communities by targeting resources for support of development in areas of existing infrastructure; conservation of the most valuable and scarce natural resources; taxpayer cost savings associated with enhanced building infrastructure intended to serve development which has spread out of regional hubs; and providing Marylanders with a high quality of life, no matter their place of residence within the state's borders. Benefits from these Smart Growth principles include minimizing air and water pollution, encouraging brownfields clean-up and reuse, and preserving natural lands.

Investment Phase

The total economic impacts of the investment phase of the *Land Use Planning GHG Benefits* strategy can be found in Figure 106. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 106: Land Use Planning GHG Benefits—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$1,227	\$160
Mining	0.0	\$4,335	\$836
Utilities	0.0	\$18,009	\$2,368
Construction	4.3	\$612,719	\$205,851
Manufacturing	0.1	\$46,832	\$8,132
Wholesale trade	0.2	\$42,204	\$15,820
Retail trade	1.0	\$61,982	\$31,615
Transportation and warehousing	0.2	\$24,032	\$8,043
Information	0.1	\$38,028	\$8,106
Finance and insurance	0.4	\$83,476	\$23,261
Real estate and rental and leasing	0.4	\$128,912	\$6,663
Professional, scientific, and technical services	3.0	\$409,126	\$208,627
Management of companies and enterprises	0.0	\$7,789	\$4,210
Administrative and support and waste management and remediation services	0.6	\$42,132	\$19,315
Educational services	0.1	\$10,663	\$5,994
Health care and social assistance	0.7	\$79,807	\$38,417
Arts, entertainment, and recreation	0.1	\$7,270	\$2,632
Accommodation and food services	0.5	\$29,631	\$10,329
Other services (except public administration)	0.4	\$34,257	\$14,499
Public administration	0.4	\$116,291	\$31,300
Average	12.8	\$1,798,724	\$646,178

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 13 jobs, \$1.8 million in output, and \$0.6 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment due to this strategy is *Construction*, primarily due to the expectation that in the planning of land management skilled engineers as well as transportation consultants may be needed to complete projects associated with this strategy through the proper allocation of scarce natural resources and most efficient plans for newly constructed areas.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Land Use Planning GHG Benefits* strategy can be found in Figure 107. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 107: Land Use Planning GHG Benefits—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.7	\$58,559	\$7,444
Mining	3.0	\$647,565	\$96,816
Utilities	2.9	\$2,985,170	\$359,620
Construction	45.2	\$5,710,632	\$2,195,439
Manufacturing	9.0	\$3,511,806	\$606,709
Wholesale trade	16.3	\$3,387,532	\$1,269,795
Retail trade	43.4	\$2,645,047	\$1,335,315
Transportation and warehousing	18.8	\$2,316,047	\$812,006
Information	8.2	\$2,659,750	\$578,963
Finance and insurance	38.5	\$8,811,454	\$2,531,518
Real estate and rental and leasing	48.4	\$12,289,686	\$702,096
Professional, scientific, and technical services	83.2	\$11,639,344	\$5,553,092
Management of companies and enterprises	2.2	\$479,459	\$259,156
Administrative and support and waste management and remediation services	63.8	\$5,391,151	\$2,196,818
Educational services	9.2	\$671,995	\$376,316
Health care and social assistance	47.2	\$5,041,762	\$2,426,646
Arts, entertainment, and recreation	10.5	\$489,019	\$175,747
Accommodation and food services	29.5	\$1,925,321	\$669,201
Other services (except public administration)	26.8	\$2,202,113	\$879,755
Public administration	299.4	\$83,171,455	\$21,129,397
Total	806.2	\$156,034,869	\$44,161,848

Source: RESI

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan Final Draft

RESI of Towson University

As shown in the figure above, the strategy will support a total of 806 jobs, \$156.0 million in output, and \$44.2 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment due to this strategy is *Public administration*, primarily due to the expectation that positions at the Maryland Department of Planning (and any other participating government agencies) will be created or retained in order to manage land use planning efforts under this strategy. *Professional, scientific, and technical services* will also benefit as continued programs will need further assistance and guidance in seeking the most energy efficient methods. *Administrative and support and waste management and remediation services* will benefit from the construction of new buildings. This industry includes services to buildings and dwellings, which will be in greater demand as more buildings are constructed.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$76,858 on average per \$1 million for the investment phase and an annual total of \$259,928 for the operation phase.

3.7.4 Growth Boundary GHG Benefits

To preserve existing communities, Maryland established Priority Funding Areas, targeted State resources to build on past investments, and reduced development pressure on critical farmland and natural resource areas. Through encouragement of projects in already developed areas, Priority Funding Areas will reduce the GHG emissions associated with continued urban and suburban sprawl in Maryland. By definition, Priority Funding Areas refer to areas of geographic growth defined under State law and designated by local jurisdictions. They provide a map for targeting State investment in infrastructure. This strategy will also provide environmental and economic benefits. The conservation and creation of green space in the rural, suburban, and urban communities will improve the quality of life by providing places where neighbors can congregate and recreate. Savings resulting from reduced spending on transportation fuels and vehicles can then be directed to spending on in-state produced goods and services which are desired by consumers but sometimes not within their designated budgets. In turn, this increase in household spending should produce benefits to Maryland's economy.

Investment Phase

The total economic impacts of the investment phase of the *Growth Boundary GHG Benefits* strategy can be found in Figure 108. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

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Figure 108: Growth Boundary GHG Benefits—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$1,176	\$153
Mining	0.0	\$3,907	\$738
Utilities	0.0	\$18,382	\$2,422
Construction	3.7	\$527,309	\$177,239
Manufacturing	0.1	\$44,226	\$7,719
Wholesale trade	0.2	\$40,870	\$15,320
Retail trade	1.0	\$59,734	\$30,429
Transportation and warehousing	0.2	\$25,958	\$8,860
Information	0.1	\$44,912	\$9,856
Finance and insurance	0.4	\$90,733	\$26,135
Real estate and rental and leasing	0.4	\$137,553	\$7,183
Professional, scientific, and technical services	2.7	\$367,588	\$186,753
Management of companies and enterprises	0.0	\$7,614	\$4,115
Administrative and support and waste management and remediation services	0.6	\$46,147	\$21,033
Educational services	0.2	\$13,113	\$7,128
Health care and social assistance	0.8	\$81,635	\$39,290
Arts, entertainment, and recreation	0.2	\$7,735	\$2,826
Accommodation and food services	0.5	\$30,976	\$10,793
Other services (except public administration)	1.7	\$162,822	\$80,948
Public administration	0.4	\$117,374	\$31,943
Average	13.4	\$1,829,765	\$670,884

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 13 jobs, \$1.8 million in output, and \$0.7 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment due to this strategy is *Construction*, primarily due to the expectation that trained professionals with experience in environmental construction and land renewal will be needed to support and maintain Priority Funding Areas. Environmental consultants in *Professional, scientific, and technical services* are also likely to be in demand as a result of investment in this strategy.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Growth Boundary GHG Benefits* strategy can be found in Figure 109. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 109: Growth Boundary GHG Benefits—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.1	\$9,524	\$1,192
Mining	0.0	\$4,741	\$280
Utilities	0.2	\$154,214	\$20,741
Construction	0.4	\$56,351	\$19,821
Manufacturing	0.4	\$197,011	\$28,339
Wholesale trade	1.3	\$267,309	\$100,199
Retail trade	8.2	\$499,459	\$251,541
Transportation and warehousing	1.1	\$124,079	\$42,761
Information	0.8	\$253,154	\$53,901
Finance and insurance	3.1	\$722,505	\$201,861
Real estate and rental and leasing	3.2	\$1,289,264	\$48,610
Professional, scientific, and technical services	1.9	\$261,104	\$114,660
Management of companies and enterprises	0.2	\$43,103	\$23,298
Administrative and support and waste management and remediation services	2.3	\$163,661	\$71,931
Educational services	1.9	\$144,318	\$80,465
Health care and social assistance	10.3	\$1,111,458	\$534,515
Arts, entertainment, and recreation	1.5	\$74,730	\$27,406
Accommodation and food services	4.7	\$304,561	\$106,258
Other services (except public administration)	4.2	\$303,335	\$129,799
Public administration	0.6	\$129,891	\$46,254
Total	46.4	\$6,113,771	\$1,903,833

Source: RESI

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan Final Draft

RESI of Towson University

As shown in the figure above, the strategy will support a total of 46 jobs, \$6.1 million in output, and \$1.9 million in wages annually once in operation. The industries experiencing the greatest positive economic impacts in terms of employment due to this strategy are those (such as *Health care and social assistance* and *Retail trade*) which would benefit from the increase in spending attributable to households directing savings elsewhere as a result of transportation and other savings.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$78,928 on average per \$1 million for the investment phase and an annual total of \$488,620 for the operation phase.

3.8 Innovative Initiatives

3.8.1 Leadership-by-Example – Local Government

This strategy seeks not only to fulfill a set of tasks, but also to provide direction for others. As Maryland strives to achieve a 20 percent reduction of GHG emissions by 2020 (from the 2006 baseline), leadership by example will emerge as an essential element and become increasingly important as more businesses and households look toward the State for guidance in regard to GHG emissions reductions. In partnership with Maryland county and municipal governments, state agencies are initiating the adoption of policies and practices to obtain high performance and energy-efficient buildings, facilities, and vehicle fleets as well as reduce the carbon footprint in purchasing, procurement, and other government operations. Some areas within Maryland have conducted GHG inventories on a jurisdictional level, adopted climate action plans and targets, and implemented tracking protocols, such as those provided by the International Council for Local Environmental Initiatives. Where local government protocols for the tracking of quantifiable reductions exist, MDE conducted a survey to track actual and projected success in GHG emissions reductions. Through MDE's statewide survey data results, a snapshot of 2010 actual local government GHG reduction was obtained.

Investment Phase

The total economic impacts of the investment phase of the *Leadership-by-Example – Local Government* strategy can be found in Figure 110. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 110: Leadership-by-Example – Local Government—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$867	\$110
Mining	0.0	\$3,393	\$423
Utilities	0.6	\$274,723	\$54,886
Construction	2.2	\$283,205	\$109,448
Manufacturing	0.1	\$30,293	\$5,161
Wholesale trade	0.2	\$33,852	\$12,689
Retail trade	0.7	\$40,744	\$20,599
Transportation and warehousing	0.2	\$24,834	\$8,413
Information	0.1	\$38,633	\$8,290
Finance and insurance	0.4	\$84,940	\$23,531
Real estate and rental and leasing	0.4	\$122,871	\$6,266
Professional, scientific, and technical services	2.7	\$365,820	\$185,318
Management of companies and enterprises	0.0	\$8,444	\$4,564
Administrative and support and waste management and remediation services	1.3	\$182,089	\$58,230
Educational services	0.1	\$9,835	\$5,529
Health care and social assistance	0.7	\$73,683	\$35,469
Arts, entertainment, and recreation	0.1	\$7,138	\$2,594
Accommodation and food services	0.5	\$30,099	\$10,491
Other services (except public administration)	0.4	\$31,449	\$13,175
Public administration	0.4	\$117,335	\$31,870
Average	11.1	\$1,764,249	\$597,056

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 11 jobs, \$1.8 million in output, and \$0.6 million in wages on average. The industries experiencing the greatest positive economic impacts in terms of employment due to this strategy are *Professional, scientific, and technical services* and *Construction*, primarily due to the expectation that state government must lead by example by obtaining high performance and energy-efficient buildings, among other measures. Environmental consultants will also likely be contracted to assist in the creation of GHG inventories, climate action plans and targets, and inventory and emissions tracking protocols.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Leadership-by-example – Local Government* strategy can be found in Figure 111. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 111: Leadership-by-Example – Local Government—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.8	\$67,671	\$8,602
Mining	3.5	\$748,318	\$111,880
Utilities	3.4	\$3,449,626	\$415,572
Construction	52.2	\$6,599,136	\$2,537,022
Manufacturing	10.4	\$4,058,199	\$701,105
Wholesale trade	18.8	\$3,914,590	\$1,467,359
Retail trade	50.2	\$3,056,584	\$1,543,073
Transportation and warehousing	21.8	\$2,676,395	\$938,344
Information	9.5	\$3,073,574	\$669,042
Finance and insurance	44.5	\$10,182,407	\$2,925,391
Real estate and rental and leasing	55.9	\$14,201,808	\$811,334
Professional, scientific, and technical services	96.1	\$13,450,280	\$6,417,084
Management of companies and enterprises	2.6	\$554,057	\$299,477
Administrative and support and waste management and remediation services	73.7	\$6,229,947	\$2,538,615
Educational services	10.6	\$776,549	\$434,866
Health care and social assistance	54.5	\$5,826,197	\$2,804,202
Arts, entertainment, and recreation	12.1	\$565,104	\$203,091
Accommodation and food services	34.1	\$2,224,877	\$773,320
Other services (except public administration)	31.0	\$2,544,734	\$1,016,634
Public administration	346.0	\$96,111,895	\$24,416,867
Total	931.7	\$180,311,946	\$51,032,880

Source: RESI



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan Final Draft

RESI of Towson University

As shown in the figure above, the strategy will support a total of 932 jobs, \$180.3 million in output, and \$51.0 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment due to this strategy is *Public administration*, primarily due to the expectation that leading by example will result in higher efficiency and subsequent cost savings for local governments, which will in turn be able to support additional employment. Other industry sectors will benefit from the ongoing sustainable procurement activities of local governments which are continuing implementation and operation of this strategy.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$97,062 on average per \$1 million for the investment phase and an annual total of \$300,370 for the operation phase.

3.8.2 Leadership-by-Example – Federal Government

Under this strategy, federal agencies with installations located in Maryland would be required to implement a comprehensive collection of lead-by-example programs which aim to improve efficiency, reduce waste, and integrate renewable energy and sustainable practices into facility operations. An established tool used to measure for a benchmark and track energy use along with GHG emissions would be necessary to achieve lead-by-example standards. Other goals of the federal government installations' lead-by-example programs include transparency, progress reports, targets, and defined objectives. Program examples include energy reduction in public buildings, facilities, and lands; improved fuel efficiency for fleet vehicles; water conservation, waste reduction, and recycling; the purchasing of products and services with lower life-cycle impacts; and the increased use of renewable energy.

Investment Phase

The total economic impacts of the investment phase of the *Leadership-by-Example – Federal Government* strategy can be found in Figure 112. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 112: Leadership-by-Example – Federal Government—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$1,038	\$125
Mining	0.0	\$3,041	\$311
Utilities	0.7	\$283,370	\$55,973
Construction	2.2	\$277,334	\$107,180
Manufacturing	0.1	\$32,748	\$5,617
Wholesale trade	0.2	\$39,486	\$14,801
Retail trade	0.7	\$42,528	\$21,499
Transportation and warehousing	0.2	\$27,864	\$9,430
Information	0.2	\$79,495	\$15,976
Finance and insurance	0.4	\$86,288	\$23,836
Real estate and rental and leasing	0.4	\$124,416	\$6,290
Professional, scientific, and technical services	2.7	\$364,580	\$184,547
Management of companies and enterprises	0.0	\$8,989	\$4,858
Administrative and support and waste management and remediation services	1.3	\$183,922	\$59,308
Educational services	0.1	\$10,303	\$5,792
Health care and social assistance	0.7	\$77,224	\$37,173
Arts, entertainment, and recreation	0.2	\$8,164	\$3,012
Accommodation and food services	0.5	\$34,799	\$12,131
Other services (except public administration)	0.4	\$34,888	\$14,537
Public administration	1.4	\$118,388	\$46,010
Total	12.4	\$1,838,866	\$628,407

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 12 jobs, \$1.8 million in output, and \$0.6 million in wages on average. The industries experiencing the greatest positive economic impacts in terms of employment due to this strategy are *Professional, scientific, and technical services* and *Construction*, primarily due to the expectation that federal government must lead by example by obtaining high performance and energy-efficient buildings, among other measures. Environmental consultants will also likely be contracted to assist and advise in the planning and implementation of

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

efficiency improvements, waste reduction, water conservation, renewable energy use, and other measures.

Operation Phase

The total economic impacts of the operation phase of the *Leadership-by-Example – Federal Government* strategy can be found in Figure 113. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 113: Leadership-by-Example – Federal Government—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	1.6	\$134,357	\$13,830
Mining	1.0	\$254,870	\$5,502
Utilities	6.6	\$6,835,375	\$848,447
Construction	5.7	\$724,944	\$272,588
Manufacturing	12.0	\$3,788,465	\$672,586
Wholesale trade	26.2	\$5,454,118	\$2,044,441
Retail trade	46.2	\$2,817,654	\$1,421,809
Transportation and warehousing	29.0	\$3,276,149	\$1,123,303
Information	63.5	\$24,364,519	\$4,637,531
Finance and insurance	29.0	\$6,853,771	\$1,923,495
Real estate and rental and leasing	29.4	\$9,374,271	\$500,374
Professional, scientific, and technical services	52.4	\$7,388,238	\$3,426,258
Management of companies and enterprises	2.9	\$632,444	\$341,847
Administrative and support and waste management and remediation services	69.3	\$4,748,970	\$2,117,438
Educational services	9.8	\$723,870	\$406,111
Health care and social assistance	51.0	\$5,447,587	\$2,621,963
Arts, entertainment, and recreation	18.7	\$905,026	\$352,284
Accommodation and food services	60.5	\$3,925,420	\$1,367,432
Other services (except public administration)	34.8	\$3,422,540	\$1,360,868
Public administration	728.7	\$58,258,131	\$22,445,681
Total	1,278.5	\$149,330,718	\$47,903,786

Source: RESI

As shown in the figure above, the strategy will support a total of 1,279 jobs, \$149.3 million in output, and \$47.9 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment due to this strategy is *Public administration*, primarily due to the expectation that leading by example will result in higher efficiency and subsequent cost savings for federal governments, which will in turn be able to support additional employment. Other industry sectors will benefit from the ongoing sustainable procurement activities of federal governments which are continuing implementation and operation of this strategy.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$104,384 on average per \$1 million for the investment phase and an annual total of \$4,215,598 for the operation phase.

3.8.3 Leadership-by-Example – Maryland University Lead-by-Example Initiatives

Throughout Maryland, the presidents of 22 public universities and colleges have come together to sign the American College and University Presidents Climate Commitment. This commitment requires that each school complete a GHG inventory, develop a climate action plan, and work toward strategy implementation to reduce GHG emissions and achieve a predefined set target. Commitment by schools to become climate-neutral by a certain date is encouraged. To achieve climate neutrality, schools are required to reduce or mitigate GHG emissions sourced from the school from a baseline year, with any remaining emissions to be offset by the purchase of carbon credits.

Investment Phase

The total economic impacts of the investment phase of the *Leadership-by-Example – Maryland University Lead-by-Example Initiatives* strategy can be found in Figure 114. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

**Figure 114: Leadership-by-Example – Maryland University Lead-by-Example Initiatives—
Investment Phase**

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$817	\$101
Mining	0.0	\$2,958	\$369
Utilities	0.4	\$170,787	\$33,394
Construction	1.3	\$170,498	\$64,380
Manufacturing	0.3	\$107,651	\$20,628
Wholesale trade	0.5	\$113,245	\$42,449
Retail trade	0.6	\$38,182	\$19,293
Transportation and warehousing	2.1	\$178,689	\$67,043
Information	0.1	\$39,342	\$8,602
Finance and insurance	0.3	\$80,914	\$22,434
Real estate and rental and leasing	0.4	\$124,934	\$6,768
Professional, scientific, and technical services	1.8	\$240,051	\$120,278
Management of companies and enterprises	0.0	\$10,286	\$5,560
Administrative and support and waste management and remediation services	0.9	\$121,006	\$40,356
Educational services	0.8	\$84,648	\$46,465
Health care and social assistance	0.7	\$70,446	\$33,909
Arts, entertainment, and recreation	0.1	\$6,676	\$2,410
Accommodation and food services	0.4	\$28,295	\$9,861
Other services (except public administration)	0.4	\$29,248	\$12,332
Public administration	0.5	\$120,666	\$33,127
Average	11.8	\$1,739,338	\$589,759

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 12 jobs, \$1.7 million in output, and \$0.6 million in wages on average. The industries experiencing the greatest positive economic impacts in terms of employment due to this strategy are *Transportation and warehousing*, and *Professional, scientific, and technical services*, primarily due to the expectation that universities must lead by example by obtaining high performance and energy-efficient buildings, and fleet vehicles among other measures. Environmental consultants will also likely be contracted to assist and advise in the planning and

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

implementation of building efficiency, efficient appliance purchasing, optimized operations, waste minimization, and other measures.

Operation Phase

The total economic impacts of the operation phase of the *Leadership-by-Example – Maryland University Lead-by-Example Initiatives* strategy can be found in Figure 115. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

**Figure 115: Leadership-by-Example – Maryland University Lead-by-Example Initiatives—
Operation Phase**

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.1	\$5,546	\$636
Mining	0.1	\$24,642	\$3,248
Utilities	0.2	\$246,574	\$31,029
Construction	1.6	\$205,103	\$78,441
Manufacturing	0.5	\$189,073	\$31,614
Wholesale trade	1.0	\$201,035	\$75,357
Retail trade	3.2	\$196,335	\$98,996
Transportation and warehousing	1.0	\$122,043	\$42,350
Information	0.7	\$213,116	\$49,443
Finance and insurance	2.0	\$472,521	\$134,046
Real estate and rental and leasing	3.8	\$951,105	\$54,621
Professional, scientific, and technical services	3.8	\$535,138	\$251,642
Management of companies and enterprises	0.1	\$29,082	\$15,719
Administrative and support and waste management and remediation services	3.2	\$258,973	\$105,296
Educational services	24.9	\$2,580,838	\$1,413,285
Health care and social assistance	3.6	\$388,408	\$186,946
Arts, entertainment, and recreation	0.7	\$35,399	\$12,899
Accommodation and food services	2.2	\$144,362	\$50,165
Other services (except public administration)	2.0	\$154,071	\$63,856
Public administration	10.0	\$2,753,450	\$710,033
Total	64.9	\$9,706,815	\$3,409,622

Source: RESI

As shown in the figure above, the strategy will support a total of 65 jobs, \$9.7 million in output, and \$3.4 million in wages annually once in operation. The industries experiencing the greatest positive economic impacts in terms of employment due to this strategy are *Educational services* and *Public administration*, primarily due to the expectation that leading by example will result in higher efficiency and subsequent cost savings for universities within Maryland's higher education system, which will in turn be able to support additional employment. Other industry

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

sectors will benefit from the ongoing sustainable purchasing by universities which are continuing implementation and operation of this strategy.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$99,439 on average per \$1 million for the investment phase and an annual total of \$254,923 for the operation phase.

3.8.4 Voluntary Stationary Source Reductions

The GGRA provides the manufacturing sector with two paths to follow to potentially receive credit for any voluntary programs that they are implementing. The first option states that companies may simply take totally voluntary action and provide a good faith estimate of potential emission reductions. Efforts will be acknowledged, and, if appropriate, included in the plan as a reduction. The driving uncertainty of emissions reduction calculations will remain a key factor in determining whether or not such reductions are included in the plan. The second option and more formal mechanism included in the GGRA allows companies to implement an early voluntary GHG emissions reduction plan and secure a formal “credit” for those actions. Early reductions must be approved by MDE prior to January 1, 2012. A source which implements an approved voluntary reduction plan under the provisions of the GGRA “may be eligible to receive voluntary early action credits under any future state law requiring GHG emissions reductions from the manufacturing sector,” according to MDE.

Investment Phase

The total economic impacts of the investment phase of the *Voluntary Stationary Source Reductions* strategy can be found in Figure 116. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 116: Voluntary Stationary Source Reductions—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$901	\$114
Mining	0.0	\$3,545	\$479
Utilities	0.6	\$242,680	\$48,327
Construction	2.7	\$361,855	\$136,229
Manufacturing	0.1	\$33,668	\$5,754
Wholesale trade	0.2	\$35,370	\$13,258
Retail trade	0.7	\$41,512	\$20,998
Transportation and warehousing	0.2	\$24,769	\$8,367
Information	0.1	\$38,202	\$8,176
Finance and insurance	0.3	\$83,760	\$23,217
Real estate and rental and leasing	0.4	\$122,810	\$6,382
Professional, scientific, and technical services	2.5	\$336,405	\$169,903
Management of companies and enterprises	0.0	\$8,313	\$4,493
Administrative and support and waste management and remediation services	1.2	\$163,373	\$52,752
Educational services	0.1	\$9,850	\$5,537
Health care and social assistance	0.7	\$73,792	\$35,522
Arts, entertainment, and recreation	0.1	\$7,027	\$2,554
Accommodation and food services	0.5	\$29,498	\$10,282
Other services (except public administration)	0.4	\$32,005	\$13,445
Public administration	0.4	\$117,077	\$31,720
Total	11.3	\$1,766,412	\$597,509

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 11 jobs, \$1.8 million in output, and \$0.6 million in wages on average. The industries experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy are *Professional, scientific, and technical services* and *Construction*, primarily due to the expectation that sources taking advantage of voluntary early reductions are likely have plans to retrofit or construct new, energy-efficient facilities, which will require engineers, planners, and construction workers within these two industries.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Voluntary Stationary Source Reductions* strategy can be found in Figure 117. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 117: Voluntary Stationary Source Reductions—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$259	\$33
Mining	0.0	\$176	\$10
Utilities	0.0	\$6,390	\$868
Construction	0.0	\$2,454	\$903
Manufacturing	0.0	\$8,229	\$1,729
Wholesale trade	0.0	\$9,384	\$3,518
Retail trade	0.2	\$13,645	\$6,874
Transportation and warehousing	0.0	\$5,261	\$1,804
Information	0.1	\$33,625	\$7,529
Finance and insurance	0.1	\$30,118	\$8,665
Real estate and rental and leasing	0.2	\$50,901	\$2,669
Professional, scientific, and technical services	0.3	\$41,697	\$19,194
Management of companies and enterprises	1.5	\$320,540	\$173,257
Administrative and support and waste management and remediation services	0.1	\$10,635	\$4,759
Educational services	0.0	\$3,610	\$2,024
Health care and social assistance	0.3	\$27,893	\$13,424
Arts, entertainment, and recreation	0.1	\$4,092	\$1,352
Accommodation and food services	0.2	\$10,353	\$3,609
Other services (except public administration)	0.2	\$12,041	\$5,458
Public administration	0.0	\$4,297	\$1,707
Total	3.4	\$595,602	\$259,383

Source: RESI

**Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan
Final Draft**

RESI of Towson University

As shown in the figure above, the strategy will support a total of 3 jobs, \$0.6 million in output, and \$0.3 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy is *Management of companies and enterprises*, primarily due to the expectation that sources which pursue voluntary early reductions have successfully implemented retrofitting or construct new, energy-efficient facilities. These facilities generate operating cost savings which are passed on to a wide variety of companies and enterprises. Positive impacts occur in other industries as these cost savings allow companies and enterprises to hire additional workers (who then spend in the economy) or increase spending with other vendors.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$93,753 on average per \$1 million for the investment phase and an annual total of \$29,976 for the operation phase.

3.8.5 State of Maryland Initiatives to Lead by Example

Through a comprehensive suite of lead-by-example programs, state government in Maryland aims to improve efficiency, reduce waste, and undergo renewable energy practices in all of its agencies' operations and facilities as well as in their purchasing practices. DGS oversees two existing programs under this suite. One strategy in particular mandates the purchase of recycled paper, which must comprise approximately 90 percent of the total volume of paper purchased. The price preference associated with recycled products has also increased from 5 to 8 percent.

Investment Phase

The total economic impacts of the investment phase of the *State of Maryland Initiatives to Lead by Example* strategy can be found in Figure 118. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 118: State of Maryland Initiatives to Lead by Example—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$887	\$112
Mining	0.0	\$2,888	\$359
Utilities	0.1	\$108,591	\$15,605
Construction	1.5	\$195,227	\$73,549
Manufacturing	0.1	\$30,258	\$5,181
Wholesale trade	1.3	\$265,690	\$99,592
Retail trade	0.7	\$44,208	\$22,333
Transportation and warehousing	0.3	\$30,284	\$10,865
Information	0.1	\$44,720	\$9,750
Finance and insurance	0.4	\$90,434	\$25,059
Real estate and rental and leasing	0.4	\$138,013	\$7,000
Professional, scientific, and technical services	3.9	\$510,967	\$268,513
Management of companies and enterprises	0.1	\$11,759	\$6,356
Administrative and support and waste management and remediation services	0.7	\$49,916	\$23,174
Educational services	0.1	\$11,006	\$6,181
Health care and social assistance	0.8	\$82,037	\$39,490
Arts, entertainment, and recreation	0.2	\$8,094	\$2,907
Accommodation and food services	0.5	\$32,046	\$11,170
Other services (except public administration)	0.4	\$34,890	\$14,381
Public administration	0.5	\$118,969	\$33,070
Average	12.1	\$1,810,882	\$674,649

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 12 jobs, \$1.8 million in output, and \$0.7 million in wages on average. The industries experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy are *Professional, scientific, and technical services* and *Construction*, primarily due to the expectation that the State of Maryland will need construction, architectural, and engineering services to implement its High Performance Building program. *Wholesale trade* will also see positive impacts due to the Green Maryland Act of 2010, which involves the purchasing of recycled paper from wholesale vendors within this industry.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *State of Maryland Initiatives to Lead by Example* strategy can be found in Figure 119. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 119: State of Maryland Initiatives to Lead by Example—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$1,203	\$153
Mining	0.1	\$13,306	\$1,989
Utilities	0.1	\$61,337	\$7,389
Construction	0.9	\$117,339	\$45,111
Manufacturing	0.2	\$72,158	\$12,466
Wholesale trade	0.3	\$69,605	\$26,091
Retail trade	0.9	\$54,349	\$27,437
Transportation and warehousing	0.4	\$47,589	\$16,685
Information	0.2	\$54,651	\$11,896
Finance and insurance	0.8	\$181,052	\$52,016
Real estate and rental and leasing	1.0	\$252,521	\$14,426
Professional, scientific, and technical services	1.7	\$239,158	\$114,102
Management of companies and enterprises	0.0	\$9,852	\$5,325
Administrative and support and waste management and remediation services	1.3	\$110,774	\$45,139
Educational services	0.2	\$13,808	\$7,732
Health care and social assistance	1.0	\$103,595	\$49,861
Arts, entertainment, and recreation	0.2	\$10,048	\$3,611
Accommodation and food services	0.6	\$39,560	\$13,750
Other services (except public administration)	0.6	\$45,248	\$18,077
Public administration	6.2	\$1,708,957	\$434,154
Total	16.6	\$3,206,111	\$907,411

Source: RESI

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

As shown in the figure above, the strategy will support a total of 17 jobs, \$3.2 million in output, and \$0.9 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy is *Public administration*, primarily due to the expectation that once state government implements this strategy and recoups any upfront costs associated with implementation, it will experience cost savings from reduced building operation costs and reduced paper waste under the two programs included in this strategy.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$117,676 on average per \$1 million for the investment phase and an annual total of \$235,352 for the operation phase.

3.8.6 State of Maryland Carbon and Footprint Initiatives

Launched by Governor O'Malley in 2009, the Maryland Environmental Footprint initiative works to calculate, reduce, track, and report the environmental footprint of State agencies and universities in five areas: electricity and building energy, water consumption, vehicle fuel reductions in fleet vehicles, waste/recycling, and aggregate GHG emissions. State government has established goals in these areas in conjunction with the state's suite of lead-by-example programs.

Investment Phase

The total economic impacts of the investment phase of the *State of Maryland Carbon Footprint Initiatives* strategy can be found in Figure 120. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 120: State of Maryland Carbon and Footprint Initiatives—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$791	\$121
Mining	0.0	\$2,601	\$226
Utilities	0.6	\$274,814	\$54,908
Construction	0.2	\$25,948	\$10,068
Manufacturing	0.1	\$23,921	\$3,944
Wholesale trade	0.8	\$160,421	\$60,133
Retail trade	0.6	\$35,346	\$17,824
Transportation and warehousing	0.2	\$26,961	\$9,574
Information	0.1	\$43,734	\$9,408
Finance and insurance	0.3	\$83,442	\$23,028
Real estate and rental and leasing	0.4	\$122,182	\$6,518
Professional, scientific, and technical services	1.7	\$226,699	\$116,741
Management of companies and enterprises	0.0	\$10,800	\$5,838
Administrative and support and waste management and remediation services	4.3	\$448,563	\$155,024
Educational services	0.1	\$9,395	\$5,264
Health care and social assistance	0.6	\$69,347	\$33,381
Arts, entertainment, and recreation	0.1	\$6,954	\$2,518
Accommodation and food services	0.4	\$28,059	\$9,778
Other services (except public administration)	0.4	\$31,947	\$12,923
Public administration	0.5	\$118,713	\$32,659
Average	11.7	\$1,750,637	\$569,876

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 12 jobs, \$1.8 million in output, and \$0.6 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy is *Administrative and support and waste management and remediation services*, primarily due to the expectation that implementation of this strategy will require services within this industry such as waste reduction, reuse, recycling, and efficient water usage, among other changes. Environmental consultants in *Professional, scientific, and technical*

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

services are also expected to be needed for development, planning, and implementation of these carbon and footprint initiatives.

Operation Phase

The total economic impacts of the operation phase of the *State of Maryland Carbon Footprint Initiatives* strategy can be found in Figure 121. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 121: State of Maryland Carbon and Footprint Initiatives—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.3	\$23,129	\$2,940
Mining	1.2	\$255,770	\$38,240
Utilities	1.2	\$1,179,057	\$142,040
Construction	17.9	\$2,255,537	\$867,136
Manufacturing	3.6	\$1,387,063	\$239,633
Wholesale trade	6.4	\$1,337,978	\$501,533
Retail trade	17.1	\$1,044,718	\$527,411
Transportation and warehousing	7.4	\$914,772	\$320,719
Information	3.3	\$1,050,525	\$228,674
Finance and insurance	15.2	\$3,480,273	\$999,877
Real estate and rental and leasing	19.1	\$4,854,075	\$277,308
Professional, scientific, and technical services	32.9	\$4,597,208	\$2,193,313
Management of companies and enterprises	0.9	\$189,373	\$102,359
Administrative and support and waste management and remediation services	25.2	\$2,129,350	\$867,680
Educational services	3.6	\$265,419	\$148,634
Health care and social assistance	18.6	\$1,991,352	\$958,456
Arts, entertainment, and recreation	4.1	\$193,149	\$69,415
Accommodation and food services	11.7	\$760,447	\$264,315
Other services (except public administration)	10.6	\$869,772	\$347,478
Public administration	118.3	\$32,850,346	\$8,345,508
Total	318.4	\$61,629,311	\$17,442,667

Source: RESI

As shown in the figure above, the strategy will support a total of 318 jobs, \$61.6 million in output, and \$17.4 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy is *Public administration*, primarily due to the expectation that once state government implements this strategy and recoups any upfront costs associated with implementation, it will experience cost savings from waste reduction, reuse, recycling, and efficient water usage, among other changes associated with these carbon and footprint initiatives. Cost savings then allow for

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

increased spending elsewhere, which produces a ripple effect through the economy in terms of indirect and induced impacts.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$122,826 on average per \$1 million for the investment phase and an annual total of \$245,653 for the operation phase.

3.8.7 Job Creation and Economic Development Initiatives Related to Climate Change

Promotion of economic development opportunities associated with reducing GHG emissions in Maryland is the key focus for this strategy managed by DBED. Based on Governor O'Malley's aggressive goal of creating, retraining, or placing 100,000 green jobs by 2015, this program will also create a task force managed by DBED. The Green Jobs & Industry Task Force aims to help Maryland create green jobs and move toward a more environmentally conscious economy. To remain on task with Governor O'Malley's job creation goal, the task force was charged with developing recommendations for green jobs creation and retention, scarce and finite natural resource utilization, environmental protection and restoration, and clean and efficient energy use in Maryland.

Investment Phase

The total economic impacts of the investment phase of the *Job Creation and Economic Development Initiatives Related to Climate Change* strategy can be found in Figure 122. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 122: Job Creation and Economic Development Initiatives Related to Climate Change—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$923	\$117
Mining	0.0	\$1,329	\$155
Utilities	0.0	\$19,925	\$2,637
Construction	0.1	\$13,624	\$5,071
Manufacturing	0.1	\$25,650	\$4,268
Wholesale trade	0.2	\$33,948	\$12,725
Retail trade	0.8	\$49,984	\$25,183
Transportation and warehousing	0.2	\$22,072	\$7,883
Information	0.1	\$48,149	\$10,454
Finance and insurance	0.4	\$107,385	\$29,976
Real estate and rental and leasing	0.5	\$165,383	\$7,907
Professional, scientific, and technical services	8.2	\$1,021,391	\$556,784
Management of companies and enterprises	0.0	\$10,497	\$5,674
Administrative and support and waste management and remediation services	1.0	\$68,585	\$32,602
Educational services	0.2	\$13,315	\$7,486
Health care and social assistance	0.9	\$100,667	\$48,458
Arts, entertainment, and recreation	0.2	\$10,373	\$3,670
Accommodation and food services	0.6	\$39,007	\$13,595
Other services (except public administration)	0.5	\$44,787	\$17,735
Public administration	0.5	\$120,166	\$32,992
Average	14.6	\$1,917,159	\$825,371

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately 15 jobs, \$1.9 million in output, and \$0.8 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy is *Professional, scientific, and technical services*, primarily due to the expectation that, as this strategy creates a more environmentally conscious economy and more highly skilled green jobs, such jobs will be in greater demand and the green industry will grow as

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

a result. A number of green jobs, such as environmental consultants, fall under *Professional, scientific, and technical services*.

Operation Phase

The total economic impacts of the operation phase of the *Job Creation and Economic Development Initiatives Related to Climate Change* strategy can be found in Figure 123. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 123: Job Creation and Economic Development Initiatives Related to Climate Change—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	2.0	\$165,815	\$20,759
Mining	0.3	\$82,539	\$4,871
Utilities	2.8	\$2,684,968	\$361,117
Construction	7.6	\$981,106	\$345,098
Manufacturing	7.6	\$3,430,078	\$493,398
Wholesale trade	22.4	\$4,654,015	\$1,744,528
Retail trade	142.7	\$8,695,887	\$4,379,491
Transportation and warehousing	19.2	\$2,160,293	\$744,494
Information	13.7	\$4,407,569	\$938,452
Finance and insurance	53.5	\$12,579,254	\$3,514,524
Real estate and rental and leasing	56.0	\$22,446,885	\$846,322
Professional, scientific, and technical services	33.0	\$4,545,978	\$1,996,310
Management of companies and enterprises	3.5	\$750,452	\$405,632
Administrative and support and waste management and remediation services	39.3	\$2,849,439	\$1,252,361
Educational services	32.7	\$2,512,659	\$1,400,948
Health care and social assistance	179.6	\$19,351,175	\$9,306,243
Arts, entertainment, and recreation	25.4	\$1,301,092	\$477,163
Accommodation and food services	82.0	\$5,302,596	\$1,850,015
Other services (except public administration)	72.9	\$5,281,257	\$2,259,890
Public administration	11.0	\$2,261,490	\$805,305
Total	807.3	\$106,444,546	\$33,146,921

Source: RESI

As shown in the figure above, the strategy will support a total of 807 jobs, \$106.4 million in output, and \$33.2 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy is *Health care and social assistance* and *Retail trade*, primarily due to the health benefits enjoyed by newly hired individuals as well as their purchases as the green industry grows and adds new employees to the state workforce.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately \$87,920 on average per \$1 million for the investment phase and an annual total of \$8,507,159 for the operation phase.

3.8.8 Public Health Initiatives Related to Climate Change

Over time, climate change within Maryland has resulted in increased negative health effects for Maryland residents. During periods of climate change, the prevalence of infectious diseases and other threats to human health significantly increases. The response to these negative effects is often costly for state governments, private businesses, and individuals. Through the collaborative effort of DHMH and other state agencies, steps to minimize the public health risks of climate change have been taken. These steps include policies directed toward GHG emissions reductions and air quality improvements. In support of the initiative, DHMH has been working with MDE to improve and effectively implement the capabilities of its Environmental Public Health Tracking infrastructure.

Investment Phase

The total economic impacts of the investment phase of the *Public Health Initiatives Related to Climate Change* strategy can be found in Figure 124. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 124: Public Health Initiatives Related to Climate Change—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$831	\$106
Mining	0.0	\$1,314	\$152
Utilities	0.0	\$20,666	\$2,757
Construction	0.0	\$14,229	\$5,338
Manufacturing	0.0	\$26,953	\$4,774
Wholesale trade	0.0	\$39,200	\$14,694
Retail trade	0.0	\$44,743	\$22,553
Transportation and warehousing	0.0	\$23,632	\$8,587
Information	2.9	\$514,997	\$216,511
Finance and insurance	0.0	\$102,347	\$28,573
Real estate and rental and leasing	-0.3	\$167,294	\$8,695
Professional, scientific, and technical services	2.1	\$333,537	\$174,847
Management of companies and enterprises	0.0	\$17,867	\$9,657
Administrative and support and waste management and remediation services	0.3	\$76,719	\$36,854
Educational services	0.0	\$11,820	\$6,643
Health care and social assistance	-5.8	\$321,723	\$126,609
Arts, entertainment, and recreation	0.0	\$9,296	\$3,358
Accommodation and food services	0.0	\$35,867	\$12,491
Other services (except public administration)	0.0	\$37,266	\$15,712
Public administration	0.3	\$119,879	\$33,278
Average	-0.2	\$1,920,180	\$732,189

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate no new full-time equivalent jobs, approximately \$1.9 million in output, and \$0.7 million in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy is *Information*, primarily due to the expectation that hospitals, doctor's offices, and private practices will need to adhere to this new strategy. In an effort to maintain systems to keep up with the technology, health care professionals will need to hire employees with an information systems background.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

The total economic impacts of the operation phase of the *Public Health Initiatives Related to Climate Change* strategy can be found in Figure 125. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.

Figure 125: Public Health Initiatives Related to Climate Change—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.1	\$8,290	\$1,038
Mining	0.0	\$4,127	\$244
Utilities	0.1	\$134,241	\$18,055
Construction	0.4	\$49,053	\$17,254
Manufacturing	0.4	\$171,495	\$24,669
Wholesale trade	1.1	\$232,688	\$87,222
Retail trade	7.1	\$434,771	\$218,963
Transportation and warehousing	1.0	\$108,009	\$37,223
Information	0.7	\$220,367	\$46,920
Finance and insurance	2.7	\$628,929	\$175,717
Real estate and rental and leasing	2.8	\$1,122,285	\$42,314
Professional, scientific, and technical services	1.7	\$227,287	\$99,810
Management of companies and enterprises	0.2	\$37,521	\$20,281
Administrative and support and waste management and remediation services	2.0	\$142,464	\$62,615
Educational services	1.6	\$125,626	\$70,044
Health care and social assistance	9.0	\$967,507	\$465,287
Arts, entertainment, and recreation	1.3	\$65,051	\$23,857
Accommodation and food services	4.1	\$265,116	\$92,496
Other services (except public administration)	3.6	\$264,049	\$112,988
Public administration	0.6	\$113,069	\$40,263
Total	40.4	\$5,321,944	\$1,657,258

Source: RESI

**Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan
Final Draft**

RESI of Towson University

As shown in the figure above, the strategy will support a total of 40 jobs, \$5.3 million in output, and \$1.7 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy is *Health care and social assistance*. Primarily due to the new regulations, employers in the health care industry will seek individuals with a diversified background in health care.

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately -\$7,746 on average per \$1 million for the investment phase and an annual total of \$425,334 for the operation phase.

3.8.9 Title V Permits for GHG Sources

The Title V operating permits program was established through the Clean Air Act amendments of 1990. Before 1990, states were required to issue air pollution permits to businesses which created new pollution sources or modified existing pollution sources. Title V of the amendments required all states to develop and implement permit programs for sources already in operation. The program is achieving enhanced compliance with industrial and commercial air pollution requirements. The Title V Program does not establish any new emissions limitations, standards, or work practices on an affected facility. However, there may be additional recordkeeping, monitoring, or reporting requirements. EPA granted Maryland final full approval for its Title V permit program in February 2003.

Investment Phase

The total economic impacts of the investment phase of the *Title V Permits for GHG Sources* strategy can be found in Figure 126. For direct, indirect, and induced impacts, please refer to Appendix A. For information regarding the modeling assumptions and procedures used to derive impacts for this strategy and phase, please refer to Appendix C. For a discussion of the general occupations most likely to be associated with strategies within each subject area, please refer to Appendix D.



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 126: Title V Permits for GHG Sources—Investment Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$299	\$109
Mining	0.0	\$964	\$160
Utilities	0.0	-\$1,281	-\$242
Construction	0.1	\$10,224	\$4,002
Manufacturing	0.0	\$909	-\$446
Wholesale trade	0.0	\$1,019	\$382
Retail trade	0.0	-\$1,978	-\$988
Transportation and warehousing	0.1	\$6,385	\$2,377
Information	1.1	\$262,196	\$67,650
Finance and insurance	0.0	-\$5,654	-\$2,375
Real estate and rental and leasing	0.0	-\$7,236	-\$899
Professional, scientific, and technical services	4.1	\$584,945	\$297,948
Management of companies and enterprises	-4.6	-\$996,279	-\$538,506
Administrative and support and waste management and remediation services	0.4	\$29,207	\$13,933
Educational services	0.0	-\$520	-\$275
Health care and social assistance	-0.1	-\$5,842	-\$2,804
Arts, entertainment, and recreation	-0.1	-\$4,309	-\$1,132
Accommodation and food services	0.0	-\$34	-\$20
Other services (except public administration)	-0.1	-\$3,478	-\$2,914
Public administration	0.4	\$104,462	\$26,736
Average	1.2	-\$26,002	-\$137,304

Source: RESI

As shown in the figure above, \$1 million dollars invested in strategy implementation will generate approximately one job, -\$26,000 in output, and -\$137,300 in wages on average. The industry experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy is *Professional, scientific, and technical services*, primarily due to the expectation that companies and enterprises required to purchase Title V permits are likely to demand services in this industry relating to energy efficiency and emissions reductions to reduce the amount of permits they need to purchase through auctions. This industry will also benefit from auction proceeds being channeled into various energy efficiency programs relating to the

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

services provided within this industry. The top losing industry during implementation is *Management of companies and enterprises* due to the expectation that companies required to purchase permits through the auctions will experience negative impacts associated with those upfront costs.

Operation Phase

The total economic impacts of the operation phase of the *Title V Permits for GHG Sources* strategy can be found in Figure 127. For direct, indirect, and induced impacts, please refer to Appendix A.



Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan**Final Draft**

RESI of Towson University

Figure 127: Title V Permits for GHG Sources—Operation Phase

Industry Sector	Employment	Output	Wages
Agriculture, forestry, fishing, and hunting	0.0	\$226	\$29
Mining	0.0	\$2,494	\$373
Utilities	0.0	\$11,496	\$1,385
Construction	0.2	\$21,991	\$8,455
Manufacturing	0.0	\$13,524	\$2,336
Wholesale trade	0.1	\$13,045	\$4,890
Retail trade	0.2	\$10,186	\$5,142
Transportation and warehousing	0.1	\$8,919	\$3,127
Information	0.0	\$10,243	\$2,230
Finance and insurance	0.1	\$33,933	\$9,749
Real estate and rental and leasing	0.2	\$47,327	\$2,704
Professional, scientific, and technical services	0.3	\$44,823	\$21,385
Management of companies and enterprises	0.0	\$1,846	\$998
Administrative and support and waste management and remediation services	0.2	\$20,761	\$8,460
Educational services	0.0	\$2,588	\$1,449
Health care and social assistance	0.2	\$19,416	\$9,345
Arts, entertainment, and recreation	0.0	\$1,883	\$677
Accommodation and food services	0.1	\$7,414	\$2,577
Other services (except public administration)	0.1	\$8,480	\$3,388
Public administration	1.2	\$320,290	\$81,369
Total	3.1	\$600,884	\$170,066

Source: RESI

As shown in the figure above, the strategy will support a total of 3 jobs, \$0.6 million in output, and \$0.2 million in wages annually once in operation. The industry experiencing the greatest positive economic impacts in terms of employment due to this phase of the strategy is *Public administration*, primarily due to the expectation that the ongoing permit auctions and the resulting proceeds will need to be administered and monitored by individuals employed by the state government.

Economic Impact Analysis for the Greenhouse Gas Emissions Reduction Act 2012 Plan

Final Draft

RESI of Towson University

Fiscal Impacts

As a result of the previously discussed activities contributing to the economic impacts of the strategy, the total state and local tax revenues would come to approximately -\$11,881 on average per \$1 million for the investment phase and an annual total of \$145,024 for the operation phase.



Appendices A and B
Economic Impact Analysis for the GGRA 2012 Plan
Final Draft

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Submitted by



December 30, 2011

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

Table of Contents

Appendix A—Detailed Impacts.....	16
A.1 Energy	16
A.2 Transportation	112
A.3 Agriculture and Forestry	226
A.4 Recycling.....	286
A.5 Multi-Sector	292
A.6 Buildings	298
A.7 Land Use	310
A.8 Innovative Initiatives.....	334
Appendix B—Methodology.....	388
B.1 General Overview	388
B.2 IMPLAN Model Overview	389
B.3 IMPLAN Industry Sectors	392
B.4 Modeling Example.....	424

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft
 RESI of Towson University

Table of Figures

Figure 1: Regional Greenhouse Gas Initiative—Investment Phase, Employment Impacts 16

Figure 2: Regional Greenhouse Gas Initiative—Investment Phase, Output Impacts 17

Figure 3: Regional Greenhouse Gas Initiative—Investment Phase, Wage Impacts..... 18

Figure 4: Regional Green House Initiative—Operation Phase, Employment Impacts 19

Figure 5: Regional Green House Initiative—Operation Phase, Output Impacts 20

Figure 6: Regional Green House Initiative—Operation Phase, Wage Impacts..... 21

Figure 7: GHG Reductions from Imported Power—Investment Phase, Employment Impacts ... 22

Figure 8: GHG Reductions from Imported Power—Investment Phase, Output Impacts..... 23

Figure 9: GHG Reductions from Imported Power—Investment Phase, Wage Impacts..... 24

Figure 10: GHG Reductions from Imported Power—Operation Phase, Employment Impacts... 25

Figure 11: GHG Reductions from Imported Power—Operation Phase, Output Impacts..... 26

Figure 12: GHG Reductions from Imported Power—Operation Phase, Wage Impacts 27

Figure 13: Federal New Source Performance Standard—Investment Phase, Employment Impacts 28

Figure 14: Federal New Source Performance Standard—Investment Phase, Output Impacts..... 29

Figure 15: Federal New Source Performance Standard—Investment Phase, Wage Impacts..... 30

Figure 16: Federal New Source Performance Standard—Operation Phase, Employment Impacts 31

Figure 17: Federal New Source Performance Standard—Operation Phase, Output Impacts..... 32

Figure 18: Federal New Source Performance Standard—Operation Phase, Wage Impacts 33

Figure 19: MACT—Investment Phase, Employment Impacts 34

Figure 20: MACT—Investment Phase, Output Impacts..... 35

Figure 21: MACT—Investment Phase, Wage Impacts 36

Figure 22: MACT—Operation Phase, Employment Impacts..... 37

Figure 23: MACT—Operation Phase, Output Impacts 38

Figure 24: MACT—Operation Phase, Wage Impacts 39

Figure 25: Prevention of Significant Deterioration—Investment Phase, Employment Impacts .. 40

Figure 26: Prevention of Significant Deterioration—Investment Phase, Output Impacts..... 41

Figure 27: Prevention of Significant Deterioration—Investment Phase, Wage Impacts 42

Figure 28: Prevention of Significant Deterioration—Operation Phase, Employment Impacts.... 43

Figure 29: Prevention of Significant Deterioration—Operation Phase, Output Impacts 44

Figure 30: Prevention of Significant Deterioration—Operation Phase, Wages Impacts..... 45

Figure 31: Energy Efficiency in the Residential Sector—Investment Phase, Employment Impacts 46

Figure 32: Energy Efficiency in the Residential Sector—Investment Phase, Output Impacts 47

Figure 33: Energy Efficiency in the Residential Sector—Investment Phase, Wage Impacts 48

Figure 34: Energy Efficiency in the Residential Sector—Operation Phase, Employment Impacts 49

Figure 35: Energy Efficiency in the Residential Sector—Operation Phase, Output Impacts 50

Figure 36: Energy Efficiency in the Residential Sector—Operation Phase, Wage Impacts 51

Figure 37: Energy Efficiency in the Commercial and Industrial Sectors—Investment Phase, Employment Impacts 52



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft
 RESI of Towson University

Figure 38: Energy Efficiency in the Commercial and Industrial Sectors—Investment Phase, Output Impacts..... 53

Figure 39: Energy Efficiency in the Commercial and Industrial Sectors—Investment Phase, Wage Impacts..... 54

Figure 40: Energy Efficiency in the Commercial and Industrial Sectors—Operation Phase, Employment Impacts 55

Figure 41: Energy Efficiency in the Commercial and Industrial Sectors—Operation Phase, Output Impacts..... 56

Figure 42: Energy Efficiency in the Commercial and Industrial Sectors—Operation Phase, Wage Impacts..... 57

Figure 43: Energy Efficiency—Appliances and Other Products—Investment Phase, Employment Impacts..... 58

Figure 44: Energy Efficiency—Appliances and Other Products—Investment Phase, Output Impacts..... 59

Figure 45: Energy Efficiency—Appliances and Other Products—Investment Phase, Wage Impacts..... 60

Figure 46: Energy Efficiency—Appliances and Other Products—Operation Phase, Employment Impacts..... 61

Figure 47: Energy Efficiency—Appliances and Other Products—Operation Phase, Output Impacts..... 62

Figure 48: Energy Efficiency—Appliances and Other Products—Operation Phase, Wage Impacts..... 63

Figure 49: Energy Efficiency in the Power Sector--General—Investment Phase, Employment Impacts..... 64

Figure 50: Energy Efficiency in the Power Sector--General—Investment Phase, Output Impacts..... 65

Figure 51: Energy Efficiency in the Power Sector--General—Investment Phase, Wage Impacts..... 66

Figure 52: Energy Efficiency in the Power Sector--General—Operation Phase, Employment Impacts..... 67

Figure 53: Energy Efficiency in the Power Sector--General—Operation Phase, Output Impacts..... 68

Figure 54: Energy Efficiency in the Power Sector--General—Operation Phase, Wage Impacts..... 69

Figure 55: EmPOWER – Utility Subprograms—Investment Phase, Employment Impacts 70

Figure 56: EmPOWER – Utility Subprograms—Investment Phase, Output Impacts..... 71

Figure 57: EmPOWER – Utility Subprograms—Investment Phase, Wage Impacts..... 72

Figure 58: EmPOWER – Utility Subprograms—Operation Phase, Employment Impacts 73

Figure 59: EmPOWER – Utility Subprograms—Operation Phase, Output Impacts..... 74

Figure 60: EmPOWER – Utility Subprograms—Operation Phase, Wage Impacts 75

Figure 61: Maryland Renewable Energy Portfolio Standard Subprogram—Investment Phase, Employment Impacts 76

Figure 62: Maryland Renewable Energy Portfolio Standard Subprogram—Investment Phase, Output Impacts..... 77

Figure 63: Maryland Renewable Energy Portfolio Standard Subprogram—Investment Phase, Wage Impacts..... 78



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft
 RESI of Towson University

Figure 64: Maryland Renewable Energy Portfolio Standard Subprogram—Operation Phase, Employment Impacts 79

Figure 65: Maryland Renewable Energy Portfolio Standard Subprogram—Operation Phase, Output Impacts..... 80

Figure 66: Maryland Renewable Energy Portfolio Standard Subprogram—Phase, Wage Impacts 81

Figure 67: Incentives and Grant Subprograms to Support Renewable Energy—Investment Phase, Employment Impacts 82

Figure 68: Incentives and Grant Subprograms to Support Renewable Energy—Investment Phase, Output Impacts..... 83

Figure 69: Incentives and Grant Subprograms to Support Renewable Energy—Investment Phase, Wage Impacts..... 84

Figure 70: Incentives and Grant Subprograms to Support Renewable Energy—Operation Phase, Employment Impacts 85

Figure 71: Incentives and Grant Subprograms to Support Renewable Energy—Operation Phase, Output Impacts..... 86

Figure 72: Incentives and Grant Subprograms to Support Renewable Energy—Operation Phase, Wage Impacts..... 87

Figure 73: Offshore Wind Initiatives to Support Renewable Energy—Investment Phase, Employment Impacts 88

Figure 74: Offshore Wind Initiatives to Support Renewable Energy—Investment Phase, Output Impacts..... 89

Figure 75: Offshore Wind Initiatives to Support Renewable Energy—Investment Phase, Wage Impacts..... 90

Figure 76: Offshore Wind Initiatives to Support Renewable Energy—Operation Phase, Employment Impacts 91

Figure 77: Offshore Wind Initiatives to Support Renewable Energy—Operation Phase, Output Impacts..... 92

Figure 78: Offshore Wind Initiatives to Support Renewable Energy—Operation Phase, Wage Impacts..... 93

Figure 79: Combined Heat and Power—Investment Phase, Employment Impacts 94

Figure 80: Combined Heat and Power—Investment Phase, Output Impacts..... 95

Figure 81: Combined Heat and Power—Investment Phase, Wage Impacts..... 96

Figure 82: Combined Heat and Power—Operation Phase, Employment Impacts 97

Figure 83: Combined Heat and Power—Operation Phase, Output Impacts..... 98

Figure 84: Combined Heat and Power—Operation Phase, Wage Impacts 99

Figure 85 Main Street—Investment Phase, Employment Impacts 100

Figure 86 Main Street—Investment Phase, Output Impacts 101

Figure 87: Main Street—Investment Phase, Wage Impacts 102

Figure 88: Main Street—Operation Phase, Employment Impacts..... 103

Figure 89: Main Street—Operation Phase, Output Impacts 104

Figure 90: Main Street—Operation Phase, Wage Impacts..... 105



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft
 RESI of Towson University

Figure 91 Weatherization and Energy Efficiency for Low-Income Houses—Investment Phase, Employment Impacts 106

Figure 92 Weatherization and Energy Efficiency for Low-Income Houses—Investment Phase, Output Impacts..... 107

Figure 93 Weatherization and Energy Efficiency for Low-Income Houses—Investment Phase, Wage Impacts..... 108

Figure 94: Weatherization and Energy Efficiency for Low-Income Houses—Operation Phase, Employment Impacts 109

Figure 95: Weatherization and Energy Efficiency for Low-Income Houses—Operation Phase, Output Impacts..... 110

Figure 96: Weatherization and Energy Efficiency for Low-Income Houses—Operation Phase, Wage Impacts..... 111

Figure 97: Maryland Clean Cars Subprogram—Investment Phase, Employment Impacts..... 112

Figure 98: Maryland Clean Cars Subprogram—Investment Phase, Output Impacts 113

Figure 99: Maryland Clean Cars Subprogram—Investment Phase, Wage Impacts 114

Figure 100: Maryland Clean Cars Subprogram—Operation Phase, Employment Impacts 115

Figure 101: Maryland Clean Cars Subprogram—Operation Phase, Output Impacts 116

Figure 102: Maryland Clean Cars Subprogram—Operation Phase, Wage Impacts..... 117

Figure 103: Federal Medium and Heavy Duty GHG Standards—Investment Phase, Employment Impacts..... 118

Figure 104: Federal Medium and Heavy Duty GHG Standards—Investment Phase, Output Impacts..... 119

Figure 105: Federal Medium and Heavy Duty GHG Standards—Investment Phase, Wage Impacts..... 120

Figure 106: Federal Medium and Heavy Duty GHG Standards—Operation Phase, Employment Impacts..... 121

Figure 107: Federal Medium and Heavy Duty GHG Standards—Operation Phase, Output Impacts..... 122

Figure 108: Federal Medium and Heavy Duty GHG Standards—Operation Phase, Wage Impacts..... 123

Figure 109: Clean Fuel Standard—Investment Phase, Employment Impacts 124

Figure 110: Clean Fuel Standard—Investment Phase, Output Impacts 125

Figure 111: Clean Fuel Standard—Investment Phase, Wage Impacts 126

Figure 112: Clean Fuel Standard—Operation Phase, Employment Impacts..... 127

Figure 113: Clean Fuel Standard—Operation Phase, Output Impacts 128

Figure 114: Clean Fuel Standard—Operation Phase, Wage Impacts 129

Figure 115: Transportation Climate Initiative—Investment Phase, Employment Impacts 130

Figure 116: Transportation Climate Initiative—Investment Phase, Output Impacts 131

Figure 117: Transportation Climate Initiative—Investment Phase, Wage Impacts 132

Figure 118: Transportation Climate Initiative—Operation Phase, Employment Impacts..... 133

Figure 119: Transportation Climate Initiative—Operation Phase, Output Impacts 134

Figure 120: Transportation Climate Initiative—Operation Phase, Wage Impacts 135

Figure 121: Public Transportation Initiatives—Investment Phase, Employment Impacts..... 136



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft
 RESI of Towson University

Figure 122: Public Transportation Initiatives—Investment Phase, Output Impacts 137

Figure 123: Public Transportation Initiatives—Investment Phase, Wage Impacts 138

Figure 124: Public Transportation Initiatives—Operation Phase, Employment Impacts..... 139

Figure 125: Public Transportation Initiatives—Operation Phase, Output Impacts 140

Figure 126: Public Transportation Initiatives—Operation Phase, Wage Impacts 141

Figure 127: Initiatives to Double Transit Ridership by 2020—Investment Phase, Employment Impacts 142

Figure 128: Initiatives to Double Transit Ridership by 2020—Investment Phase, Output Impacts 143

Figure 129: Initiatives to Double Transit Ridership by 2020—Investment Phase, Wage Impacts 144

Figure 130: Initiatives to Double Transit Ridership by 2020—Operation Phase, Employment Impacts 145

Figure 131: Initiatives to Double Transit Ridership by 2020—Operation Phase, Output Impacts 146

Figure 132: Initiatives to Double Transit Ridership by 2020—Operation Phase, Wage Impacts 147

Figure 133: Intercity Transportation Initiatives—Investment Phase, Employment Impacts 148

Figure 134: Intercity Transportation Initiatives—Investment Phase, Output Impacts 149

Figure 135: Intercity Transportation Initiatives—Investment Phase, Wage Impacts 150

Figure 136: Intercity Transportation Initiatives—Operation Phase, Employment Impacts 151

Figure 137: Intercity Transportation Initiatives—Operation Phase, Output Impacts 152

Figure 138: Intercity Transportation Initiatives—Operation Phase, Wage Impacts 153

Figure 139: Bike and Pedestrian Initiatives—Investment Phase, Employment Impacts 154

Figure 140: Bike and Pedestrian Initiatives—Investment Phase, Output Impacts 155

Figure 141: Bike and Pedestrian Initiatives—Investment Phase, Wage Impacts 156

Figure 142: Bike and Pedestrian Initiatives—Operation Phase, Employment Impacts 157

Figure 143: Bike and Pedestrian Initiatives—Operation Phase, Output Impacts 158

Figure 144: Bike and Pedestrian Initiatives—Operation Phase, Wage Impacts 159

Figure 145: Pricing Initiatives—Investment Phase, Employment Impacts 160

Figure 146: Pricing Initiatives—Investment Phase, Output Impacts 161

Figure 147: Pricing Initiatives—Investment Phase, Wage Impacts 162

Figure 148: Pricing Initiatives—Operation Phase, Employment Impacts 163

Figure 149: Pricing Initiatives—Operation Phase, Output Impacts 164

Figure 150: Pricing Initiatives—Operation Phase, Wage Impacts 165

Figure 151: Transportation Technology Initiatives—Investment Phase, Employment Impacts 166

Figure 152: Transportation Technology Initiatives—Investment Phase, Output Impacts 167

Figure 153: Transportation Technology Initiatives—Investment Phase, Wage Impacts 168

Figure 154: Transportation Technology Initiatives—Operation Phase, Employment Impacts.. 169

Figure 155: Transportation Technology Initiatives—Operation Phase, Output Impacts 170

Figure 156: Transportation Technology Initiatives—Operation Phase, Wage Impacts 171

Figure 157: Electric Vehicle Initiatives—Investment Phase, Employment Impacts 172

Figure 158: Electric Vehicle Initiatives—Investment Phase, Output Impacts 173



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

Figure 159: Electric Vehicle Initiatives—Investment Phase, Wage Impacts 174

Figure 160: Electric Vehicle Initiatives—Operation Phase, Employment Impacts 175

Figure 161: Electric Vehicle Initiatives—Operation Phase, Output Impacts 176

Figure 162: Electric Vehicle Initiatives—Operation Phase, Wage Impacts 177

Figure 163: Low-Emitting Vehicles Initiatives—Investment Phase, Employment Impacts 178

Figure 164: Low-Emitting Vehicles Initiatives—Investment Phase, Output Impacts 179

Figure 165: Low-Emitting Vehicles Initiatives—Investment Phase, Wage Impacts 180

Figure 166: Low-Emitting Vehicles Initiatives—Operation Phase, Employment Impacts 181

Figure 167: Low-Emitting Vehicles Initiatives—Operation Phase, Output Impacts 182

Figure 168: Low-Emitting Vehicles Initiatives—Operation Phase, Wage Impacts 183

Figure 169: Airport Initiatives—Investment Phase, Employment Impacts 184

Figure 170: Airport Initiatives—Investment Phase, Output Impacts 185

Figure 171: Airport Initiatives—Investment Phase, Wage Impacts 186

Figure 172: Airport Initiatives—Operation Phase, Employment Impacts 187

Figure 173: Airport Initiatives—Operation Phase, Output Impacts 188

Figure 174: Airport Initiatives—Operation Phase, Wage Impacts 189

Figure 175: Port Initiatives—Investment Phase, Employment Impacts 190

Figure 176: Port Initiatives—Investment Phase, Output Impacts 191

Figure 177: Port Initiatives—Investment Phase, Wage Impacts 192

Figure 178: Port Initiatives—Operation Phase, Employment Impacts 193

Figure 179: Port Initiatives—Operation Phase, Output Impacts 194

Figure 180: Port Initiatives—Operation Phase, Wage Impacts 195

Figure 181: Freight and Freight Rail Strategies—Investment Phase, Employment Impacts 196

Figure 182: Freight and Freight Rail Strategies—Investment Phase, Output Impacts 197

Figure 183: Freight and Freight Rail Strategies—Investment Phase, Wage Impacts 198

Figure 184: Freight and Freight Rail Strategies—Operation Phase, Employment Impacts 199

Figure 185: Freight and Freight Rail Strategies—Operation Phase, Output Impacts 200

Figure 186: Freight and Freight Rail Strategies—Operation Phase, Wage Impacts 201

Figure 187: Renewable Fuels Standard—Investment Phase, Employment Impacts 202

Figure 188: Renewable Fuels Standard—Investment Phase, Output Impacts 203

Figure 189: Renewable Fuels Standard—Investment Phase, Wage Impacts 204

Figure 190: Renewable Fuels Standard—Operation Phase, Employment Impacts 205

Figure 191: Renewable Fuels Standard—Operation Phase, Output Impacts 206

Figure 192: Renewable Fuels Standard—Operation Phase, Wage Impacts 207

Figure 193: CAFÉ Standards: Model Years 2008-2011—Investment Phase, Employment Impacts 208

Figure 194: CAFÉ Standards: Model Years 2008-2011—Investment Phase, Output Impacts .. 209

Figure 195: CAFÉ Standards: Model Years 2008-2011—Investment Phase, Wage Impacts 210

Figure 196: CAFÉ Standards: Model Years 2008-2011—Operation Phase, Employment Impacts 211

Figure 197: CAFÉ Standards: Model Years 2008-2011—Operation Phase, Output Impacts 212

Figure 198: CAFÉ Standards: Model Years 2008-2011—Operation Phase, Wage Impacts 213



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft
 RESI of Towson University

Figure 199: Promoting Hybrid and Electric Vehicles—Investment Phase, Employment Impacts 214

Figure 200: Promoting Hybrid and Electric Vehicles—Investment Phase, Output Impacts..... 215

Figure 201: Promoting Hybrid and Electric Vehicles—Investment Phase, Wage Impacts 216

Figure 202: Promoting Hybrid and Electric Vehicles—Operation Phase, Employment Impacts 217

Figure 203: Promoting Hybrid and Electric Vehicles—Operation Phase, Output Impacts 218

Figure 204: Promoting Hybrid and Electric Vehicles—Operation Phase, Wage Impacts 219

Figure 205: PAYD Insurance in Maryland—Investment Phase, Employment Impacts 220

Figure 206: PAYD Insurance in Maryland—Investment Phase, Output Impacts 221

Figure 207: PAYD Insurance in Maryland—Investment Phase, Wage Impacts..... 222

Figure 208: PAYD Insurance in Maryland—Operation Phase, Employment Impacts 223

Figure 209: PAYD Insurance in Maryland—Operation Phase, Output Impacts..... 224

Figure 210: PAYD Insurance in Maryland—Operation Phase, Wage Impacts..... 225

Figure 211: Managing Forests to Capture Carbon—Investment Phase, Employment Impacts . 226

Figure 212: Managing Forests to Capture Carbon—Investment Phase, Output Impacts..... 227

Figure 213: Managing Forests to Capture Carbon—Investment Phase, Wage Impacts..... 228

Figure 214: Managing Forests to Capture Carbon—Operation Phase, Employment Impacts... 229

Figure 215: Managing Forests to Capture Carbon—Operation Phase, Output Impacts..... 230

Figure 216: Managing Forests to Capture Carbon—Operation Phase, Wage Impacts 231

Figure 217: Creating Ecosystem Markets to Encourage GHG Emissions Reductions—Investment Phase, Employment Impacts..... 232

Figure 218: Creating Ecosystem Markets to Encourage GHG Emissions Reductions—Investment Phase, Output Impacts 233

Figure 219: Creating Ecosystem Markets to Encourage GHG Emissions Reductions—Investment Phase, Wage Impacts 234

Figure 220: Creating Ecosystem Markets to Encourage GHG Emissions Reductions—Operation Phase, Employment Impacts..... 235

Figure 221: Creating Ecosystem Markets to Encourage GHG Emissions Reductions—Operation Phase, Output Impacts 236

Figure 222: Creating Ecosystem Markets to Encourage GHG Emissions Reductions—Operation Phase, Wage Impacts 237

Figure 223: Increasing Urban Trees to Capture Carbon—Investment Phase, Employment Impacts..... 238

Figure 224: Increasing Urban Trees to Capture Carbon—Investment Phase, Output Impacts .. 239

Figure 225: Increasing Urban Trees to Capture Carbon—Investment Phase, Wage Impacts.... 240

Figure 226: Increasing Urban Trees to Capture Carbon—Operation Phase, Employment Impacts 241

Figure 227: Increasing Urban Trees to Capture Carbon—Operation Phase, Output Impacts.... 242

Figure 228: Increasing Urban Trees to Capture Carbon—Operation Phase, Wage Impacts..... 243

Figure 229: Creating and Protecting Wetlands and Waterway Borders to Capture Carbon—Investment Phase, Employment Impacts 244



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft
 RESI of Towson University

Figure 230: Creating and Protecting Wetlands and Waterway Borders to Capture Carbon—
 Investment Phase, Output Impacts..... 245

Figure 231: Creating and Protecting Wetlands and Waterway Borders to Capture Carbon—
 Investment Phase, Wage Impacts 246

Figure 232: Creating and Protecting Wetlands and Waterway Borders to Capture Carbon—
 Operation Phase, Employment Impacts 247

Figure 233: Creating and Protecting Wetlands and Waterway Borders to Capture Carbon—
 Operation Phase, Output Impacts 248

Figure 234: Creating and Protecting Wetlands and Waterway Borders to Capture Carbon—
 Operation Phase, Wage Impacts 249

Figure 235: Geological Opportunities to Store Carbon—Investment Phase, Employment Impacts
 250

Figure 236: Geological Opportunities to Store Carbon—Investment Phase, Output Impacts ... 251

Figure 237: Geological Opportunities to Store Carbon—Investment Phase, Wage Impacts 252

Figure 238: Geological Opportunities to Store Carbon—Operation Phase, Employment Impacts
 253

Figure 239: Geological Opportunities to Store Carbon—Operation Phase, Output Impacts 254

Figure 240: Geological Opportunities to Store Carbon—Operation Phase, Wage Impacts 255

Figure 241: Planting Forests in Maryland—Investment Phase, Employment Impacts 256

Figure 242: Planting Forests in Maryland—Investment Phase, Output Impacts..... 257

Figure 243: Planting Forests in Maryland—Investment Phase, Wage Impacts 258

Figure 244: Planting Forests in Maryland—Operation Phase, Employment Impacts..... 259

Figure 245: Planting Forests in Maryland—Operation Phase, Output Impacts 260

Figure 246: Planting Forests in Maryland—Operation Phase, Wage Impacts 261

Figure 247: Expanded Use of Forests and Feedstocks for Energy Production—Investment Phase,
 Employment Impacts 262

Figure 248: Expanded Use of Forests and Feedstocks for Energy Production—Investment Phase,
 Output Impacts..... 263

Figure 249: Expanded Use of Forests and Feedstocks for Energy Production—Investment Phase,
 Wage Impacts..... 264

Figure 250: Expanded Use of Forests and Feedstocks for Energy Production—Operation Phase,
 Employment Impacts 265

Figure 251: Expanded Use of Forests and Feedstocks for Energy Production—Operation Phase,
 Output Impacts..... 266

Figure 252: Expanded Use of Forests and Feedstocks for Energy Production—Operation Phase,
 Wage Impacts..... 267

Figure 253: Conservation of Agricultural Land for GHG Benefits—Investment Phase,
 Employment Impacts 268

Figure 254: Conservation of Agricultural Land for GHG Benefits—Investment Phase, Output
 Impacts..... 269

Figure 255: Conservation of Agricultural Land for GHG Benefits—Investment Phase, Wage
 Impacts 270



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft
 RESI of Towson University

Figure 256: Conservation of Agricultural Land for GHG Benefits—Operation Phase, Employment Impacts 271

Figure 257: Conservation of Agricultural Land for GHG Benefits—Operation Phase, Output Impacts 272

Figure 258: Conservation of Agricultural Land for GHG Benefits—Operation Phase, Wage Impacts 273

Figure 259: Buy Local for GHG Benefits—Investment Phase, Employment Impacts 274

Figure 260: Buy Local for GHG Benefits—Investment Phase, Output Impacts 275

Figure 261: Buy Local for GHG Benefits—Investment Phase, Wage Impacts 276

Figure 262: Buy Local for GHG Benefits—Operation Phase, Employment Impacts 277

Figure 263: Buy Local for GHG Benefits—Operation Phase, Output Impacts 278

Figure 264: Buy Local for GHG Benefits—Operation Phase, Wage Impacts 279

Figure 265: Nutrient Trading for GHG Benefits—Investment Phase, Employment Impacts 280

Figure 266: Nutrient Trading for GHG Benefits—Investment Phase, Output Impacts 281

Figure 267: Nutrient Trading for GHG Benefits—Investment Phase, Wage Impacts 282

Figure 268: Nutrient Trading for GHG Benefits—Operation Phase, Employment Impacts 283

Figure 269: Nutrient Trading for GHG Benefits—Operation Phase, Output Impacts 284

Figure 270: Nutrient Trading for GHG Benefits—Operation Phase, Wage Impacts 285

Figure 271: Recycling and Source Reduction—Investment Phase, Employment Impacts 286

Figure 272: Recycling and Source Reduction—Investment Phase, Output Impacts 287

Figure 273: Recycling and Source Reduction—Investment Phase, Wage Impacts 288

Figure 274: Recycling and Source Reduction—Operation Phase, Employment Impacts 289

Figure 275: Recycling and Source Reduction—Operation Phase, Output Impacts 290

Figure 276: Recycling and Source Reduction—Operation Phase, Wage Impacts 291

Figure 277: Outreach and Public Education—Investment Phase, Employment Impacts 292

Figure 278: Outreach and Public Education—Investment Phase, Output Impacts 293

Figure 279: Outreach and Public Education—Investment Phase, Wage Impacts 294

Figure 280: Outreach and Public Education—Operation Phase, Employment Impacts 295

Figure 281: Outreach and Public Education—Operation Phase, Output Impacts 296

Figure 282: Outreach and Public Education—Operation Phase, Wage Impacts 297

Figure 283: Green Building Initiatives—Investment Phase, Employment Impacts 298

Figure 284: Green Building Initiatives—Investment Phase, Output Impacts 299

Figure 285: Green Building Initiatives—Investment Phase, Wage Impacts 300

Figure 286: Green Building Initiatives—Operation Phase, Employment Impacts 301

Figure 287: Green Building Initiatives—Operation Phase, Output Impacts 302

Figure 288: Green Building Initiatives—Operation Phase, Employment Impacts 303

Figure 289: Building Codes—Investment Phase, Employment Impacts 304

Figure 290: Building Codes—Investment Phase, Output Impacts 305

Figure 291: Building Codes—Investment Phase, Wage Impacts 306

Figure 292: Green Building Initiatives—Operation Phase, Employment Impacts 307

Figure 293: Green Building Initiatives—Operation Phase, Output Impacts 308

Figure 294: Green Building Initiatives—Operation Phase, Output Impacts 309



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

Figure 295: Reducing GHG Emissions from the Transportation Sector through Land Use and Location Efficiency—Investment Phase, Employment Impacts 310

Figure 296: Reducing GHG Emissions from the Transportation Sector through Land Use and Location Efficiency—Investment Phase, Output Impacts..... 311

Figure 297: Reducing GHG Emissions from the Transportation Sector through Land Use and Location Efficiency—Investment Phase, Wage Impacts..... 312

Figure 298: Reducing GHG Emissions from the Transportation Sector through Land Use and Location Efficiency—Operation Phase, Employment Impacts 313

Figure 299: Reducing GHG Emissions from the Transportation Sector through Land Use and Location Efficiency—Operation Phase, Output Impacts..... 314

Figure 300: Reducing GHG Emissions from the Transportation Sector through Land Use and Location Efficiency—Operation Phase, Wage Impacts 315

Figure 301: Transportation GHG Targets for Local Governments and Metropolitan Planning Organizations—Investment Phase, Employment Impacts..... 316

Figure 302: Transportation GHG Targets for Local Governments and Metropolitan Planning Organizations—Investment Phase, Output Impacts 317

Figure 303: Transportation GHG Targets for Local Governments and Metropolitan Planning Organizations—Investment Phase, Wage Impacts 318

Figure 304: Transportation GHG Targets for Local Governments and Metropolitan Planning Organizations—Operation Phase, Employment Impacts 319

Figure 305: Transportation GHG Targets for Local Governments and Metropolitan Planning Organizations—Operation Phase, Output Impacts..... 320

Figure 306: Transportation GHG Targets for Local Governments and Metropolitan Planning Organizations—Operation Phase, Wage Impacts..... 321

Figure 307: Funding Mechanisms for Smart Growth—Investment Phase, Employment Impacts 322

Figure 308: Funding Mechanisms for Smart Growth—Investment Phase, Output Impacts..... 323

Figure 309: Funding Mechanisms for Smart Growth—Investment Phase, Wage Impacts 324

Figure 310: Funding Mechanisms for Smart Growth—Operation Phase, Employment Impacts 325

Figure 311: Funding Mechanisms for Smart Growth—Operation Phase, Output Impacts 326

Figure 312: Funding Mechanisms for Smart Growth—Operation Phase, Wage Impacts..... 327

Figure 313: GHG Benefits from Priority Funding Areas and Other Growth Boundaries—Investment Phase, Employment Impacts 328

Figure 314: GHG Benefits from Priority Funding Areas and Other Growth Boundaries—Investment Phase, Output Impacts..... 329

Figure 315: GHG Benefits from Priority Funding Areas and Other Growth Boundaries—Investment Phase, Wage Impacts 330

Figure 316: GHG Benefits from Priority Funding Areas and Other Growth Boundaries—Operation Phase, Employment Impacts..... 331

Figure 317: GHG Benefits from Priority Funding Areas and Other Growth Boundaries—Operation Phase, Output Impacts 332



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft
 RESI of Towson University

Figure 318: GHG Benefits from Priority Funding Areas and Other Growth Boundaries—
 Operation Phase, Wage Impacts 333

Figure 319: Leadership-by-Example-Local Government—Investment Phase, Employment
 Impacts 334

Figure 320: Leadership-by-Example-Local Government—Investment Phase, Output Impacts 335

Figure 321: Leadership-by-Example-Local Government—Investment Phase, Wage Impacts.. 336

Figure 322: Leadership-by-Example-Local Government—Operation Phase, Employment
 Impacts 337

Figure 323: Leadership-by-Example-Local Government—Operation Phase, Output Impacts.. 338

Figure 324: Leadership-by-Example-Local Government—Operation Phase, Wage Impacts.... 339

Figure 325: Leadership-by-Example-Federal Government—Investment Phase, Employment
 Impacts 340

Figure 326: Leadership-by-Example-Federal Government—Investment Phase, Output Impacts
 341

Figure 327: Leadership-by-Example-Federal Government—Investment Phase, Wage Impacts 342

Figure 328: Leadership-by-Example-Federal Government—Operation Phase, Employment
 Impacts 343

Figure 329: Leadership-by-Example-Federal Government—Operation Phase, Output Impacts 344

Figure 330: Leadership-by-Example-Federal Government—Operation Phase, Wage Impacts. 345

Figure 331: Leadership-by-Example-Maryland Colleges and Universities—Investment Phase,
 Employment Impacts 346

Figure 332: Leadership-by-Example-Maryland Colleges and Universities—Investment Phase,
 Output Impacts 347

Figure 333: Leadership-by-Example-Maryland Colleges and Universities—Investment Phase,
 Wage Impacts 348

Figure 334: Leadership-by-Example-Maryland Colleges and Universities—Operation Phase,
 Employment Impacts 349

Figure 335: Leadership-by-Example-Maryland Colleges and Universities—Operation Phase,
 Output Impacts 350

Figure 336: Leadership-by-Example-Maryland Colleges and Universities—Operation Phase,
 Wage Impacts 351

Figure 337: State of Maryland Initiative to Lead by Example—Investment Phase, Employment
 Impacts 352

Figure 338: State of Maryland Initiative to Lead by Example—Investment Phase, Output
 Impacts 353

Figure 339: State of Maryland Initiative to Lead by Example—Investment Phase, Wage Impacts
 354

Figure 340 State of Maryland Initiative to Lead by Example—Operation Phase, Employment
 Impacts 355

Figure 341 State of Maryland Initiative to Lead by Example—Operation Phase, Output Impacts
 356

Figure 342: State of Maryland Initiative to Lead by Example—Operation Phase, Wage Impacts
 357



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft
 RESI of Towson University

Figure 343: State of Maryland Carbon and Footprint Initiatives—Investment Phase, Employment Impacts 358

Figure 344: State of Maryland Carbon and Footprint Initiatives—Investment Phase, Output Impacts 359

Figure 345: State of Maryland Carbon and Footprint Initiatives—Investment Phase, Wage Impacts 360

Figure 346: State of Maryland Carbon and Footprint Initiatives—Operation Phase, Employment Impacts 361

Figure 347: State of Maryland Carbon and Footprint Initiatives—Operation Phase, Output Impacts 362

Figure 348: State of Maryland Carbon and Footprint Initiatives—Operation Phase, Wage Impacts 363

Figure 349: GHG Early Voluntary Reduction—Investment Phase, Employment Impacts 364

Figure 350: GHG Early Voluntary Reduction—Investment Phase, Output Impacts 365

Figure 351: GHG Early Voluntary Reduction—Investment Phase, Wage Impacts 366

Figure 352: GHG Early Voluntary Reduction—Operation Phase, Employment Impacts 367

Figure 353: GHG Early Voluntary Reduction—Operation Phase, Output Impacts 368

Figure 354: GHG Early Voluntary Reduction—Operation Phase, Wage Impacts 369

Figure 355: Job Creation and Economic Development Initiatives—Investment Phase, Employment Impacts 370

Figure 356: Job Creation and Economic Development Initiatives—Investment Phase, Output Impacts 371

Figure 357: Job Creation and Economic Development Initiatives—Investment Phase, Wage Impacts 372

Figure 358: Job Creation and Economic Development Initiatives—Operation Phase, Employment Impacts 373

Figure 359: Job Creation and Economic Development Initiatives—Operation Phase, Output Impacts 374

Figure 360: Job Creation and Economic Development Initiatives—Operation Phase, Wage Impacts 375

Figure 361: Public Health Initiatives Related to Climate Changes—Investment Phase, Employment Impacts 376

Figure 362: Public Health Initiatives Related to Climate Changes—Investment Phase, Output Impacts 377

Figure 363: Public Health Initiatives Related to Climate Changes—Investment Phase, Wage Impacts 378

Figure 364: Public Health Initiatives Related to Climate Changes—Operation Phase, Employment Impacts 379

Figure 365: Public Health Initiatives Related to Climate Changes—Operation Phase, Output Impacts 380

Figure 366: Public Health Initiatives Related to Climate Changes—Operation Phase, Wage Impacts 381

Figure 367: Title V Permits for GHG Sources—Investment Phase, Employment Impacts 382



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

Figure 368: Title V Permits for GHG Sources—Investment Phase, Output Impacts	383
Figure 369: Title V Permits for GHG Sources—Investment Phase, Wage Impacts	384
Figure 370: Title V Permits for GHG Sources—Operation Phase, Employment Impacts.....	385
Figure 371: Title V Permits for GHG Sources—Operation Phase, Output Impacts	386
Figure 372: Title V Permits for GHG Sources—Operation Phase, Wage Impacts	387
Figure 373: Sampling of IMPLAN Users	392
Figure 374: IMPLAN Industry Codes—Investment Phase	393
Figure 375: IMPLAN Industry Codes—Operation Phase	417
Figure 376: Example Strategy Economic Impacts—Investment Phase	429
Figure 377: Example Strategy Economic Impacts—Operation Phase	430
Figure 378: Example Strategy Fiscal Impacts	430



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Appendix A—Detailed Impacts**A.1 Energy****Figure 1: Regional Greenhouse Gas Initiative—Investment Phase, Employment Impacts**

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	-1.1	0.0	0.0	-1.1
Construction	0.0	-0.1	0.0	-0.1
Manufacturing	0.0	0.0	0.0	0.0
Wholesale trade	0.0	0.0	0.1	0.1
Retail trade	0.0	0.0	0.5	0.5
Transportation and warehousing	0.0	0.0	0.1	0.0
Information	0.0	0.0	0.0	0.1
Finance and insurance	0.0	0.1	0.2	0.3
Real estate and rental and leasing	0.0	0.2	0.2	0.3
Professional, scientific, and technical services	7.3	0.5	0.1	7.8
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.6	0.1	0.7
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.6	0.6
Arts, entertainment, and recreation	0.0	0.1	0.1	0.1
Accommodation and food services	0.0	-0.1	0.3	0.2
Other services (except public administration)	0.0	0.1	0.2	0.4
Public administration	0.4	0.0	0.0	0.4
Average	6.6	1.3	2.7	10.6

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 2: Regional Greenhouse Gas Initiative—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	-\$17	\$538	\$521
Mining	\$0	-\$6,383	\$265	-\$6,118
Utilities	-\$1,000,000	\$5,266	\$8,361	-\$986,373
Construction	\$0	-\$17,773	\$3,355	-\$14,418
Manufacturing	\$0	\$2,746	\$10,996	\$13,742
Wholesale trade	\$0	\$965	\$16,332	\$17,296
Retail trade	\$0	-\$334	\$30,749	\$30,415
Transportation and warehousing	\$0	-\$21,235	\$7,222	-\$14,013
Information	\$0	\$8,664	\$14,567	\$23,232
Finance and insurance	\$0	\$19,191	\$43,900	\$63,091
Real estate and rental and leasing	\$0	\$30,110	\$75,662	\$105,772
Professional, scientific, and technical services	\$900,000	\$56,629	\$15,210	\$971,839
Management of companies and enterprises	\$0	\$5,303	\$2,487	\$7,791
Administrative and support and waste management and remediation services	\$0	\$44,099	\$9,486	\$53,586
Educational services	\$0	-\$68	\$8,181	\$8,114
Health care and social assistance	\$0	\$4	\$62,979	\$62,983
Arts, entertainment, and recreation	\$0	\$2,082	\$4,416	\$6,498
Accommodation and food services	\$0	-\$3,294	\$18,108	\$14,814
Other services (except public administration)	\$0	\$14,077	\$17,781	\$31,859
Public administration	\$100,000	\$5,730	\$7,352	\$113,082
Average	\$0	\$145,763	\$357,950	\$503,712

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 3: Regional Greenhouse Gas Initiative—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	-\$2	\$68	\$66
Mining	\$0	\$51	\$16	\$67
Utilities	-\$146,110	\$662	\$1,124	-\$144,324
Construction	\$0	-\$7,181	\$1,175	-\$6,006
Manufacturing	\$0	\$788	\$1,599	\$2,387
Wholesale trade	\$0	\$362	\$6,122	\$6,483
Retail trade	\$0	-\$174	\$15,486	\$15,312
Transportation and warehousing	\$0	-\$5,197	\$2,485	-\$2,712
Information	\$0	\$1,622	\$3,119	\$4,741
Finance and insurance	\$0	\$5,306	\$12,216	\$17,522
Real estate and rental and leasing	\$0	\$2,469	\$2,643	\$5,112
Professional, scientific, and technical services	\$498,905	\$31,721	\$6,683	\$537,309
Management of companies and enterprises	\$0	\$2,867	\$1,345	\$4,211
Administrative and support and waste management and remediation services	\$0	\$21,825	\$4,169	\$25,995
Educational services	\$0	-\$40	\$4,598	\$4,558
Health care and social assistance	\$0	\$1	\$30,313	\$30,315
Arts, entertainment, and recreation	\$0	\$644	\$1,609	\$2,253
Accommodation and food services	\$0	-\$1,171	\$6,319	\$5,148
Other services (except public administration)	\$0	\$4,374	\$7,659	\$12,033
Public administration	\$25,247	\$2,139	\$2,639	\$30,025
Average	\$378,041	\$61,067	\$111,387	\$550,495

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 4: Regional Greenhouse Initiative—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.1	0.3	0.4
Mining	0.0	1.5	0.0	1.6
Utilities	0.0	1.2	0.4	1.6
Construction	0.0	23.0	1.1	24.1
Manufacturing	0.0	3.7	1.1	4.8
Wholesale trade	0.0	5.3	3.4	8.7
Retail trade	0.0	1.6	21.6	23.2
Transportation and warehousing	0.0	7.3	2.7	10.1
Information	0.0	2.4	1.9	4.4
Finance and insurance	0.0	12.6	8.0	20.5
Real estate and rental and leasing	0.0	18.4	7.4	25.8
Professional, scientific, and technical services	0.0	39.7	4.7	44.4
Management of companies and enterprises	0.0	0.7	0.5	1.2
Administrative and support and waste management and remediation services	0.0	28.4	5.6	34.0
Educational services	0.0	0.1	4.8	4.9
Health care and social assistance	0.0	0.0	25.2	25.2
Arts, entertainment, and recreation	0.0	1.9	3.7	5.6
Accommodation and food services	0.0	3.8	12.0	15.8
Other services (except public administration)	0.0	3.7	10.6	14.3
Public administration	151.8	6.4	1.5	159.7
Total	151.8	162.0	116.3	430.1

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 5: Regional Greenhouse Initiative—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$8,264	\$22,979	\$31,243
Mining	\$0	\$334,177	\$11,315	\$345,493
Utilities	\$0	\$1,235,532	\$357,133	\$1,592,664
Construction	\$0	\$2,903,499	\$143,268	\$3,046,768
Manufacturing	\$0	\$1,403,976	\$469,662	\$1,873,638
Wholesale trade	\$0	\$1,109,713	\$697,622	\$1,807,335
Retail trade	\$0	\$98,234	\$1,312,966	\$1,411,200
Transportation and warehousing	\$0	\$927,275	\$308,396	\$1,235,670
Information	\$0	\$796,896	\$622,149	\$1,419,044
Finance and insurance	\$0	\$2,826,525	\$1,874,610	\$4,701,135
Real estate and rental and leasing	\$0	\$3,325,946	\$3,230,915	\$6,556,861
Professional, scientific, and technical services	\$0	\$5,560,320	\$649,566	\$6,209,886
Management of companies and enterprises	\$0	\$149,570	\$106,233	\$255,804
Administrative and support and waste management and remediation services	\$0	\$2,471,216	\$405,100	\$2,876,316
Educational services	\$0	\$9,287	\$349,240	\$358,526
Health care and social assistance	\$0	\$306	\$2,689,602	\$2,689,908
Arts, entertainment, and recreation	\$0	\$72,367	\$188,537	\$260,904
Accommodation and food services	\$0	\$253,887	\$773,321	\$1,027,208
Other services (except public administration)	\$0	\$415,642	\$759,241	\$1,174,883
Public administration	\$42,400,106	\$1,659,982	\$314,001	\$44,374,089
Total	\$42,400,106	\$25,562,614	\$15,285,856	\$83,248,576

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 6: Regional Greenhouse Initiative—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$1,068	\$2,904	\$3,972
Mining	\$0	\$50,960	\$694	\$51,654
Utilities	\$0	\$143,852	\$48,014	\$191,866
Construction	\$0	\$1,121,147	\$50,176	\$1,171,323
Manufacturing	\$0	\$255,415	\$68,280	\$323,694
Wholesale trade	\$0	\$415,969	\$261,499	\$677,468
Retail trade	\$0	\$51,197	\$661,228	\$712,424
Transportation and warehousing	\$0	\$327,127	\$106,099	\$433,226
Information	\$0	\$175,695	\$133,197	\$308,891
Finance and insurance	\$0	\$828,959	\$521,670	\$1,350,629
Real estate and rental and leasing	\$0	\$261,691	\$112,896	\$374,586
Professional, scientific, and technical services	\$0	\$2,677,329	\$285,387	\$2,962,716
Management of companies and enterprises	\$0	\$80,845	\$57,421	\$138,266
Administrative and support and waste management and remediation services	\$0	\$994,011	\$178,047	\$1,172,058
Educational services	\$0	\$4,527	\$196,247	\$200,774
Health care and social assistance	\$0	\$112	\$1,294,565	\$1,294,677
Arts, entertainment, and recreation	\$0	\$25,062	\$68,703	\$93,765
Accommodation and food services	\$0	\$87,162	\$269,874	\$357,036
Other services (except public administration)	\$0	\$142,328	\$327,043	\$469,372
Public administration	\$10,704,551	\$455,806	\$112,715	\$11,273,071
Total	\$10,704,551	\$8,100,262	\$4,756,658	\$23,561,470

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 7: GHG Reductions from Imported Power—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.5	0.0	0.0	0.5
Construction	0.0	0.2	0.0	0.2
Manufacturing	0.0	0.0	0.0	0.1
Wholesale trade	0.0	0.0	0.1	0.1
Retail trade	0.0	0.0	0.6	0.6
Transportation and warehousing	0.0	0.1	0.1	0.2
Information	0.0	0.1	0.1	0.1
Finance and insurance	0.0	0.1	0.2	0.3
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	3.6	0.5	0.1	4.3
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.5	0.1	0.6
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.7	0.7
Arts, entertainment, and recreation	0.0	0.1	0.1	0.2
Accommodation and food services	0.0	0.2	0.3	0.5
Other services (except public administration)	0.0	0.1	0.3	0.4
Public administration	0.4	0.0	0.0	0.4
Average	4.5	2.1	3.1	9.6

Source: RESI

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Figure 8: GHG Reductions from Imported Power—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$78	\$600	\$679
Mining	\$0	\$4,128	\$296	\$4,424
Utilities	\$450,000	\$5,381	\$9,294	\$464,675
Construction	\$0	\$19,250	\$3,774	\$23,024
Manufacturing	\$0	\$8,149	\$12,244	\$20,393
Wholesale trade	\$0	\$8,487	\$18,112	\$26,598
Retail trade	\$0	\$828	\$34,634	\$35,462
Transportation and warehousing	\$0	\$20,613	\$8,119	\$28,731
Information	\$0	\$20,700	\$16,261	\$36,961
Finance and insurance	\$0	\$29,842	\$49,327	\$79,169
Real estate and rental and leasing	\$0	\$32,285	\$84,963	\$117,249
Professional, scientific, and technical services	\$450,000	\$73,293	\$17,024	\$540,317
Management of companies and enterprises	\$0	\$3,988	\$2,780	\$6,768
Administrative and support and waste management and remediation services	\$0	\$33,797	\$10,637	\$44,434
Educational services	\$0	\$111	\$9,310	\$9,421
Health care and social assistance	\$0	\$4	\$70,459	\$70,463
Arts, entertainment, and recreation	\$0	\$2,264	\$4,975	\$7,238
Accommodation and food services	\$0	\$11,322	\$20,279	\$31,601
Other services (except public administration)	\$0	\$9,568	\$20,028	\$29,596
Public administration	\$100,000	\$7,375	\$8,223	\$115,599
Average	\$1,000,000	\$291,463	\$401,338	\$1,692,801

Source: RESI

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Figure 9: GHG Reductions from Imported Power—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$10	\$76	\$86
Mining	\$0	\$159	\$18	\$177
Utilities	\$65,749	\$679	\$1,249	\$67,677
Construction	\$0	\$7,580	\$1,321	\$8,901
Manufacturing	\$0	\$1,580	\$1,783	\$3,363
Wholesale trade	\$0	\$3,181	\$6,789	\$9,970
Retail trade	\$0	\$432	\$17,442	\$17,874
Transportation and warehousing	\$0	\$6,429	\$2,791	\$9,220
Information	\$0	\$4,679	\$3,483	\$8,162
Finance and insurance	\$0	\$8,479	\$13,706	\$22,185
Real estate and rental and leasing	\$0	\$2,714	\$2,939	\$5,653
Professional, scientific, and technical services	\$249,452	\$33,717	\$7,480	\$290,650
Management of companies and enterprises	\$0	\$2,156	\$1,502	\$3,658
Administrative and support and waste management and remediation services	\$0	\$15,982	\$4,674	\$20,656
Educational services	\$0	\$57	\$5,240	\$5,298
Health care and social assistance	\$0	\$1	\$33,918	\$33,920
Arts, entertainment, and recreation	\$0	\$772	\$1,812	\$2,584
Accommodation and food services	\$0	\$3,942	\$7,077	\$11,020
Other services (except public administration)	\$0	\$3,353	\$8,633	\$11,986
Public administration	\$25,247	\$2,923	\$2,955	\$31,125
Average	\$340,448	\$98,825	\$124,891	\$564,164

Source: RESI

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Figure 10: GHG Reductions from Imported Power—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.9	0.0	0.0	0.9
Construction	0.0	0.2	0.0	0.2
Manufacturing	0.0	0.0	0.0	0.0
Wholesale trade	0.0	0.0	0.0	0.1
Retail trade	0.0	0.0	0.3	0.3
Transportation and warehousing	0.0	0.1	0.0	0.2
Information	0.0	0.0	0.0	0.1
Finance and insurance	0.0	0.1	0.1	0.2
Real estate and rental and leasing	0.0	0.1	0.1	0.1
Professional, scientific, and technical services	0.0	0.2	0.1	0.3
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.1	0.1	0.2
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.3	0.3
Arts, entertainment, and recreation	0.0	0.0	0.0	0.1
Accommodation and food services	0.0	0.2	0.1	0.3
Other services (except public administration)	0.0	0.0	0.1	0.1
Public administration	0.0	0.0	0.0	0.0
Total	0.9	1.1	1.4	3.4

Source: RESI

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Figure 11: GHG Reductions from Imported Power—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$69	\$272	\$341
Mining	\$0	\$6,204	\$134	\$6,338
Utilities	\$851,008	\$1,156	\$4,203	\$856,367
Construction	\$0	\$22,138	\$1,726	\$23,864
Manufacturing	\$0	\$4,587	\$5,547	\$10,133
Wholesale trade	\$0	\$5,998	\$8,173	\$14,171
Retail trade	\$0	\$788	\$15,865	\$16,653
Transportation and warehousing	\$0	\$26,996	\$3,712	\$30,709
Information	\$0	\$13,820	\$7,385	\$21,205
Finance and insurance	\$0	\$15,151	\$22,544	\$37,695
Real estate and rental and leasing	\$0	\$11,922	\$38,808	\$50,730
Professional, scientific, and technical services	\$0	\$34,418	\$7,751	\$42,169
Management of companies and enterprises	\$0	\$1,039	\$1,264	\$2,303
Administrative and support and waste management and remediation services	\$0	\$7,913	\$4,851	\$12,764
Educational services	\$0	\$120	\$4,306	\$4,426
Health care and social assistance	\$0	\$1	\$32,068	\$32,069
Arts, entertainment, and recreation	\$0	\$1,019	\$2,280	\$3,298
Accommodation and food services	\$0	\$11,349	\$9,239	\$20,588
Other services (except public administration)	\$0	\$1,827	\$9,175	\$11,002
Public administration	\$0	\$2,287	\$3,742	\$6,029
Total	\$851,008	\$168,801	\$183,045	\$1,202,854

Source: RESI

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Figure 12: GHG Reductions from Imported Power—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$9	\$35	\$43
Mining	\$0	\$66	\$8	\$74
Utilities	\$124,340	\$159	\$565	\$125,065
Construction	\$0	\$8,822	\$604	\$9,426
Manufacturing	\$0	\$792	\$809	\$1,601
Wholesale trade	\$0	\$2,248	\$3,063	\$5,312
Retail trade	\$0	\$411	\$7,990	\$8,401
Transportation and warehousing	\$0	\$7,741	\$1,275	\$9,016
Information	\$0	\$3,280	\$1,583	\$4,862
Finance and insurance	\$0	\$4,343	\$6,255	\$10,598
Real estate and rental and leasing	\$0	\$1,049	\$1,330	\$2,379
Professional, scientific, and technical services	\$0	\$13,168	\$3,406	\$16,574
Management of companies and enterprises	\$0	\$562	\$683	\$1,245
Administrative and support and waste management and remediation services	\$0	\$3,491	\$2,132	\$5,623
Educational services	\$0	\$64	\$2,428	\$2,492
Health care and social assistance	\$0	\$0	\$15,439	\$15,440
Arts, entertainment, and recreation	\$0	\$376	\$830	\$1,206
Accommodation and food services	\$0	\$3,964	\$3,224	\$7,188
Other services (except public administration)	\$0	\$894	\$3,957	\$4,852
Public administration	\$0	\$1,179	\$1,346	\$2,525
Total	\$124,340	\$52,619	\$56,962	\$233,921

Source: RESI

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Figure 13: Federal New Source Performance Standard—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	-0.1	0.0	-0.1
Utilities	-0.8	0.0	0.0	-0.8
Construction	0.0	-0.1	0.0	0.0
Manufacturing	0.0	0.0	0.0	0.0
Wholesale trade	0.0	0.0	0.1	0.1
Retail trade	0.0	0.0	0.6	0.6
Transportation and warehousing	0.0	0.0	0.1	0.1
Information	0.0	0.0	0.1	0.1
Finance and insurance	0.0	0.0	0.2	0.3
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	7.3	0.4	0.1	7.8
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.6	0.2	0.7
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.7	0.7
Arts, entertainment, and recreation	0.0	0.1	0.1	0.2
Accommodation and food services	0.0	0.0	0.3	0.3
Other services (except public administration)	0.0	0.1	0.3	0.4
Public administration	0.4	0.0	0.0	0.4
Average	6.8	1.3	3.1	11.2

Source: RESI

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Figure 14: Federal New Source Performance Standard—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	-\$26	\$613	\$587
Mining	\$0	-\$33,754	\$302	-\$33,452
Utilities	-\$1,000,000	\$3,484	\$9,517	-\$986,999
Construction	\$0	-\$7,363	\$3,834	-\$3,530
Manufacturing	\$0	\$1,171	\$12,524	\$13,695
Wholesale trade	\$0	-\$73	\$18,576	\$18,504
Retail trade	\$0	-\$160	\$35,153	\$34,993
Transportation and warehousing	\$0	-\$9,522	\$8,251	-\$1,271
Information	\$0	\$12,191	\$16,604	\$28,795
Finance and insurance	\$0	\$10,944	\$50,147	\$61,091
Real estate and rental and leasing	\$0	\$25,904	\$86,411	\$112,315
Professional, scientific, and technical services	\$900,000	\$54,254	\$17,352	\$971,607
Management of companies and enterprises	\$0	\$4,484	\$2,836	\$7,320
Administrative and support and waste management and remediation services	\$0	\$42,592	\$10,829	\$53,421
Educational services	\$0	-\$730	\$9,384	\$8,655
Health care and social assistance	\$0	\$4	\$71,839	\$71,843
Arts, entertainment, and recreation	\$0	\$2,217	\$5,048	\$7,265
Accommodation and food services	\$0	\$1,394	\$20,663	\$22,057
Other services (except public administration)	\$0	\$11,806	\$20,328	\$32,134
Public administration	\$100,000	\$5,241	\$8,386	\$113,627
Average	\$0	\$124,058	\$408,598	\$532,656

Source: RESI

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Figure 15: Federal New Source Performance Standard—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	-\$3	\$78	\$74
Mining	\$0	-\$74	\$19	-\$55
Utilities	-\$103,190	\$478	\$1,280	-\$101,432
Construction	\$0	-\$3,029	\$1,342	-\$1,687
Manufacturing	\$0	\$368	\$1,822	\$2,189
Wholesale trade	\$0	-\$27	\$6,963	\$6,936
Retail trade	\$0	-\$83	\$17,703	\$17,620
Transportation and warehousing	\$0	-\$1,914	\$2,838	\$924
Information	\$0	\$2,531	\$3,556	\$6,086
Finance and insurance	\$0	\$2,977	\$13,948	\$16,925
Real estate and rental and leasing	\$0	\$2,349	\$3,009	\$5,358
Professional, scientific, and technical services	\$498,905	\$29,259	\$7,624	\$535,788
Management of companies and enterprises	\$0	\$2,424	\$1,533	\$3,957
Administrative and support and waste management and remediation services	\$0	\$21,304	\$4,759	\$26,063
Educational services	\$0	-\$401	\$5,276	\$4,875
Health care and social assistance	\$0	\$1	\$34,580	\$34,581
Arts, entertainment, and recreation	\$0	\$697	\$1,839	\$2,537
Accommodation and food services	\$0	\$471	\$7,211	\$7,682
Other services (except public administration)	\$0	\$3,482	\$8,758	\$12,240
Public administration	\$25,247	\$1,883	\$3,011	\$30,141
Average	\$420,961	\$62,692	\$127,148	\$610,801

Source: RESI

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Figure 16: Federal New Source Performance Standard—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	1.6	0.0	0.0	1.6
Construction	0.0	0.3	0.0	0.3
Manufacturing	0.0	0.0	0.0	0.0
Wholesale trade	0.0	0.1	0.1	0.1
Retail trade	0.0	0.0	0.5	0.5
Transportation and warehousing	0.0	0.2	0.1	0.3
Information	0.0	0.1	0.0	0.1
Finance and insurance	0.0	0.1	0.2	0.3
Real estate and rental and leasing	0.0	0.1	0.2	0.3
Professional, scientific, and technical services	0.0	0.4	0.1	0.5
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.2	0.1	0.3
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.5	0.5
Arts, entertainment, and recreation	0.0	0.0	0.1	0.1
Accommodation and food services	0.0	0.3	0.3	0.6
Other services (except public administration)	0.0	0.0	0.2	0.3
Public administration	0.0	0.0	0.0	0.1
Total	1.6	2.0	2.5	6.0

Source: RESI

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Figure 17: Federal New Source Performance Standard—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$121	\$480	\$601
Mining	\$0	\$10,919	\$236	\$11,155
Utilities	\$1,497,774	\$2,035	\$7,398	\$1,507,206
Construction	\$0	\$38,962	\$3,038	\$42,001
Manufacturing	\$0	\$8,072	\$9,762	\$17,835
Wholesale trade	\$0	\$10,557	\$14,384	\$24,940
Retail trade	\$0	\$1,386	\$27,923	\$29,310
Transportation and warehousing	\$0	\$47,514	\$6,533	\$54,047
Information	\$0	\$24,323	\$12,997	\$37,320
Finance and insurance	\$0	\$26,665	\$39,678	\$66,343
Real estate and rental and leasing	\$0	\$20,982	\$68,303	\$89,285
Professional, scientific, and technical services	\$0	\$60,576	\$13,642	\$74,218
Management of companies and enterprises	\$0	\$1,829	\$2,224	\$4,053
Administrative and support and waste management and remediation services	\$0	\$13,927	\$8,538	\$22,465
Educational services	\$0	\$211	\$7,579	\$7,790
Health care and social assistance	\$0	\$2	\$56,439	\$56,441
Arts, entertainment, and recreation	\$0	\$1,793	\$4,012	\$5,805
Accommodation and food services	\$0	\$19,975	\$16,260	\$36,235
Other services (except public administration)	\$0	\$3,215	\$16,148	\$19,363
Public administration	\$0	\$4,025	\$6,585	\$10,610
Total	\$1,497,774	\$297,090	\$322,159	\$2,117,023

Source: RESI

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Figure 18: Federal New Source Performance Standard—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$15	\$61	\$76
Mining	\$0	\$116	\$15	\$130
Utilities	\$218,839	\$281	\$994	\$220,114
Construction	\$0	\$15,527	\$1,063	\$16,590
Manufacturing	\$0	\$1,395	\$1,424	\$2,818
Wholesale trade	\$0	\$3,957	\$5,392	\$9,349
Retail trade	\$0	\$723	\$14,062	\$14,785
Transportation and warehousing	\$0	\$13,624	\$2,244	\$15,868
Information	\$0	\$5,772	\$2,785	\$8,558
Finance and insurance	\$0	\$7,643	\$11,009	\$18,652
Real estate and rental and leasing	\$0	\$1,846	\$2,341	\$4,187
Professional, scientific, and technical services	\$0	\$23,175	\$5,995	\$29,170
Management of companies and enterprises	\$0	\$989	\$1,202	\$2,191
Administrative and support and waste management and remediation services	\$0	\$6,144	\$3,752	\$9,896
Educational services	\$0	\$113	\$4,273	\$4,386
Health care and social assistance	\$0	\$1	\$27,173	\$27,174
Arts, entertainment, and recreation	\$0	\$663	\$1,461	\$2,123
Accommodation and food services	\$0	\$6,977	\$5,675	\$12,651
Other services (except public administration)	\$0	\$1,574	\$6,965	\$8,539
Public administration	\$0	\$2,075	\$2,369	\$4,444
Total	\$218,839	\$92,609	\$100,253	\$411,702

Source: RESI

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Figure 19: MACT—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	-1.1	-0.1	0.0	-1.2
Utilities	0.2	0.0	0.0	0.2
Construction	0.0	0.1	0.0	0.1
Manufacturing	-1.8	0.0	0.0	-1.8
Wholesale trade	0.0	-0.1	0.0	-0.1
Retail trade	0.0	0.0	0.1	0.1
Transportation and warehousing	0.0	-0.1	0.0	-0.1
Information	0.0	0.0	0.0	0.0
Finance and insurance	0.0	0.0	0.0	0.0
Real estate and rental and leasing	0.0	0.1	0.0	0.1
Professional, scientific, and technical services	1.8	0.2	0.0	2.1
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.1	0.0	0.1
Educational services	0.0	0.0	0.0	0.0
Health care and social assistance	0.0	0.0	0.1	0.1
Arts, entertainment, and recreation	0.0	0.0	0.0	0.0
Accommodation and food services	0.0	0.1	0.0	0.1
Other services (except public administration)	0.0	0.0	0.0	0.1
Public administration	0.4	0.0	0.0	0.4
Average	-0.4	0.2	0.5	0.3

Source: RESI

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Figure 20: MACT—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$35	\$91	\$126
Mining	-\$50,000	-\$26,802	\$45	-\$76,757
Utilities	\$225,000	-\$17,786	\$1,395	\$208,609
Construction	\$0	\$10,274	\$582	\$10,856
Manufacturing	-\$500,000	-\$31,366	\$1,845	-\$529,520
Wholesale trade	\$0	-\$17,524	\$2,705	-\$14,820
Retail trade	\$0	-\$804	\$5,355	\$4,551
Transportation and warehousing	\$0	-\$15,413	\$1,250	-\$14,163
Information	\$0	\$4,736	\$2,465	\$7,201
Finance and insurance	\$0	\$3,485	\$7,586	\$11,072
Real estate and rental and leasing	\$0	\$4,140	\$13,050	\$17,190
Professional, scientific, and technical services	\$225,000	\$30,501	\$2,596	\$258,096
Management of companies and enterprises	\$0	-\$6,964	\$422	-\$6,542
Administrative and support and waste management and remediation services	\$0	\$6,459	\$1,628	\$8,087
Educational services	\$0	\$23	\$1,471	\$1,494
Health care and social assistance	\$0	\$0	\$10,733	\$10,733
Arts, entertainment, and recreation	\$0	\$742	\$770	\$1,512
Accommodation and food services	\$0	\$4,766	\$3,096	\$7,862
Other services (except public administration)	\$0	\$2,407	\$3,097	\$5,504
Public administration	\$100,000	\$3,137	\$1,252	\$104,389
Average	\$0	-\$45,952	\$61,433	\$15,480

Source: RESI

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Figure 21: MACT—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$4	\$12	\$15
Mining	-\$11,728	-\$3,798	\$3	-\$15,523
Utilities	\$32,875	-\$2,384	\$187	\$30,678
Construction	\$0	\$4,008	\$203	\$4,212
Manufacturing	-\$124,307	-\$3,084	\$270	-\$127,122
Wholesale trade	\$0	-\$6,569	\$1,014	-\$5,555
Retail trade	\$0	-\$419	\$2,697	\$2,278
Transportation and warehousing	\$0	-\$4,330	\$429	-\$3,902
Information	\$0	\$1,119	\$529	\$1,647
Finance and insurance	\$0	\$382	\$2,101	\$2,483
Real estate and rental and leasing	\$0	-\$399	\$442	\$42
Professional, scientific, and technical services	\$124,726	\$15,069	\$1,141	\$140,936
Management of companies and enterprises	\$0	-\$3,764	\$228	-\$3,536
Administrative and support and waste management and remediation services	\$0	\$3,105	\$715	\$3,820
Educational services	\$0	\$12	\$831	\$843
Health care and social assistance	\$0	\$0	\$5,168	\$5,168
Arts, entertainment, and recreation	\$0	\$272	\$280	\$552
Accommodation and food services	\$0	\$1,658	\$1,080	\$2,738
Other services (except public administration)	\$0	\$554	\$1,337	\$1,891
Public administration	\$25,247	\$980	\$451	\$26,677
Average	\$46,812	\$2,414	\$19,118	\$68,344

Source: RESI

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Figure 22: MACT—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.1
Mining	0.0	0.3	0.0	0.3
Utilities	11.2	0.0	0.1	11.3
Construction	0.0	2.2	0.2	2.3
Manufacturing	0.0	0.2	0.2	0.3
Wholesale trade	0.0	0.4	0.5	0.8
Retail trade	0.0	0.2	3.2	3.4
Transportation and warehousing	0.0	1.5	0.4	1.9
Information	0.0	0.6	0.3	0.9
Finance and insurance	0.0	0.8	1.2	2.0
Real estate and rental and leasing	0.0	0.7	1.1	1.8
Professional, scientific, and technical services	0.0	2.6	0.7	3.3
Management of companies and enterprises	0.0	0.1	0.1	0.1
Administrative and support and waste management and remediation services	0.0	1.3	0.8	2.2
Educational services	0.0	0.0	0.7	0.7
Health care and social assistance	0.0	0.0	3.7	3.7
Arts, entertainment, and recreation	0.0	0.3	0.5	0.8
Accommodation and food services	0.0	2.2	1.8	3.9
Other services (except public administration)	0.0	0.3	1.6	1.8
Public administration	0.0	0.2	0.2	0.4
Total	11.2	13.6	17.1	42.0

Source: RESI

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Figure 23: MACT—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$847	\$3,345	\$4,192
Mining	\$0	\$76,154	\$1,646	\$77,800
Utilities	\$10,446,000	\$14,193	\$51,594	\$10,511,787
Construction	\$0	\$271,736	\$21,191	\$292,927
Manufacturing	\$0	\$56,300	\$68,086	\$124,386
Wholesale trade	\$0	\$73,625	\$100,318	\$173,943
Retail trade	\$0	\$9,670	\$194,746	\$204,416
Transportation and warehousing	\$0	\$331,376	\$45,566	\$376,943
Information	\$0	\$169,640	\$90,644	\$260,285
Finance and insurance	\$0	\$185,972	\$276,726	\$462,698
Real estate and rental and leasing	\$0	\$146,336	\$476,367	\$622,703
Professional, scientific, and technical services	\$0	\$422,480	\$95,143	\$517,623
Management of companies and enterprises	\$0	\$12,758	\$15,512	\$28,270
Administrative and support and waste management and remediation services	\$0	\$97,130	\$59,550	\$156,680
Educational services	\$0	\$1,470	\$52,858	\$54,329
Health care and social assistance	\$0	\$14	\$393,628	\$393,642
Arts, entertainment, and recreation	\$0	\$12,505	\$27,981	\$40,486
Accommodation and food services	\$0	\$139,310	\$113,403	\$252,713
Other services (except public administration)	\$0	\$22,424	\$112,621	\$135,046
Public administration	\$0	\$28,072	\$45,928	\$74,000
Total	\$10,446,000	\$2,072,012	\$2,246,854	\$14,764,866

Source: RESI

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Figure 24: MACT—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$105	\$424	\$529
Mining	\$0	\$808	\$102	\$909
Utilities	\$1,526,260	\$1,958	\$6,935	\$1,535,153
Construction	\$0	\$108,293	\$7,413	\$115,706
Manufacturing	\$0	\$9,726	\$9,928	\$19,655
Wholesale trade	\$0	\$27,598	\$37,604	\$65,201
Retail trade	\$0	\$5,040	\$98,076	\$103,116
Transportation and warehousing	\$0	\$95,019	\$15,653	\$110,672
Information	\$0	\$40,258	\$19,426	\$59,683
Finance and insurance	\$0	\$53,307	\$76,781	\$130,087
Real estate and rental and leasing	\$0	\$12,873	\$16,326	\$29,199
Professional, scientific, and technical services	\$0	\$161,633	\$41,810	\$203,444
Management of companies and enterprises	\$0	\$6,896	\$8,385	\$15,280
Administrative and support and waste management and remediation services	\$0	\$42,850	\$26,166	\$69,016
Educational services	\$0	\$790	\$29,799	\$30,589
Health care and social assistance	\$0	\$5	\$189,514	\$189,520
Arts, entertainment, and recreation	\$0	\$4,621	\$10,188	\$14,809
Accommodation and food services	\$0	\$48,659	\$39,576	\$88,235
Other services (except public administration)	\$0	\$10,977	\$48,577	\$59,555
Public administration	\$0	\$14,475	\$16,519	\$30,994
Total	\$1,526,260	\$645,890	\$699,201	\$2,871,352

Source: RESI

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**Figure 25: Prevention of Significant Deterioration Program—Investment Phase,
Employment Impacts**

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.0	0.0	0.0
Manufacturing	0.0	0.0	0.0	0.0
Wholesale trade	0.0	0.0	0.0	0.0
Retail trade	0.0	0.0	-0.1	-0.1
Transportation and warehousing	0.0	0.1	0.0	0.1
Information	3.2	0.1	0.0	3.3
Finance and insurance	0.0	-0.1	0.0	-0.1
Real estate and rental and leasing	0.0	0.0	0.0	0.0
Professional, scientific, and technical services	2.4	-0.3	0.0	2.2
Management of companies and enterprises	-4.6	0.0	0.0	-4.6
Administrative and support and waste management and remediation services	0.0	0.3	0.0	0.3
Educational services	0.0	0.0	0.0	0.0
Health care and social assistance	0.0	0.0	-0.1	-0.1
Arts, entertainment, and recreation	0.0	-0.1	0.0	-0.1
Accommodation and food services	0.0	0.0	0.0	0.0
Other services (except public administration)	0.0	-0.1	0.0	-0.1
Public administration	0.4	0.0	0.0	0.4
Average	1.4	0.1	-0.3	1.1

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 26: Prevention of Significant Deterioration Program—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	-\$4	-\$69	-\$74
Mining	\$0	\$701	-\$34	\$667
Utilities	\$0	-\$2,553	-\$1,133	-\$3,686
Construction	\$0	\$5,311	-\$380	\$4,930
Manufacturing	\$0	\$2,966	-\$1,455	\$1,511
Wholesale trade	\$0	\$3,047	-\$2,284	\$763
Retail trade	\$0	\$248	-\$3,404	-\$3,156
Transportation and warehousing	\$0	\$9,035	-\$826	\$8,209
Information	\$600,000	-\$5,303	-\$1,859	\$592,838
Finance and insurance	\$0	-\$7,970	-\$5,059	-\$13,030
Real estate and rental and leasing	\$0	-\$7,563	-\$8,806	-\$16,369
Professional, scientific, and technical services	\$300,000	-\$32,314	-\$1,865	\$265,821
Management of companies and enterprises	-\$1,000,000	\$5,931	-\$312	-\$994,381
Administrative and support and waste management and remediation services	\$0	\$17,104	-\$1,131	\$15,973
Educational services	\$0	-\$41	-\$746	-\$788
Health care and social assistance	\$0	-\$2	-\$7,772	-\$7,774
Arts, entertainment, and recreation	\$0	-\$4,035	-\$486	-\$4,522
Accommodation and food services	\$0	-\$317	-\$2,200	-\$2,517
Other services (except public administration)	\$0	-\$4,913	-\$1,967	-\$6,880
Public administration	\$100,000	\$5,889	-\$911	\$104,978
Average	\$0	-\$14,784	-\$42,701	-\$57,485

Source: RESI

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Figure 27: Prevention of Significant Deterioration Program—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	-\$3	-\$8	-\$11
Mining	\$0	\$117	-\$2	\$116
Utilities	\$0	-\$413	-\$153	-\$566
Construction	\$0	\$2,034	-\$135	\$1,899
Manufacturing	\$0	\$215	-\$207	\$8
Wholesale trade	\$0	\$1,142	-\$856	\$286
Retail trade	\$0	\$129	-\$1,714	-\$1,585
Transportation and warehousing	\$0	\$3,666	-\$288	\$3,378
Information	\$205,088	\$3,867	-\$395	\$208,560
Finance and insurance	\$0	-\$3,178	-\$1,442	-\$4,620
Real estate and rental and leasing	\$0	-\$1,076	-\$356	-\$1,431
Professional, scientific, and technical services	\$166,302	-\$14,420	-\$818	\$151,064
Management of companies and enterprises	-\$540,518	\$3,206	-\$169	-\$537,480
Administrative and support and waste management and remediation services	\$0	\$9,010	-\$498	\$8,511
Educational services	\$0	-\$19	-\$405	-\$424
Health care and social assistance	\$0	-\$1	-\$3,733	-\$3,733
Arts, entertainment, and recreation	\$0	-\$1,019	-\$179	-\$1,198
Accommodation and food services	\$0	-\$118	-\$768	-\$886
Other services (except public administration)	\$0	-\$3,580	-\$838	-\$4,418
Public administration	\$25,247	\$2,689	-\$322	\$27,613
Average	-\$143,881	\$2,249	-\$13,284	-\$154,917

Source: RESI

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Figure 28: Prevention of Significant Deterioration Program—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.1	0.0	0.1
Manufacturing	0.0	0.0	0.0	0.0
Wholesale trade	0.0	0.0	0.0	0.0
Retail trade	0.0	0.0	0.0	0.1
Transportation and warehousing	0.0	0.0	0.0	0.0
Information	0.0	0.0	0.0	0.0
Finance and insurance	0.0	0.0	0.0	0.0
Real estate and rental and leasing	0.0	0.0	0.0	0.1
Professional, scientific, and technical services	0.0	0.1	0.0	0.1
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.1	0.0	0.1
Educational services	0.0	0.0	0.0	0.0
Health care and social assistance	0.0	0.0	0.1	0.1
Arts, entertainment, and recreation	0.0	0.0	0.0	0.0
Accommodation and food services	0.0	0.0	0.0	0.0
Other services (except public administration)	0.0	0.0	0.0	0.0
Public administration	0.3	0.0	0.0	0.4
Total	0.3	0.4	0.3	1.0

Source: RESI

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Figure 29: Prevention of Significant Deterioration Program—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$18	\$51	\$70
Mining	\$0	\$745	\$25	\$770
Utilities	\$0	\$2,754	\$796	\$3,550
Construction	\$0	\$6,471	\$319	\$6,791
Manufacturing	\$0	\$3,129	\$1,047	\$4,176
Wholesale trade	\$0	\$2,473	\$1,555	\$4,028
Retail trade	\$0	\$219	\$2,926	\$3,145
Transportation and warehousing	\$0	\$2,067	\$687	\$2,754
Information	\$0	\$1,776	\$1,387	\$3,163
Finance and insurance	\$0	\$6,300	\$4,178	\$10,478
Real estate and rental and leasing	\$0	\$7,413	\$7,201	\$14,614
Professional, scientific, and technical services	\$0	\$12,393	\$1,448	\$13,840
Management of companies and enterprises	\$0	\$333	\$237	\$570
Administrative and support and waste management and remediation services	\$0	\$5,508	\$903	\$6,411
Educational services	\$0	\$21	\$778	\$799
Health care and social assistance	\$0	\$1	\$5,994	\$5,995
Arts, entertainment, and recreation	\$0	\$161	\$420	\$581
Accommodation and food services	\$0	\$566	\$1,724	\$2,289
Other services (except public administration)	\$0	\$926	\$1,692	\$2,619
Public administration	\$94,500	\$3,700	\$700	\$98,900
Total	\$94,500	\$56,973	\$34,069	\$185,542

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 30: Prevention of Significant Deterioration Program—Operation Phase, Wages Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$2	\$6	\$9
Mining	\$0	\$114	\$2	\$115
Utilities	\$0	\$321	\$107	\$428
Construction	\$0	\$2,499	\$112	\$2,611
Manufacturing	\$0	\$569	\$152	\$721
Wholesale trade	\$0	\$927	\$583	\$1,510
Retail trade	\$0	\$114	\$1,474	\$1,588
Transportation and warehousing	\$0	\$729	\$236	\$966
Information	\$0	\$392	\$297	\$688
Finance and insurance	\$0	\$1,848	\$1,163	\$3,010
Real estate and rental and leasing	\$0	\$583	\$252	\$835
Professional, scientific, and technical services	\$0	\$5,967	\$636	\$6,603
Management of companies and enterprises	\$0	\$180	\$128	\$308
Administrative and support and waste management and remediation services	\$0	\$2,215	\$397	\$2,612
Educational services	\$0	\$10	\$437	\$447
Health care and social assistance	\$0	\$0	\$2,885	\$2,886
Arts, entertainment, and recreation	\$0	\$56	\$153	\$209
Accommodation and food services	\$0	\$194	\$601	\$796
Other services (except public administration)	\$0	\$317	\$729	\$1,046
Public administration	\$23,858	\$1,016	\$251	\$25,125
Total	\$23,858	\$18,054	\$10,601	\$52,513

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 31: Energy Efficiency in the Residential Sector—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.1
Construction	1.2	0.1	0.0	1.3
Manufacturing	0.0	0.1	0.0	0.1
Wholesale trade	0.0	0.1	0.1	0.2
Retail trade	4.3	0.1	0.7	5.1
Transportation and warehousing	0.0	0.1	0.1	0.2
Information	0.0	0.1	0.1	0.1
Finance and insurance	0.0	0.1	0.3	0.4
Real estate and rental and leasing	0.0	0.2	0.2	0.5
Professional, scientific, and technical services	3.1	0.5	0.2	3.7
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.5	0.2	0.6
Educational services	0.5	0.0	0.2	0.7
Health care and social assistance	0.0	0.0	0.8	0.8
Arts, entertainment, and recreation	0.0	0.0	0.1	0.2
Accommodation and food services	0.0	0.1	0.4	0.5
Other services (except public administration)	0.4	0.1	0.4	0.8
Public administration	0.4	0.1	0.1	0.5
Average	9.8	2.2	3.8	15.9

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 32: Energy Efficiency in the Residential Sector—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$308	\$757	\$1,065
Mining	\$0	\$1,956	\$373	\$2,329
Utilities	\$28,125	\$10,155	\$11,738	\$50,017
Construction	\$158,571	\$9,545	\$4,747	\$172,864
Manufacturing	\$0	\$16,081	\$15,454	\$31,535
Wholesale trade	\$0	\$12,764	\$22,892	\$35,655
Retail trade	\$223,393	\$8,468	\$43,549	\$275,410
Transportation and warehousing	\$0	\$14,180	\$10,215	\$24,395
Information	\$0	\$23,093	\$20,508	\$43,601
Finance and insurance	\$0	\$31,768	\$62,074	\$93,842
Real estate and rental and leasing	\$0	\$44,134	\$106,940	\$151,074
Professional, scientific, and technical services	\$401,518	\$73,414	\$21,451	\$496,382
Management of companies and enterprises	\$0	\$4,714	\$3,504	\$8,219
Administrative and support and waste management and remediation services	\$0	\$34,166	\$13,395	\$47,560
Educational services	\$56,250	\$924	\$11,667	\$68,841
Health care and social assistance	\$0	\$14	\$88,794	\$88,809
Arts, entertainment, and recreation	\$0	\$2,173	\$6,255	\$8,427
Accommodation and food services	\$0	\$8,063	\$25,548	\$33,611
Other services (except public administration)	\$32,143	\$9,228	\$25,183	\$66,554
Public administration	\$100,000	\$9,809	\$10,364	\$120,173
Average	\$1,000,000	\$314,957	\$505,408	\$1,820,365

Source: RESI

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Figure 33: Energy Efficiency in the Residential Sector—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$47	\$96	\$143
Mining	\$0	\$316	\$23	\$339
Utilities	\$4,109	\$1,314	\$1,578	\$7,001
Construction	\$50,795	\$3,705	\$1,662	\$56,162
Manufacturing	\$0	\$3,206	\$2,249	\$5,455
Wholesale trade	\$0	\$4,784	\$8,581	\$13,365
Retail trade	\$127,332	\$4,419	\$21,932	\$153,682
Transportation and warehousing	\$0	\$5,110	\$3,513	\$8,622
Information	\$0	\$5,217	\$4,392	\$9,609
Finance and insurance	\$0	\$8,978	\$17,256	\$26,235
Real estate and rental and leasing	\$0	\$3,673	\$3,712	\$7,384
Professional, scientific, and technical services	\$213,291	\$34,487	\$9,425	\$257,204
Management of companies and enterprises	\$0	\$2,548	\$1,894	\$4,442
Administrative and support and waste management and remediation services	\$0	\$15,966	\$5,887	\$21,853
Educational services	\$30,807	\$440	\$6,563	\$37,810
Health care and social assistance	\$0	\$5	\$42,743	\$42,748
Arts, entertainment, and recreation	\$0	\$742	\$2,279	\$3,021
Accommodation and food services	\$0	\$2,796	\$8,916	\$11,712
Other services (except public administration)	\$18,502	\$3,571	\$10,853	\$32,926
Public administration	\$25,247	\$3,977	\$3,723	\$32,947
Average	\$470,082	\$105,304	\$157,275	\$732,661

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 34: Energy Efficiency in the Residential Sector—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.5	0.5
Mining	0.0	0.1	0.1	0.2
Utilities	0.0	0.1	0.7	0.8
Construction	0.0	1.2	2.0	3.2
Manufacturing	0.0	0.2	2.0	2.2
Wholesale trade	0.0	0.3	6.0	6.3
Retail trade	0.0	0.1	38.2	38.3
Transportation and warehousing	0.0	0.4	5.1	5.5
Information	0.0	0.1	3.7	3.8
Finance and insurance	0.0	0.6	14.3	14.9
Real estate and rental and leasing	0.0	0.9	14.9	15.9
Professional, scientific, and technical services	0.0	2.0	8.8	10.9
Management of companies and enterprises	0.0	0.0	0.9	1.0
Administrative and support and waste management and remediation services	0.0	1.5	10.5	12.0
Educational services	0.0	0.0	8.8	8.8
Health care and social assistance	0.0	0.0	48.0	48.0
Arts, entertainment, and recreation	0.0	0.1	6.8	6.9
Accommodation and food services	0.0	0.2	21.9	22.1
Other services (except public administration)	0.0	0.2	19.5	19.7
Public administration	7.8	0.3	2.9	11.0
Total	7.8	8.3	215.8	231.9

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 35: Energy Efficiency in the Residential Sector—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$422	\$44,287	\$44,709
Mining	\$0	\$17,059	\$22,039	\$39,097
Utilities	\$0	\$63,070	\$716,349	\$779,419
Construction	\$0	\$148,214	\$262,411	\$410,625
Manufacturing	\$0	\$71,668	\$915,829	\$987,498
Wholesale trade	\$0	\$56,647	\$1,245,702	\$1,302,349
Retail trade	\$0	\$5,015	\$2,328,040	\$2,333,055
Transportation and warehousing	\$0	\$47,334	\$577,440	\$624,775
Information	\$0	\$40,679	\$1,177,771	\$1,218,449
Finance and insurance	\$0	\$144,285	\$3,366,424	\$3,510,709
Real estate and rental and leasing	\$0	\$169,778	\$6,001,342	\$6,171,121
Professional, scientific, and technical services	\$0	\$283,836	\$1,215,158	\$1,498,994
Management of companies and enterprises	\$0	\$7,635	\$200,548	\$208,183
Administrative and support and waste management and remediation services	\$0	\$126,147	\$761,562	\$887,709
Educational services	\$0	\$474	\$671,144	\$671,618
Health care and social assistance	\$0	\$16	\$5,168,794	\$5,168,810
Arts, entertainment, and recreation	\$0	\$3,694	\$347,921	\$351,615
Accommodation and food services	\$0	\$12,960	\$1,418,203	\$1,431,164
Other services (except public administration)	\$0	\$21,217	\$1,411,936	\$1,433,153
Public administration	\$2,164,385	\$84,737	\$604,039	\$2,853,160
Total	\$2,164,385	\$1,304,886	\$28,456,939	\$31,926,210

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 36: Energy Efficiency in the Residential Sector—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$54	\$5,546	\$5,600
Mining	\$0	\$2,601	\$1,302	\$3,903
Utilities	\$0	\$7,343	\$96,345	\$103,688
Construction	\$0	\$57,231	\$92,290	\$149,521
Manufacturing	\$0	\$13,038	\$131,774	\$144,812
Wholesale trade	\$0	\$21,234	\$466,943	\$488,177
Retail trade	\$0	\$2,613	\$1,172,465	\$1,175,078
Transportation and warehousing	\$0	\$16,699	\$198,992	\$215,691
Information	\$0	\$8,969	\$250,806	\$259,775
Finance and insurance	\$0	\$42,316	\$940,441	\$982,757
Real estate and rental and leasing	\$0	\$13,358	\$225,815	\$239,173
Professional, scientific, and technical services	\$0	\$136,669	\$533,628	\$670,297
Management of companies and enterprises	\$0	\$4,127	\$108,400	\$112,527
Administrative and support and waste management and remediation services	\$0	\$50,741	\$334,715	\$385,456
Educational services	\$0	\$231	\$374,278	\$374,509
Health care and social assistance	\$0	\$6	\$2,485,800	\$2,485,805
Arts, entertainment, and recreation	\$0	\$1,279	\$127,574	\$128,853
Accommodation and food services	\$0	\$4,449	\$494,799	\$499,248
Other services (except public administration)	\$0	\$7,265	\$604,288	\$611,554
Public administration	\$546,432	\$23,267	\$215,141	\$784,840
Total	\$546,432	\$413,491	\$8,861,343	\$9,821,266

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 37: Energy Efficiency in the Commercial and Industrial Sectors—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.1
Construction	1.0	0.1	0.0	1.1
Manufacturing	0.1	0.0	0.0	0.2
Wholesale trade	0.4	0.1	0.1	0.5
Retail trade	2.9	0.1	0.7	3.6
Transportation and warehousing	0.0	0.1	0.1	0.2
Information	0.0	0.1	0.1	0.1
Finance and insurance	0.0	0.1	0.3	0.4
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	3.5	0.6	0.2	4.2
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.5	0.2	0.7
Educational services	0.0	0.0	0.2	0.2
Health care and social assistance	0.0	0.0	0.8	0.8
Arts, entertainment, and recreation	0.0	0.1	0.1	0.2
Accommodation and food services	0.0	0.1	0.4	0.5
Other services (except public administration)	0.0	0.1	0.3	0.4
Public administration	0.4	0.0	0.0	0.5
Average	8.3	2.3	3.7	14.3

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 38: Energy Efficiency in the Commercial and Industrial Sectors—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$182	\$737	\$919
Mining	\$0	\$2,017	\$363	\$2,379
Utilities	\$45,714	\$8,087	\$11,420	\$65,222
Construction	\$135,714	\$9,887	\$4,618	\$150,220
Manufacturing	\$40,000	\$16,467	\$15,036	\$71,503
Wholesale trade	\$75,714	\$15,842	\$22,274	\$113,830
Retail trade	\$151,429	\$3,371	\$42,362	\$197,161
Transportation and warehousing	\$0	\$16,188	\$9,937	\$26,125
Information	\$0	\$24,153	\$19,952	\$44,104
Finance and insurance	\$0	\$32,195	\$60,384	\$92,580
Real estate and rental and leasing	\$0	\$39,981	\$104,031	\$144,012
Professional, scientific, and technical services	\$451,429	\$82,396	\$20,868	\$554,693
Management of companies and enterprises	\$0	\$6,999	\$3,409	\$10,408
Administrative and support and waste management and remediation services	\$0	\$36,661	\$13,030	\$49,691
Educational services	\$0	\$295	\$11,346	\$11,642
Health care and social assistance	\$0	\$4	\$86,384	\$86,388
Arts, entertainment, and recreation	\$0	\$2,288	\$6,084	\$8,372
Accommodation and food services	\$0	\$8,409	\$24,854	\$33,263
Other services (except public administration)	\$0	\$10,858	\$24,497	\$35,355
Public administration	\$100,000	\$8,527	\$10,083	\$118,610
Average	\$1,000,000	\$324,809	\$491,670	\$1,816,479

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 39: Energy Efficiency in the Commercial and Industrial Sectors—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$29	\$93	\$122
Mining	\$0	\$292	\$22	\$314
Utilities	\$6,679	\$1,049	\$1,535	\$9,264
Construction	\$51,457	\$3,845	\$1,617	\$56,919
Manufacturing	\$9,218	\$3,030	\$2,188	\$14,436
Wholesale trade	\$28,381	\$5,938	\$8,349	\$42,669
Retail trade	\$86,313	\$1,761	\$21,334	\$109,407
Transportation and warehousing	\$0	\$5,909	\$3,417	\$9,326
Information	\$0	\$5,339	\$4,273	\$9,612
Finance and insurance	\$0	\$8,945	\$16,787	\$25,732
Real estate and rental and leasing	\$0	\$3,512	\$3,611	\$7,123
Professional, scientific, and technical services	\$242,297	\$38,821	\$9,169	\$290,287
Management of companies and enterprises	\$0	\$3,783	\$1,843	\$5,626
Administrative and support and waste management and remediation services	\$0	\$17,349	\$5,727	\$23,076
Educational services	\$0	\$152	\$6,383	\$6,535
Health care and social assistance	\$0	\$2	\$41,582	\$41,584
Arts, entertainment, and recreation	\$0	\$788	\$2,216	\$3,004
Accommodation and food services	\$0	\$2,920	\$8,674	\$11,593
Other services (except public administration)	\$0	\$4,073	\$10,557	\$14,630
Public administration	\$25,247	\$3,768	\$3,622	\$32,636
Average	\$449,592	\$111,304	\$153,000	\$713,895

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 40: Energy Efficiency in the Commercial and Industrial Sectors—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.3	0.4
Mining	0.0	0.0	0.1	0.1
Utilities	0.0	0.3	0.4	0.8
Construction	0.0	0.9	1.3	2.2
Manufacturing	0.0	1.8	1.3	3.1
Wholesale trade	0.0	1.2	4.0	5.2
Retail trade	0.0	0.2	25.5	25.6
Transportation and warehousing	0.0	2.1	3.2	5.3
Information	0.0	10.0	2.3	12.3
Finance and insurance	0.0	5.6	9.4	15.1
Real estate and rental and leasing	0.0	8.7	8.8	17.5
Professional, scientific, and technical services	0.0	29.5	5.6	35.1
Management of companies and enterprises	168.9	0.4	0.6	169.9
Administrative and support and waste management and remediation services	0.0	9.4	6.6	16.0
Educational services	0.0	0.1	5.6	5.6
Health care and social assistance	0.0	0.0	29.8	29.8
Arts, entertainment, and recreation	0.0	5.9	4.3	10.3
Accommodation and food services	0.0	4.1	14.2	18.3
Other services (except public administration)	0.0	5.5	12.5	17.9
Public administration	0.0	0.8	1.8	2.6
Total	168.9	86.4	137.7	393.0

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 41: Energy Efficiency in the Commercial and Industrial Sectors—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$2,326	\$27,331	\$29,657
Mining	\$0	\$6,723	\$13,461	\$20,184
Utilities	\$0	\$305,528	\$425,935	\$731,463
Construction	\$0	\$111,550	\$169,396	\$280,946
Manufacturing	\$0	\$382,474	\$559,442	\$941,916
Wholesale trade	\$0	\$240,774	\$833,410	\$1,074,185
Retail trade	\$0	\$11,134	\$1,550,791	\$1,561,925
Transportation and warehousing	\$0	\$237,369	\$364,783	\$602,152
Information	\$0	\$3,109,182	\$739,726	\$3,848,908
Finance and insurance	\$0	\$1,229,333	\$2,218,128	\$3,447,462
Real estate and rental and leasing	\$0	\$2,001,650	\$3,824,685	\$5,826,336
Professional, scientific, and technical services	\$0	\$4,002,020	\$770,820	\$4,772,840
Management of companies and enterprises	\$36,484,720	\$79,658	\$126,208	\$36,690,586
Administrative and support and waste management and remediation services	\$0	\$737,208	\$480,080	\$1,217,288
Educational services	\$0	\$3,929	\$409,344	\$413,272
Health care and social assistance	\$0	\$196	\$3,192,631	\$3,192,827
Arts, entertainment, and recreation	\$0	\$245,795	\$222,641	\$468,436
Accommodation and food services	\$0	\$267,749	\$917,277	\$1,185,026
Other services (except public administration)	\$0	\$481,570	\$896,746	\$1,378,316
Public administration	\$0	\$119,060	\$372,806	\$491,867
Total	\$36,484,720	\$13,575,230	\$18,115,643	\$68,175,594

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 42: Energy Efficiency in the Commercial and Industrial Sectors—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$385	\$3,449	\$3,834
Mining	\$0	\$334	\$822	\$1,157
Utilities	\$0	\$42,078	\$57,270	\$99,348
Construction	\$0	\$43,967	\$59,353	\$103,320
Manufacturing	\$0	\$116,635	\$81,242	\$197,877
Wholesale trade	\$0	\$90,253	\$312,399	\$402,651
Retail trade	\$0	\$5,803	\$781,001	\$786,803
Transportation and warehousing	\$0	\$80,913	\$125,570	\$206,483
Information	\$0	\$703,455	\$158,310	\$861,765
Finance and insurance	\$0	\$373,949	\$617,942	\$991,891
Real estate and rental and leasing	\$0	\$170,909	\$134,597	\$305,506
Professional, scientific, and technical services	\$0	\$1,858,367	\$338,632	\$2,196,999
Management of companies and enterprises	\$19,720,632	\$43,056	\$68,218	\$19,831,906
Administrative and support and waste management and remediation services	\$0	\$333,668	\$211,023	\$544,692
Educational services	\$0	\$1,902	\$229,732	\$231,635
Health care and social assistance	\$0	\$72	\$1,536,527	\$1,536,599
Arts, entertainment, and recreation	\$0	\$73,547	\$81,156	\$154,703
Accommodation and food services	\$0	\$92,966	\$320,110	\$413,075
Other services (except public administration)	\$0	\$238,631	\$386,079	\$624,710
Public administration	\$0	\$61,645	\$133,728	\$195,372
Total	\$19,720,632	\$4,332,534	\$5,637,160	\$29,690,325

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 43: Energy Efficiency – Appliances and Other Products—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.1	0.0	0.1
Manufacturing	0.0	0.0	0.0	0.1
Wholesale trade	1.1	0.1	0.1	1.3
Retail trade	8.6	0.0	0.7	9.2
Transportation and warehousing	0.0	0.2	0.1	0.3
Information	0.0	0.1	0.1	0.2
Finance and insurance	0.0	0.1	0.2	0.3
Real estate and rental and leasing	0.0	0.3	0.2	0.5
Professional, scientific, and technical services	1.9	0.4	0.1	2.4
Management of companies and enterprises	0.0	0.0	0.0	0.1
Administrative and support and waste management and remediation services	0.0	0.3	0.2	0.5
Educational services	0.0	0.0	0.1	0.2
Health care and social assistance	0.0	0.0	0.8	0.8
Arts, entertainment, and recreation	0.0	0.1	0.1	0.2
Accommodation and food services	0.0	0.1	0.4	0.4
Other services (except public administration)	0.0	0.1	0.3	0.4
Public administration	0.4	0.1	0.0	0.5
Average	11.9	1.9	3.5	17.3

Source: RESI

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Figure 44: Energy Efficiency – Appliances and Other Products—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$138	\$691	\$829
Mining	\$0	\$946	\$340	\$1,286
Utilities	\$0	\$10,170	\$10,723	\$20,893
Construction	\$0	\$8,917	\$4,327	\$13,243
Manufacturing	\$0	\$10,306	\$14,114	\$24,420
Wholesale trade	\$225,000	\$16,182	\$20,924	\$262,106
Retail trade	\$450,000	\$1,249	\$39,679	\$490,928
Transportation and warehousing	\$0	\$22,865	\$9,311	\$32,176
Information	\$0	\$37,755	\$18,719	\$56,474
Finance and insurance	\$0	\$27,506	\$56,585	\$84,091
Real estate and rental and leasing	\$0	\$46,946	\$97,496	\$144,442
Professional, scientific, and technical services	\$225,000	\$48,322	\$19,570	\$292,891
Management of companies and enterprises	\$0	\$8,003	\$3,198	\$11,201
Administrative and support and waste management and remediation services	\$0	\$24,965	\$12,215	\$37,180
Educational services	\$0	\$614	\$10,607	\$11,221
Health care and social assistance	\$0	\$4	\$81,014	\$81,018
Arts, entertainment, and recreation	\$0	\$3,165	\$5,698	\$8,863
Accommodation and food services	\$0	\$4,658	\$23,305	\$27,963
Other services (except public administration)	\$0	\$6,019	\$22,945	\$28,964
Public administration	\$100,000	\$10,920	\$9,457	\$120,376
Average	\$1,000,000	\$289,648	\$460,919	\$1,750,567

Source: RESI

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Figure 45: Energy Efficiency – Appliances and Other Products—Investment Phase, Wage Impacts

Agriculture, forestry, fishing, and hunting	\$0	\$34	\$87	\$122
Mining	\$0	\$127	\$21	\$148
Utilities	\$0	\$1,359	\$1,442	\$2,801
Construction	\$0	\$3,455	\$1,515	\$4,969
Manufacturing	\$0	\$2,562	\$2,053	\$4,615
Wholesale trade	\$84,340	\$6,066	\$7,843	\$98,249
Retail trade	\$256,495	\$662	\$19,983	\$277,140
Transportation and warehousing	\$0	\$9,084	\$3,202	\$12,286
Information	\$0	\$8,529	\$4,009	\$12,538
Finance and insurance	\$0	\$7,488	\$15,735	\$23,223
Real estate and rental and leasing	\$0	\$3,844	\$3,391	\$7,235
Professional, scientific, and technical services	\$80,198	\$21,437	\$8,598	\$110,233
Management of companies and enterprises	\$0	\$4,326	\$1,729	\$6,054
Administrative and support and waste management and remediation services	\$0	\$11,287	\$5,368	\$16,655
Educational services	\$0	\$314	\$5,965	\$6,280
Health care and social assistance	\$0	\$1	\$38,997	\$38,998
Arts, entertainment, and recreation	\$0	\$929	\$2,076	\$3,005
Accommodation and food services	\$0	\$1,608	\$8,133	\$9,740
Other services (except public administration)	\$0	\$2,380	\$9,887	\$12,267
Public administration	\$25,247	\$5,477	\$3,396	\$34,120
Average	\$446,279	\$90,971	\$143,430	\$680,680

Source: RESI

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Figure 46: Energy Efficiency – Appliances and Other Products—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.2	0.2
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.3	0.3
Construction	0.0	0.0	0.7	0.7
Manufacturing	0.0	0.0	0.7	0.7
Wholesale trade	0.0	0.0	2.0	2.0
Retail trade	0.0	0.0	13.0	13.0
Transportation and warehousing	0.0	0.0	1.7	1.7
Information	0.0	0.0	1.2	1.2
Finance and insurance	0.0	0.0	4.9	4.9
Real estate and rental and leasing	0.0	0.0	5.1	5.1
Professional, scientific, and technical services	0.0	0.0	3.0	3.0
Management of companies and enterprises	0.0	0.0	0.3	0.3
Administrative and support and waste management and remediation services	0.0	0.0	3.6	3.6
Educational services	0.0	0.0	3.0	3.0
Health care and social assistance	0.0	0.0	16.3	16.3
Arts, entertainment, and recreation	0.0	0.0	2.3	2.3
Accommodation and food services	0.0	0.0	7.5	7.5
Other services (except public administration)	0.0	0.0	6.6	6.6
Public administration	0.0	0.0	1.0	1.0
Total	0.0	0.0	73.4	73.4

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 47: Energy Efficiency – Appliances and Other Products—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$0	\$15,074	\$15,074
Mining	\$0	\$0	\$7,504	\$7,504
Utilities	\$0	\$0	\$244,093	\$244,093
Construction	\$0	\$0	\$89,193	\$89,193
Manufacturing	\$0	\$0	\$311,831	\$311,831
Wholesale trade	\$0	\$0	\$423,100	\$423,100
Retail trade	\$0	\$0	\$790,550	\$790,550
Transportation and warehousing	\$0	\$0	\$196,394	\$196,394
Information	\$0	\$0	\$400,696	\$400,696
Finance and insurance	\$0	\$0	\$1,143,590	\$1,143,590
Real estate and rental and leasing	\$0	\$0	\$2,040,664	\$2,040,664
Professional, scientific, and technical services	\$0	\$0	\$413,278	\$413,278
Management of companies and enterprises	\$0	\$0	\$68,224	\$68,224
Administrative and support and waste management and remediation services	\$0	\$0	\$259,045	\$259,045
Educational services	\$0	\$0	\$228,428	\$228,428
Health care and social assistance	\$0	\$0	\$1,759,231	\$1,759,231
Arts, entertainment, and recreation	\$0	\$0	\$118,283	\$118,283
Accommodation and food services	\$0	\$0	\$482,063	\$482,063
Other services (except public administration)	\$0	\$0	\$480,123	\$480,123
Public administration	\$0	\$0	\$205,594	\$205,594
Total	\$0	\$0	\$9,676,958	\$9,676,958

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 48: Energy Efficiency – Appliances and Other Products—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$0	\$1,887	\$1,887
Mining	\$0	\$0	\$443	\$443
Utilities	\$0	\$0	\$32,829	\$32,829
Construction	\$0	\$0	\$31,373	\$31,373
Manufacturing	\$0	\$0	\$44,855	\$44,855
Wholesale trade	\$0	\$0	\$158,596	\$158,596
Retail trade	\$0	\$0	\$398,143	\$398,143
Transportation and warehousing	\$0	\$0	\$67,683	\$67,683
Information	\$0	\$0	\$85,315	\$85,315
Finance and insurance	\$0	\$0	\$319,508	\$319,508
Real estate and rental and leasing	\$0	\$0	\$76,940	\$76,940
Professional, scientific, and technical services	\$0	\$0	\$181,486	\$181,486
Management of companies and enterprises	\$0	\$0	\$36,876	\$36,876
Administrative and support and waste management and remediation services	\$0	\$0	\$113,853	\$113,853
Educational services	\$0	\$0	\$127,361	\$127,361
Health care and social assistance	\$0	\$0	\$846,038	\$846,038
Arts, entertainment, and recreation	\$0	\$0	\$43,379	\$43,379
Accommodation and food services	\$0	\$0	\$168,186	\$168,186
Other services (except public administration)	\$0	\$0	\$205,448	\$205,448
Public administration	\$0	\$0	\$73,211	\$73,211
Total	\$0	\$0	\$3,013,413	\$3,013,413

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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**Figure 49: Energy Efficiency in the Power Sector – General—Investment Phase,
Employment Impacts**

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.1	0.0	0.1
Utilities	0.5	0.0	0.0	0.5
Construction	0.0	0.1	0.0	0.2
Manufacturing	0.0	0.0	0.0	0.0
Wholesale trade	0.0	0.0	0.1	0.1
Retail trade	0.0	0.0	0.4	0.5
Transportation and warehousing	0.0	0.1	0.1	0.2
Information	0.0	0.1	0.0	0.1
Finance and insurance	0.0	0.1	0.2	0.3
Real estate and rental and leasing	0.0	0.2	0.1	0.3
Professional, scientific, and technical services	2.4	0.5	0.1	3.0
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.4	0.1	0.5
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.5	0.5
Arts, entertainment, and recreation	0.0	0.0	0.1	0.1
Accommodation and food services	0.0	0.1	0.2	0.4
Other services (except public administration)	0.0	0.1	0.2	0.3
Public administration	0.4	0.0	0.0	0.4
Average	3.3	1.9	2.4	7.6

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 50: Energy Efficiency in the Power Sector – General—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	-\$26	\$613	\$587
Mining	\$0	-\$33,754	\$302	-\$33,452
Utilities	-\$1,000,000	\$3,484	\$9,517	-\$986,999
Construction	\$0	-\$7,363	\$3,834	-\$3,530
Manufacturing	\$0	\$1,171	\$12,524	\$13,695
Wholesale trade	\$0	-\$73	\$18,576	\$18,504
Retail trade	\$0	-\$160	\$35,153	\$34,993
Transportation and warehousing	\$0	-\$9,522	\$8,251	-\$1,271
Information	\$0	\$12,191	\$16,604	\$28,795
Finance and insurance	\$0	\$10,944	\$50,147	\$61,091
Real estate and rental and leasing	\$0	\$25,904	\$86,411	\$112,315
Professional, scientific, and technical services	\$900,000	\$54,254	\$17,352	\$971,607
Management of companies and enterprises	\$0	\$4,484	\$2,836	\$7,320
Administrative and support and waste management and remediation services	\$0	\$42,592	\$10,829	\$53,421
Educational services	\$0	-\$730	\$9,384	\$8,655
Health care and social assistance	\$0	\$4	\$71,839	\$71,843
Arts, entertainment, and recreation	\$0	\$2,217	\$5,048	\$7,265
Accommodation and food services	\$0	\$1,394	\$20,663	\$22,057
Other services (except public administration)	\$0	\$11,806	\$20,328	\$32,134
Public administration	\$100,000	\$5,241	\$8,386	\$113,627
Average	\$0	\$124,058	\$408,598	\$532,656

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 51: Energy Efficiency in the Power Sector – General—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	-\$3	\$78	\$74
Mining	\$0	-\$74	\$19	-\$55
Utilities	-\$103,190	\$478	\$1,280	-\$101,432
Construction	\$0	-\$3,029	\$1,342	-\$1,687
Manufacturing	\$0	\$368	\$1,822	\$2,189
Wholesale trade	\$0	-\$27	\$6,963	\$6,936
Retail trade	\$0	-\$83	\$17,703	\$17,620
Transportation and warehousing	\$0	-\$1,914	\$2,838	\$924
Information	\$0	\$2,531	\$3,556	\$6,086
Finance and insurance	\$0	\$2,977	\$13,948	\$16,925
Real estate and rental and leasing	\$0	\$2,349	\$3,009	\$5,358
Professional, scientific, and technical services	\$498,905	\$29,259	\$7,624	\$535,788
Management of companies and enterprises	\$0	\$2,424	\$1,533	\$3,957
Administrative and support and waste management and remediation services	\$0	\$21,304	\$4,759	\$26,063
Educational services	\$0	-\$401	\$5,276	\$4,875
Health care and social assistance	\$0	\$1	\$34,580	\$34,581
Arts, entertainment, and recreation	\$0	\$697	\$1,839	\$2,537
Accommodation and food services	\$0	\$471	\$7,211	\$7,682
Other services (except public administration)	\$0	\$3,482	\$8,758	\$12,240
Public administration	\$25,247	\$1,883	\$3,011	\$30,141
Average	\$420,961	\$62,692	\$127,148	\$610,801

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 52: Energy Efficiency in the Power Sector – General—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.1	0.1
Mining	0.0	0.9	0.0	0.9
Utilities	32.3	0.0	0.2	32.5
Construction	0.0	6.2	0.5	6.7
Manufacturing	0.0	0.4	0.4	0.9
Wholesale trade	0.0	1.0	1.4	2.4
Retail trade	0.0	0.5	9.2	9.6
Transportation and warehousing	0.0	4.3	1.2	5.4
Information	0.0	1.7	0.8	2.5
Finance and insurance	0.0	2.3	3.4	5.7
Real estate and rental and leasing	0.0	2.0	3.1	5.1
Professional, scientific, and technical services	0.0	7.5	2.0	9.5
Management of companies and enterprises	0.0	0.2	0.2	0.4
Administrative and support and waste management and remediation services	0.0	3.9	2.4	6.3
Educational services	0.0	0.0	2.1	2.1
Health care and social assistance	0.0	0.0	10.6	10.6
Arts, entertainment, and recreation	0.0	0.9	1.6	2.4
Accommodation and food services	0.0	6.2	5.0	11.3
Other services (except public administration)	0.0	0.7	4.5	5.3
Public administration	0.0	0.5	0.6	1.2
Total	32.3	39.2	49.3	120.8

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 53: Energy Efficiency in the Power Sector – General—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$2,435	\$9,620	\$12,056
Mining	\$0	\$219,025	\$4,735	\$223,760
Utilities	\$30,043,553	\$40,821	\$148,388	\$30,232,762
Construction	\$0	\$781,535	\$60,947	\$842,482
Manufacturing	\$0	\$161,924	\$195,821	\$357,745
Wholesale trade	\$0	\$211,751	\$288,523	\$500,274
Retail trade	\$0	\$27,811	\$560,106	\$587,917
Transportation and warehousing	\$0	\$953,065	\$131,053	\$1,084,118
Information	\$0	\$487,900	\$260,700	\$748,600
Finance and insurance	\$0	\$534,870	\$795,886	\$1,330,757
Real estate and rental and leasing	\$0	\$420,873	\$1,370,071	\$1,790,944
Professional, scientific, and technical services	\$0	\$1,215,087	\$273,640	\$1,488,726
Management of companies and enterprises	\$0	\$36,692	\$44,614	\$81,306
Administrative and support and waste management and remediation services	\$0	\$279,354	\$171,271	\$450,625
Educational services	\$0	\$4,229	\$152,024	\$156,253
Health care and social assistance	\$0	\$41	\$1,132,106	\$1,132,147
Arts, entertainment, and recreation	\$0	\$35,966	\$80,475	\$116,441
Accommodation and food services	\$0	\$400,666	\$326,157	\$726,823
Other services (except public administration)	\$0	\$64,494	\$323,908	\$388,403
Public administration	\$0	\$80,737	\$132,093	\$212,830
Total	\$30,043,553	\$5,959,277	\$6,462,137	\$42,464,967

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 54: Energy Efficiency in the Power Sector – General—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$301	\$1,221	\$1,522
Mining	\$0	\$2,322	\$293	\$2,616
Utilities	\$4,389,650	\$5,631	\$19,945	\$4,415,225
Construction	\$0	\$311,459	\$21,320	\$332,779
Manufacturing	\$0	\$27,974	\$28,555	\$56,528
Wholesale trade	\$0	\$79,374	\$108,151	\$187,524
Retail trade	\$0	\$14,494	\$282,076	\$296,570
Transportation and warehousing	\$0	\$273,284	\$45,018	\$318,302
Information	\$0	\$115,784	\$55,870	\$171,655
Finance and insurance	\$0	\$153,314	\$220,828	\$374,142
Real estate and rental and leasing	\$0	\$37,023	\$46,954	\$83,978
Professional, scientific, and technical services	\$0	\$464,871	\$120,250	\$585,121
Management of companies and enterprises	\$0	\$19,833	\$24,115	\$43,947
Administrative and support and waste management and remediation services	\$0	\$123,241	\$75,255	\$198,496
Educational services	\$0	\$2,271	\$85,704	\$87,976
Health care and social assistance	\$0	\$15	\$545,059	\$545,074
Arts, entertainment, and recreation	\$0	\$13,292	\$29,300	\$42,592
Accommodation and food services	\$0	\$139,946	\$113,825	\$253,771
Other services (except public administration)	\$0	\$31,572	\$139,712	\$171,284
Public administration	\$0	\$41,631	\$47,510	\$89,141
Total	\$4,389,650	\$1,857,632	\$2,010,961	\$8,258,243

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 55: EmPOWER – Utility Subprograms—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.1	0.0	0.0	0.2
Construction	1.0	0.1	0.0	1.2
Manufacturing	0.0	0.0	0.0	0.1
Wholesale trade	0.6	0.1	0.1	0.8
Retail trade	4.9	0.1	0.6	5.6
Transportation and warehousing	0.0	0.2	0.1	0.2
Information	0.0	0.1	0.1	0.1
Finance and insurance	0.0	0.1	0.2	0.4
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	1.9	0.5	0.1	2.6
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.4	0.2	0.6
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.8	0.8
Arts, entertainment, and recreation	0.0	0.0	0.1	0.2
Accommodation and food services	0.0	0.1	0.4	0.5
Other services (except public administration)	0.0	0.1	0.3	0.4
Public administration	0.4	0.1	0.0	0.5
Average	9.0	2.1	3.5	14.5

Source: RESI

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Figure 56: EmPOWER – Utility Subprograms—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$149	\$425	\$574
Mining	\$0	-\$5,322	\$209	-\$5,113
Utilities	-\$1,000,000	\$7,561	\$6,621	-\$985,818
Construction	\$150,000	-\$17,150	\$2,640	\$135,490
Manufacturing	\$0	\$8,383	\$8,700	\$17,082
Wholesale trade	\$150,000	\$9,571	\$12,948	\$172,519
Retail trade	\$300,000	\$3,684	\$24,179	\$327,863
Transportation and warehousing	\$0	-\$13,404	\$5,685	-\$7,719
Information	\$0	\$8,446	\$11,510	\$19,956
Finance and insurance	\$0	\$13,153	\$34,565	\$47,718
Real estate and rental and leasing	\$0	\$27,523	\$59,591	\$87,114
Professional, scientific, and technical services	\$300,000	\$30,982	\$12,001	\$342,983
Management of companies and enterprises	\$0	\$5,899	\$1,964	\$7,863
Administrative and support and waste management and remediation services	\$0	\$22,723	\$7,477	\$30,200
Educational services	\$0	\$332	\$6,398	\$6,729
Health care and social assistance	\$0	\$3	\$49,701	\$49,703
Arts, entertainment, and recreation	\$0	\$812	\$3,472	\$4,284
Accommodation and food services	\$0	-\$6,418	\$14,283	\$7,865
Other services (except public administration)	\$0	\$6,851	\$13,982	\$20,832
Public administration	\$100,000	\$6,460	\$5,803	\$112,263
Average	\$0	\$110,238	\$282,153	\$392,391

Source: RESI

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Figure 57: EmPOWER – Utility Subprograms—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$30	\$54	\$84
Mining	\$0	\$268	\$13	\$281
Utilities	-\$146,110	\$984	\$890	-\$144,235
Construction	\$59,807	-\$6,931	\$925	\$53,801
Manufacturing	\$0	\$1,785	\$1,264	\$3,049
Wholesale trade	\$56,227	\$3,588	\$4,854	\$64,668
Retail trade	\$170,997	\$1,928	\$12,177	\$185,101
Transportation and warehousing	\$0	-\$2,094	\$1,957	-\$138
Information	\$0	\$1,639	\$2,463	\$4,102
Finance and insurance	\$0	\$3,354	\$9,626	\$12,980
Real estate and rental and leasing	\$0	\$2,386	\$2,092	\$4,479
Professional, scientific, and technical services	\$157,518	\$17,927	\$5,272	\$180,717
Management of companies and enterprises	\$0	\$3,189	\$1,062	\$4,250
Administrative and support and waste management and remediation services	\$0	\$10,839	\$3,287	\$14,126
Educational services	\$0	\$167	\$3,592	\$3,759
Health care and social assistance	\$0	\$1	\$23,920	\$23,921
Arts, entertainment, and recreation	\$0	\$254	\$1,265	\$1,520
Accommodation and food services	\$0	-\$2,259	\$4,984	\$2,725
Other services (except public administration)	\$0	\$2,467	\$6,021	\$8,487
Public administration	\$25,247	\$2,890	\$2,082	\$30,219
Average	\$323,685	\$42,411	\$87,800	\$453,896

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 58: EmPOWER – Utility Subprograms—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	1.0	1.0
Mining	0.0	0.0	0.2	0.2
Utilities	0.0	0.1	1.4	1.5
Construction	0.0	0.3	3.8	4.1
Manufacturing	0.0	0.6	3.8	4.4
Wholesale trade	0.0	0.4	11.2	11.6
Retail trade	0.0	0.1	71.3	71.3
Transportation and warehousing	0.0	0.7	9.5	10.2
Information	0.0	3.3	6.8	10.1
Finance and insurance	0.0	1.8	26.7	28.5
Real estate and rental and leasing	0.0	2.9	27.6	30.4
Professional, scientific, and technical services	0.0	9.7	16.4	26.1
Management of companies and enterprises	55.7	0.1	1.7	57.5
Administrative and support and waste management and remediation services	0.0	3.1	19.5	22.6
Educational services	0.0	0.0	16.3	16.3
Health care and social assistance	0.0	0.0	89.0	89.0
Arts, entertainment, and recreation	0.0	2.0	12.6	14.6
Accommodation and food services	0.0	1.4	40.8	42.1
Other services (except public administration)	0.0	1.8	36.2	38.0
Public administration	0.0	0.3	5.5	5.7
Total	55.7	28.5	401.0	485.1

Source: RESI

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Figure 59: EmPOWER – Utility Subprograms—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$700	\$76,386	\$77,086
Mining	\$0	\$2,023	\$37,980	\$40,003
Utilities	\$0	\$91,944	\$1,231,873	\$1,323,817
Construction	\$0	\$33,569	\$454,275	\$487,844
Manufacturing	\$0	\$115,100	\$1,578,339	\$1,693,438
Wholesale trade	\$0	\$72,457	\$2,163,902	\$2,236,360
Retail trade	\$0	\$3,351	\$4,041,257	\$4,044,607
Transportation and warehousing	\$0	\$71,432	\$997,795	\$1,069,228
Information	\$0	\$935,660	\$2,034,404	\$2,970,064
Finance and insurance	\$0	\$369,949	\$5,838,396	\$6,208,344
Real estate and rental and leasing	\$0	\$602,365	\$10,378,097	\$10,980,462
Professional, scientific, and technical services	\$0	\$1,204,345	\$2,100,656	\$3,305,001
Management of companies and enterprises	\$10,979,505	\$23,972	\$346,464	\$11,349,941
Administrative and support and waste management and remediation services	\$0	\$221,851	\$1,315,776	\$1,537,627
Educational services	\$0	\$1,182	\$1,156,050	\$1,157,233
Health care and social assistance	\$0	\$59	\$8,915,353	\$8,915,412
Arts, entertainment, and recreation	\$0	\$73,968	\$601,833	\$675,801
Accommodation and food services	\$0	\$80,575	\$2,455,749	\$2,536,324
Other services (except public administration)	\$0	\$144,921	\$2,440,799	\$2,585,720
Public administration	\$0	\$35,829	\$1,041,809	\$1,077,638
Total	\$10,979,505	\$4,085,253	\$49,207,193	\$64,271,951

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 60: EmPOWER – Utility Subprograms—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$127	\$10,280	\$10,407
Mining	\$0	\$110	\$2,417	\$2,527
Utilities	\$0	\$13,867	\$177,935	\$191,801
Construction	\$0	\$14,489	\$171,565	\$186,054
Manufacturing	\$0	\$38,436	\$244,101	\$282,537
Wholesale trade	\$0	\$29,742	\$871,364	\$901,106
Retail trade	\$0	\$1,912	\$2,186,414	\$2,188,327
Transportation and warehousing	\$0	\$26,664	\$369,309	\$395,973
Information	\$0	\$231,819	\$465,531	\$697,350
Finance and insurance	\$0	\$123,233	\$1,751,687	\$1,874,919
Real estate and rental and leasing	\$0	\$56,322	\$417,136	\$473,458
Professional, scientific, and technical services	\$0	\$612,413	\$990,912	\$1,603,324
Management of companies and enterprises	\$6,498,807	\$14,189	\$201,150	\$6,714,147
Administrative and support and waste management and remediation services	\$0	\$109,958	\$621,171	\$731,129
Educational services	\$0	\$627	\$692,785	\$693,412
Health care and social assistance	\$0	\$24	\$4,605,487	\$4,605,511
Arts, entertainment, and recreation	\$0	\$24,237	\$236,921	\$261,158
Accommodation and food services	\$0	\$30,636	\$920,369	\$951,005
Other services (except public administration)	\$0	\$78,639	\$1,122,647	\$1,201,286
Public administration	\$0	\$20,315	\$398,783	\$419,098
Total	\$6,498,807	\$1,427,759	\$16,457,963	\$24,384,529

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 61: Maryland Renewable Energy Portfolio Standard Program—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	3.2	0.1	0.0	3.3
Manufacturing	0.0	0.1	0.0	0.1
Wholesale trade	0.0	0.1	0.1	0.2
Retail trade	0.0	0.1	0.7	0.8
Transportation and warehousing	0.0	0.1	0.1	0.2
Information	0.0	0.1	0.1	0.1
Finance and insurance	0.0	0.1	0.3	0.4
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	3.6	0.7	0.2	4.5
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.5	0.2	0.7
Educational services	0.0	0.0	0.2	0.2
Health care and social assistance	0.0	0.0	0.8	0.8
Arts, entertainment, and recreation	0.0	0.1	0.1	0.2
Accommodation and food services	0.0	0.1	0.4	0.5
Other services (except public administration)	0.0	0.2	0.3	0.5
Public administration	0.4	0.0	0.1	0.4
Average	7.2	2.5	3.8	13.5

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 62: Maryland Renewable Energy Portfolio Standard Program—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$281	\$747	\$1,028
Mining	\$0	\$2,602	\$368	\$2,970
Utilities	\$0	\$7,580	\$11,569	\$19,149
Construction	\$450,000	\$8,326	\$4,688	\$463,014
Manufacturing	\$0	\$26,234	\$15,237	\$41,471
Wholesale trade	\$0	\$17,416	\$22,555	\$39,972
Retail trade	\$0	\$5,423	\$43,011	\$48,434
Transportation and warehousing	\$0	\$13,106	\$10,086	\$23,192
Information	\$0	\$21,440	\$20,227	\$41,667
Finance and insurance	\$0	\$30,159	\$61,285	\$91,444
Real estate and rental and leasing	\$0	\$38,310	\$105,571	\$143,882
Professional, scientific, and technical services	\$450,000	\$104,781	\$21,165	\$575,946
Management of companies and enterprises	\$0	\$5,487	\$3,457	\$8,944
Administrative and support and waste management and remediation services	\$0	\$37,255	\$13,220	\$50,475
Educational services	\$0	\$93	\$11,540	\$11,633
Health care and social assistance	\$0	\$4	\$87,608	\$87,611
Arts, entertainment, and recreation	\$0	\$2,137	\$6,178	\$8,314
Accommodation and food services	\$0	\$6,937	\$25,211	\$32,148
Other services (except public administration)	\$0	\$15,470	\$24,873	\$40,342
Public administration	\$100,000	\$7,493	\$10,225	\$117,718
Average	\$1,000,000	\$350,534	\$498,821	\$1,849,354

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 63: Maryland Renewable Energy Portfolio Standard Program—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$35	\$95	\$129
Mining	\$0	\$490	\$23	\$513
Utilities	\$0	\$970	\$1,555	\$2,525
Construction	\$159,520	\$3,224	\$1,641	\$164,385
Manufacturing	\$0	\$4,870	\$2,218	\$7,088
Wholesale trade	\$0	\$6,528	\$8,455	\$14,983
Retail trade	\$0	\$2,826	\$21,661	\$24,487
Transportation and warehousing	\$0	\$4,493	\$3,468	\$7,961
Information	\$0	\$4,584	\$4,332	\$8,916
Finance and insurance	\$0	\$8,463	\$17,033	\$25,496
Real estate and rental and leasing	\$0	\$3,892	\$3,659	\$7,551
Professional, scientific, and technical services	\$249,452	\$50,640	\$9,300	\$309,392
Management of companies and enterprises	\$0	\$2,966	\$1,869	\$4,834
Administrative and support and waste management and remediation services	\$0	\$17,692	\$5,810	\$23,501
Educational services	\$0	\$47	\$6,494	\$6,541
Health care and social assistance	\$0	\$1	\$42,172	\$42,174
Arts, entertainment, and recreation	\$0	\$722	\$2,250	\$2,973
Accommodation and food services	\$0	\$2,407	\$8,798	\$11,205
Other services (except public administration)	\$0	\$5,818	\$10,720	\$16,538
Public administration	\$25,247	\$2,913	\$3,674	\$31,833
Average	\$434,218	\$123,582	\$155,225	\$713,026

Source: RESI

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Figure 64: Maryland Renewable Energy Portfolio Standard Program—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.5	0.5
Mining	0.0	0.1	0.1	0.2
Utilities	2.3	0.0	0.8	3.1
Construction	0.0	0.5	2.1	2.5
Manufacturing	0.0	0.1	2.1	2.2
Wholesale trade	0.0	0.1	6.0	6.2
Retail trade	0.0	0.0	38.6	38.6
Transportation and warehousing	0.0	0.4	5.2	5.6
Information	0.0	0.7	3.7	4.4
Finance and insurance	0.0	0.5	14.4	14.9
Real estate and rental and leasing	0.0	0.7	15.0	15.7
Professional, scientific, and technical services	0.0	2.3	8.9	11.2
Management of companies and enterprises	9.9	0.0	0.9	10.9
Administrative and support and waste management and remediation services	0.0	0.8	10.6	11.4
Educational services	0.0	0.0	8.8	8.8
Health care and social assistance	0.0	0.0	48.4	48.4
Arts, entertainment, and recreation	0.0	0.4	6.8	7.3
Accommodation and food services	0.0	0.7	22.1	22.8
Other services (except public administration)	0.0	0.4	19.7	20.0
Public administration	0.0	0.1	3.0	3.0
Total	12.2	7.9	217.7	237.7

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 65: Maryland Renewable Energy Portfolio Standard Program—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$310	\$44,613	\$44,923
Mining	\$0	\$15,991	\$22,195	\$38,186
Utilities	\$2,139,375	\$20,822	\$720,902	\$2,881,099
Construction	\$0	\$62,193	\$264,708	\$326,902
Manufacturing	\$0	\$33,958	\$922,304	\$956,261
Wholesale trade	\$0	\$29,197	\$1,257,389	\$1,286,586
Retail trade	\$0	\$2,633	\$2,350,514	\$2,353,148
Transportation and warehousing	\$0	\$81,786	\$582,154	\$663,940
Information	\$0	\$217,058	\$1,187,007	\$1,404,065
Finance and insurance	\$0	\$110,173	\$3,397,696	\$3,507,868
Real estate and rental and leasing	\$0	\$147,342	\$6,051,580	\$6,198,922
Professional, scientific, and technical services	\$0	\$321,194	\$1,225,082	\$1,546,276
Management of companies and enterprises	\$2,139,375	\$7,284	\$202,136	\$2,348,795
Administrative and support and waste management and remediation services	\$0	\$63,121	\$767,689	\$830,810
Educational services	\$0	\$532	\$676,205	\$676,736
Health care and social assistance	\$0	\$14	\$5,207,367	\$5,207,382
Arts, entertainment, and recreation	\$0	\$16,974	\$350,900	\$367,874
Accommodation and food services	\$0	\$44,231	\$1,430,543	\$1,474,774
Other services (except public administration)	\$0	\$32,831	\$1,423,731	\$1,456,562
Public administration	\$0	\$12,731	\$608,530	\$621,261
Total	\$4,278,750	\$1,220,373	\$28,693,247	\$34,192,370

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 66: Maryland Renewable Energy Portfolio Standard Program—Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$44	\$5,588	\$5,632
Mining	\$0	\$185	\$1,313	\$1,498
Utilities	\$312,583	\$2,868	\$96,956	\$412,408
Construction	\$0	\$24,757	\$93,088	\$117,844
Manufacturing	\$0	\$8,831	\$132,741	\$141,572
Wholesale trade	\$0	\$10,944	\$471,324	\$482,269
Retail trade	\$0	\$1,372	\$1,183,783	\$1,185,155
Transportation and warehousing	\$0	\$24,205	\$200,607	\$224,812
Information	\$0	\$49,494	\$252,809	\$302,303
Finance and insurance	\$0	\$32,845	\$949,070	\$981,915
Real estate and rental and leasing	\$0	\$12,658	\$227,266	\$239,925
Professional, scientific, and technical services	\$0	\$142,073	\$537,994	\$680,067
Management of companies and enterprises	\$1,156,370	\$3,937	\$109,258	\$1,269,565
Administrative and support and waste management and remediation services	\$0	\$28,341	\$337,408	\$365,749
Educational services	\$0	\$273	\$377,177	\$377,451
Health care and social assistance	\$0	\$5	\$2,504,405	\$2,504,410
Arts, entertainment, and recreation	\$0	\$5,259	\$128,645	\$133,904
Accommodation and food services	\$0	\$15,417	\$499,107	\$514,524
Other services (except public administration)	\$0	\$16,241	\$609,442	\$625,683
Public administration	\$0	\$6,579	\$216,785	\$223,364
Total	\$1,468,953	\$386,330	\$8,934,766	\$10,790,049

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 67: Incentives and Grant Programs to Support Renewable Energy—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.2	0.0	0.0	0.2
Construction	0.3	0.1	0.0	0.4
Manufacturing	0.7	0.1	0.0	0.8
Wholesale trade	0.2	0.1	0.1	0.3
Retail trade	1.2	0.0	0.6	1.8
Transportation and warehousing	0.0	0.1	0.1	0.2
Information	0.0	0.1	0.1	0.1
Finance and insurance	0.0	0.1	0.2	0.3
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	2.6	0.5	0.1	3.3
Management of companies and enterprises	0.0	0.0	0.0	0.1
Administrative and support and waste management and remediation services	0.0	0.5	0.1	0.6
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.7	0.7
Arts, entertainment, and recreation	0.0	0.0	0.1	0.1
Accommodation and food services	0.0	0.1	0.3	0.4
Other services (except public administration)	0.0	0.1	0.3	0.4
Public administration	0.4	0.0	0.0	0.4
Average	5.5	2.2	3.1	10.7

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 68: Incentives and Grant Programs to Support Renewable Energy—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$105	\$603	\$709
Mining	\$0	\$2,343	\$297	\$2,640
Utilities	\$160,714	\$8,737	\$9,354	\$178,805
Construction	\$32,143	\$12,798	\$3,779	\$48,720
Manufacturing	\$278,571	\$25,593	\$12,314	\$316,478
Wholesale trade	\$32,143	\$21,880	\$18,246	\$72,269
Retail trade	\$64,286	\$1,746	\$34,664	\$100,695
Transportation and warehousing	\$0	\$18,067	\$8,132	\$26,199
Information	\$0	\$22,622	\$16,336	\$38,959
Finance and insurance	\$0	\$28,175	\$49,420	\$77,595
Real estate and rental and leasing	\$0	\$34,249	\$85,145	\$119,393
Professional, scientific, and technical services	\$332,143	\$73,301	\$17,084	\$422,528
Management of companies and enterprises	\$0	\$9,927	\$2,791	\$12,718
Administrative and support and waste management and remediation services	\$0	\$35,386	\$10,666	\$46,052
Educational services	\$0	\$178	\$9,278	\$9,456
Health care and social assistance	\$0	\$5	\$70,720	\$70,725
Arts, entertainment, and recreation	\$0	\$2,026	\$4,978	\$7,004
Accommodation and food services	\$0	\$8,048	\$20,346	\$28,393
Other services (except public administration)	\$0	\$8,718	\$20,045	\$28,763
Public administration	\$100,000	\$8,014	\$8,255	\$116,269
Average	\$1,000,000	\$321,915	\$402,454	\$1,724,369

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 69: Incentives and Grant Programs to Support Renewable Energy—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$16	\$76	\$92
Mining	\$0	\$191	\$18	\$209
Utilities	\$23,482	\$1,129	\$1,257	\$25,868
Construction	\$12,816	\$5,008	\$1,323	\$19,146
Manufacturing	\$63,945	\$3,988	\$1,792	\$69,725
Wholesale trade	\$12,049	\$8,202	\$6,839	\$27,090
Retail trade	\$36,642	\$911	\$17,457	\$55,011
Transportation and warehousing	\$0	\$6,140	\$2,797	\$8,936
Information	\$0	\$5,052	\$3,499	\$8,551
Finance and insurance	\$0	\$8,069	\$13,740	\$21,809
Real estate and rental and leasing	\$0	\$2,892	\$2,958	\$5,850
Professional, scientific, and technical services	\$180,983	\$33,819	\$7,506	\$222,307
Management of companies and enterprises	\$0	\$5,365	\$1,509	\$6,874
Administrative and support and waste management and remediation services	\$0	\$16,658	\$4,687	\$21,346
Educational services	\$0	\$91	\$5,219	\$5,310
Health care and social assistance	\$0	\$2	\$34,042	\$34,044
Arts, entertainment, and recreation	\$0	\$701	\$1,814	\$2,514
Accommodation and food services	\$0	\$2,797	\$7,100	\$9,897
Other services (except public administration)	\$0	\$3,230	\$8,638	\$11,868
Public administration	\$25,247	\$3,414	\$2,965	\$31,625
Average	\$355,162	\$107,674	\$125,237	\$588,073

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 70: Incentives and Grant Programs to Support Renewable Energy—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.3	0.3
Mining	0.0	0.3	0.0	0.3
Utilities	0.0	0.3	0.4	0.7
Construction	0.0	3.9	1.1	5.0
Manufacturing	0.0	1.1	1.0	2.1
Wholesale trade	0.0	1.2	3.1	4.3
Retail trade	0.0	0.3	20.1	20.4
Transportation and warehousing	0.0	1.7	2.6	4.3
Information	0.0	3.0	1.9	4.9
Finance and insurance	0.0	3.5	7.5	11.0
Real estate and rental and leasing	0.0	5.2	7.4	12.6
Professional, scientific, and technical services	0.0	14.1	4.5	18.6
Management of companies and enterprises	43.9	0.2	0.5	44.6
Administrative and support and waste management and remediation services	0.0	7.0	5.4	12.4
Educational services	0.0	0.0	4.5	4.5
Health care and social assistance	0.0	0.0	24.4	24.4
Arts, entertainment, and recreation	0.0	1.9	3.5	5.3
Accommodation and food services	0.0	1.7	11.3	13.0
Other services (except public administration)	0.0	2.0	10.0	12.1
Public administration	24.5	1.2	1.5	27.2
Total	68.4	48.6	111.0	228.0

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 71: Incentives and Grant Programs to Support Renewable Energy—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$1,940	\$22,397	\$24,337
Mining	\$0	\$55,755	\$11,091	\$66,846
Utilities	\$6,870	\$278,935	\$355,924	\$641,729
Construction	\$0	\$497,985	\$135,697	\$633,682
Manufacturing	\$0	\$326,165	\$460,844	\$787,009
Wholesale trade	\$0	\$241,824	\$654,367	\$896,191
Retail trade	\$0	\$18,762	\$1,222,534	\$1,241,296
Transportation and warehousing	\$0	\$211,651	\$295,514	\$507,165
Information	\$0	\$937,135	\$600,609	\$1,537,744
Finance and insurance	\$0	\$776,112	\$1,757,943	\$2,534,055
Real estate and rental and leasing	\$0	\$1,057,518	\$3,083,798	\$4,141,316
Professional, scientific, and technical services	\$0	\$1,938,541	\$622,788	\$2,561,329
Management of companies and enterprises	\$9,485,650	\$44,868	\$102,379	\$9,632,897
Administrative and support and waste management and remediation services	\$0	\$590,738	\$389,236	\$979,973
Educational services	\$0	\$2,522	\$338,304	\$340,826
Health care and social assistance	\$0	\$100	\$2,615,845	\$2,615,946
Arts, entertainment, and recreation	\$0	\$75,597	\$179,198	\$254,795
Accommodation and food services	\$0	\$110,697	\$733,692	\$844,389
Other services (except public administration)	\$0	\$192,328	\$724,590	\$916,919
Public administration	\$6,846,000	\$298,997	\$305,572	\$7,450,569
Total	\$16,338,520	\$7,658,169	\$14,612,323	\$38,609,013

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 72: Incentives and Grant Programs to Support Renewable Energy—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$272	\$2,815	\$3,088
Mining	\$0	\$8,316	\$666	\$8,982
Utilities	\$1,004	\$34,168	\$47,863	\$83,034
Construction	\$0	\$192,525	\$47,635	\$240,160
Manufacturing	\$0	\$71,570	\$66,607	\$138,177
Wholesale trade	\$0	\$90,646	\$245,285	\$335,931
Retail trade	\$0	\$9,778	\$615,694	\$625,472
Transportation and warehousing	\$0	\$73,918	\$101,775	\$175,693
Information	\$0	\$211,286	\$128,209	\$339,494
Finance and insurance	\$0	\$231,103	\$490,354	\$721,457
Real estate and rental and leasing	\$0	\$86,696	\$112,331	\$199,027
Professional, scientific, and technical services	\$0	\$915,549	\$273,547	\$1,189,096
Management of companies and enterprises	\$5,127,160	\$24,252	\$55,337	\$5,206,750
Administrative and support and waste management and remediation services	\$0	\$247,273	\$171,080	\$418,353
Educational services	\$0	\$1,226	\$189,260	\$190,487
Health care and social assistance	\$0	\$37	\$1,258,471	\$1,258,508
Arts, entertainment, and recreation	\$0	\$23,171	\$65,519	\$88,690
Accommodation and food services	\$0	\$38,275	\$256,010	\$294,285
Other services (except public administration)	\$0	\$85,029	\$311,019	\$396,048
Public administration	\$1,728,377	\$89,632	\$109,211	\$1,927,220
Total	\$6,856,541	\$2,434,722	\$4,548,688	\$13,839,951

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 73: Offshore Wind Initiatives to Support Renewable Energy—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.3	0.0	0.0	0.3
Construction	0.0	0.1	0.0	0.2
Manufacturing	0.6	0.0	0.0	0.6
Wholesale trade	0.0	0.1	0.1	0.2
Retail trade	0.0	0.0	0.5	0.5
Transportation and warehousing	0.0	0.1	0.1	0.2
Information	0.0	0.1	0.0	0.1
Finance and insurance	0.0	0.1	0.2	0.3
Real estate and rental and leasing	0.0	0.1	0.2	0.3
Professional, scientific, and technical services	2.4	0.5	0.1	3.0
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.5	0.1	0.7
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.6	0.6
Arts, entertainment, and recreation	0.0	0.0	0.1	0.1
Accommodation and food services	0.0	0.1	0.3	0.4
Other services (except public administration)	0.0	0.1	0.2	0.3
Public administration	0.4	0.0	0.0	0.4
Average	3.7	2.1	2.6	8.4

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 74: Offshore Wind Initiatives to Support Renewable Energy—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$66	\$520	\$586
Mining	\$0	\$3,063	\$256	\$3,319
Utilities	\$300,000	\$6,477	\$8,058	\$314,535
Construction	\$0	\$15,775	\$3,262	\$19,037
Manufacturing	\$300,000	\$20,028	\$10,611	\$330,639
Wholesale trade	\$0	\$15,987	\$15,713	\$31,700
Retail trade	\$0	\$701	\$29,923	\$30,624
Transportation and warehousing	\$0	\$18,949	\$7,018	\$25,967
Information	\$0	\$17,382	\$14,082	\$31,464
Finance and insurance	\$0	\$24,652	\$42,644	\$67,297
Real estate and rental and leasing	\$0	\$28,123	\$73,464	\$101,587
Professional, scientific, and technical services	\$300,000	\$71,105	\$14,733	\$385,838
Management of companies and enterprises	\$0	\$6,395	\$2,407	\$8,801
Administrative and support and waste management and remediation services	\$0	\$39,052	\$9,201	\$48,252
Educational services	\$0	\$92	\$8,021	\$8,114
Health care and social assistance	\$0	\$6	\$60,983	\$60,990
Arts, entertainment, and recreation	\$0	\$1,736	\$4,298	\$6,034
Accommodation and food services	\$0	\$8,345	\$17,547	\$25,893
Other services (except public administration)	\$0	\$7,693	\$17,304	\$24,997
Public administration	\$100,000	\$7,300	\$7,118	\$114,418
Average	\$1,000,000	\$292,927	\$347,162	\$1,640,089

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 75: Offshore Wind Initiatives to Support Renewable Energy—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$9	\$66	\$74
Mining	\$0	\$149	\$16	\$165
Utilities	\$43,833	\$820	\$1,083	\$45,736
Construction	\$0	\$6,196	\$1,142	\$7,338
Manufacturing	\$57,388	\$3,004	\$1,544	\$61,936
Wholesale trade	\$0	\$5,993	\$5,890	\$11,883
Retail trade	\$0	\$366	\$15,069	\$15,435
Transportation and warehousing	\$0	\$5,993	\$2,413	\$8,406
Information	\$0	\$3,900	\$3,016	\$6,916
Finance and insurance	\$0	\$7,081	\$11,854	\$18,934
Real estate and rental and leasing	\$0	\$2,382	\$2,548	\$4,930
Professional, scientific, and technical services	\$166,302	\$32,240	\$6,473	\$205,015
Management of companies and enterprises	\$0	\$3,456	\$1,301	\$4,757
Administrative and support and waste management and remediation services	\$0	\$18,563	\$4,043	\$22,606
Educational services	\$0	\$47	\$4,513	\$4,561
Health care and social assistance	\$0	\$2	\$29,356	\$29,358
Arts, entertainment, and recreation	\$0	\$593	\$1,566	\$2,158
Accommodation and food services	\$0	\$2,904	\$6,124	\$9,028
Other services (except public administration)	\$0	\$2,750	\$7,457	\$10,207
Public administration	\$25,247	\$2,984	\$2,557	\$30,788
Average	\$292,769	\$99,430	\$108,031	\$500,231

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 76: Offshore Wind Initiatives to Support Renewable Energy—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.1	0.1
Construction	0.0	0.1	0.2	0.3
Manufacturing	0.0	0.2	0.2	0.4
Wholesale trade	0.0	0.1	0.5	0.7
Retail trade	0.0	0.0	3.4	3.4
Transportation and warehousing	0.0	0.2	0.4	0.7
Information	0.0	1.2	0.3	1.5
Finance and insurance	0.0	0.7	1.2	1.9
Real estate and rental and leasing	0.0	1.0	1.2	2.2
Professional, scientific, and technical services	0.0	3.5	0.7	4.2
Management of companies and enterprises	19.8	0.0	0.1	19.9
Administrative and support and waste management and remediation services	0.0	1.1	0.9	2.0
Educational services	0.0	0.0	0.7	0.7
Health care and social assistance	0.0	0.0	4.0	4.0
Arts, entertainment, and recreation	0.0	0.7	0.6	1.3
Accommodation and food services	0.0	0.5	1.9	2.4
Other services (except public administration)	0.0	0.6	1.7	2.3
Public administration	0.0	0.1	0.2	0.3
Total	19.8	10.1	18.3	48.2

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 77: Offshore Wind Initiatives to Support Renewable Energy—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$273	\$3,641	\$3,913
Mining	\$0	\$788	\$1,795	\$2,584
Utilities	\$0	\$35,831	\$57,001	\$92,832
Construction	\$0	\$13,082	\$22,442	\$35,524
Manufacturing	\$0	\$44,855	\$74,614	\$119,469
Wholesale trade	\$0	\$28,237	\$109,957	\$138,194
Retail trade	\$0	\$1,306	\$204,700	\$206,006
Transportation and warehousing	\$0	\$27,837	\$48,452	\$76,289
Information	\$0	\$364,630	\$98,324	\$462,953
Finance and insurance	\$0	\$144,170	\$293,158	\$437,328
Real estate and rental and leasing	\$0	\$234,744	\$507,474	\$742,218
Professional, scientific, and technical services	\$0	\$469,337	\$102,333	\$571,671
Management of companies and enterprises	\$4,278,750	\$9,342	\$16,771	\$4,304,863
Administrative and support and waste management and remediation services	\$0	\$86,456	\$63,783	\$150,239
Educational services	\$0	\$461	\$54,603	\$55,064
Health care and social assistance	\$0	\$23	\$425,222	\$425,245
Arts, entertainment, and recreation	\$0	\$28,826	\$29,526	\$58,352
Accommodation and food services	\$0	\$31,400	\$121,496	\$152,896
Other services (except public administration)	\$0	\$56,476	\$119,032	\$175,508
Public administration	\$0	\$13,963	\$49,658	\$63,621
Total	\$4,278,750	\$1,592,037	\$2,403,983	\$8,274,770

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 78: Offshore Wind Initiatives to Support Renewable Energy—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$45	\$459	\$504
Mining	\$0	\$39	\$109	\$148
Utilities	\$0	\$4,935	\$7,664	\$12,599
Construction	\$0	\$5,156	\$7,867	\$13,023
Manufacturing	\$0	\$13,678	\$10,823	\$24,501
Wholesale trade	\$0	\$10,584	\$41,217	\$51,801
Retail trade	\$0	\$681	\$103,090	\$103,771
Transportation and warehousing	\$0	\$9,489	\$16,681	\$26,170
Information	\$0	\$82,498	\$21,030	\$103,528
Finance and insurance	\$0	\$43,855	\$81,697	\$125,552
Real estate and rental and leasing	\$0	\$20,043	\$18,007	\$38,050
Professional, scientific, and technical services	\$0	\$217,940	\$44,954	\$262,895
Management of companies and enterprises	\$2,312,739	\$5,049	\$9,065	\$2,326,854
Administrative and support and waste management and remediation services	\$0	\$39,131	\$28,036	\$67,167
Educational services	\$0	\$223	\$30,620	\$30,843
Health care and social assistance	\$0	\$8	\$204,630	\$204,638
Arts, entertainment, and recreation	\$0	\$8,625	\$10,770	\$19,396
Accommodation and food services	\$0	\$10,903	\$42,398	\$53,301
Other services (except public administration)	\$0	\$27,985	\$51,211	\$79,196
Public administration	\$0	\$7,229	\$17,797	\$25,027
Total	\$2,312,739	\$508,098	\$748,125	\$3,568,963

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 79: Combined Heat and Power—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.3	0.0	0.0	0.3
Construction	0.0	0.1	0.0	0.2
Manufacturing	0.0	0.0	0.0	0.1
Wholesale trade	0.0	0.0	0.1	0.1
Retail trade	0.0	0.0	0.6	0.6
Transportation and warehousing	0.0	0.1	0.1	0.2
Information	0.0	0.1	0.1	0.2
Finance and insurance	0.0	0.1	0.2	0.3
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	4.9	0.5	0.1	5.6
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.4	0.1	0.6
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.7	0.7
Arts, entertainment, and recreation	0.0	0.1	0.1	0.2
Accommodation and food services	0.0	0.2	0.3	0.5
Other services (except public administration)	0.0	0.1	0.3	0.4
Public administration	0.4	0.0	0.0	0.4
Average	5.6	2.2	3.1	10.9

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 80: Combined Heat and Power—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$76	\$603	\$679
Mining	\$0	\$3,057	\$297	\$3,354
Utilities	\$300,000	\$6,476	\$9,336	\$315,812
Construction	\$0	\$15,747	\$3,789	\$19,535
Manufacturing	\$0	\$10,038	\$12,299	\$22,337
Wholesale trade	\$0	\$8,079	\$18,197	\$26,276
Retail trade	\$0	\$819	\$34,769	\$35,589
Transportation and warehousing	\$0	\$20,129	\$8,151	\$28,280
Information	\$0	\$37,726	\$16,332	\$54,058
Finance and insurance	\$0	\$28,855	\$49,526	\$78,380
Real estate and rental and leasing	\$0	\$39,708	\$85,308	\$125,016
Professional, scientific, and technical services	\$600,000	\$72,507	\$17,096	\$689,603
Management of companies and enterprises	\$0	\$4,592	\$2,792	\$7,383
Administrative and support and waste management and remediation services	\$0	\$31,969	\$10,680	\$42,650
Educational services	\$0	\$99	\$9,341	\$9,440
Health care and social assistance	\$0	\$5	\$70,758	\$70,763
Arts, entertainment, and recreation	\$0	\$4,101	\$4,994	\$9,095
Accommodation and food services	\$0	\$10,132	\$20,364	\$30,496
Other services (except public administration)	\$0	\$8,826	\$20,106	\$28,932
Public administration	\$100,000	\$8,790	\$8,258	\$117,049
Average	\$1,000,000	\$311,732	\$402,997	\$1,714,730

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 81: Combined Heat and Power—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$11	\$76	\$87
Mining	\$0	\$149	\$18	\$167
Utilities	\$43,833	\$835	\$1,255	\$45,923
Construction	\$0	\$6,181	\$1,326	\$7,507
Manufacturing	\$0	\$2,352	\$1,791	\$4,143
Wholesale trade	\$0	\$3,029	\$6,821	\$9,849
Retail trade	\$0	\$427	\$17,510	\$17,937
Transportation and warehousing	\$0	\$6,720	\$2,802	\$9,522
Information	\$0	\$8,467	\$3,498	\$11,966
Finance and insurance	\$0	\$8,154	\$13,762	\$21,917
Real estate and rental and leasing	\$0	\$3,356	\$2,953	\$6,309
Professional, scientific, and technical services	\$273,232	\$32,488	\$7,512	\$313,232
Management of companies and enterprises	\$0	\$2,482	\$1,509	\$3,991
Administrative and support and waste management and remediation services	\$0	\$15,065	\$4,694	\$19,759
Educational services	\$0	\$51	\$5,258	\$5,308
Health care and social assistance	\$0	\$2	\$34,062	\$34,064
Arts, entertainment, and recreation	\$0	\$1,202	\$1,819	\$3,021
Accommodation and food services	\$0	\$3,522	\$7,107	\$10,629
Other services (except public administration)	\$0	\$3,135	\$8,667	\$11,802
Public administration	\$25,247	\$3,872	\$2,967	\$32,086
Average	\$342,311	\$101,500	\$125,407	\$569,218

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 82: Combined Heat and Power—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.1	0.1
Mining	0.0	0.2	0.0	0.3
Utilities	8.7	0.1	0.2	9.0
Construction	0.0	1.9	0.5	2.4
Manufacturing	0.0	0.5	0.4	1.0
Wholesale trade	0.0	0.5	1.4	1.9
Retail trade	0.0	0.2	9.1	9.2
Transportation and warehousing	0.0	1.6	1.1	2.8
Information	0.0	2.7	0.8	3.5
Finance and insurance	0.0	1.9	3.4	5.2
Real estate and rental and leasing	0.0	2.5	3.1	5.6
Professional, scientific, and technical services	0.0	8.6	2.0	10.6
Management of companies and enterprises	37.6	0.1	0.2	37.9
Administrative and support and waste management and remediation services	0.0	3.1	2.4	5.5
Educational services	0.0	0.0	2.0	2.0
Health care and social assistance	0.0	0.0	10.7	10.7
Arts, entertainment, and recreation	0.0	1.6	1.6	3.1
Accommodation and food services	0.0	2.6	5.0	7.6
Other services (except public administration)	0.0	1.4	4.5	5.9
Public administration	0.0	0.3	0.7	1.0
Total	46.3	29.8	49.1	125.2

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 83: Combined Heat and Power—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$1,175	\$9,741	\$10,917
Mining	\$0	\$60,656	\$4,802	\$65,458
Utilities	\$8,115,000	\$78,982	\$152,044	\$8,346,026
Construction	\$0	\$235,910	\$60,434	\$296,344
Manufacturing	\$0	\$128,807	\$199,331	\$328,139
Wholesale trade	\$0	\$110,749	\$293,160	\$403,909
Retail trade	\$0	\$9,988	\$552,009	\$561,998
Transportation and warehousing	\$0	\$310,226	\$130,394	\$440,621
Information	\$0	\$823,336	\$263,226	\$1,086,562
Finance and insurance	\$0	\$417,903	\$789,041	\$1,206,944
Real estate and rental and leasing	\$0	\$558,892	\$1,364,774	\$1,923,666
Professional, scientific, and technical services	\$0	\$1,218,341	\$274,525	\$1,492,866
Management of companies and enterprises	\$8,115,000	\$27,628	\$44,937	\$8,187,565
Administrative and support and waste management and remediation services	\$0	\$239,427	\$171,323	\$410,750
Educational services	\$0	\$2,016	\$148,231	\$150,247
Health care and social assistance	\$0	\$55	\$1,140,054	\$1,140,109
Arts, entertainment, and recreation	\$0	\$64,385	\$79,605	\$143,990
Accommodation and food services	\$0	\$167,776	\$326,140	\$493,917
Other services (except public administration)	\$0	\$124,532	\$320,829	\$445,362
Public administration	\$0	\$48,289	\$133,109	\$181,398
Total	\$16,230,000	\$4,629,076	\$6,457,710	\$27,316,786

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 84: Combined Heat and Power—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$167	\$1,230	\$1,397
Mining	\$0	\$702	\$293	\$995
Utilities	\$1,185,679	\$10,880	\$20,442	\$1,217,001
Construction	\$0	\$93,907	\$21,174	\$115,081
Manufacturing	\$0	\$33,498	\$28,948	\$62,446
Wholesale trade	\$0	\$41,514	\$109,889	\$151,403
Retail trade	\$0	\$5,206	\$278,000	\$283,206
Transportation and warehousing	\$0	\$91,813	\$44,866	\$136,679
Information	\$0	\$187,738	\$56,324	\$244,062
Finance and insurance	\$0	\$124,586	\$219,640	\$344,225
Real estate and rental and leasing	\$0	\$48,014	\$48,050	\$96,064
Professional, scientific, and technical services	\$0	\$538,907	\$120,607	\$659,514
Management of companies and enterprises	\$4,386,300	\$14,934	\$24,289	\$4,425,523
Administrative and support and waste management and remediation services	\$0	\$107,504	\$75,298	\$182,802
Educational services	\$0	\$1,037	\$83,235	\$84,272
Health care and social assistance	\$0	\$20	\$548,688	\$548,709
Arts, entertainment, and recreation	\$0	\$19,949	\$29,026	\$48,975
Accommodation and food services	\$0	\$58,478	\$113,814	\$172,292
Other services (except public administration)	\$0	\$61,605	\$138,108	\$199,713
Public administration	\$0	\$24,956	\$47,743	\$72,699
Total	\$5,571,979	\$1,465,411	\$2,009,666	\$9,047,056

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 85: Main Street—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	2.8	0.1	0.0	2.9
Manufacturing	0.0	0.1	0.0	0.1
Wholesale trade	0.0	0.1	0.1	0.2
Retail trade	0.0	0.1	0.7	0.8
Transportation and warehousing	0.0	0.1	0.1	0.2
Information	0.0	0.1	0.1	0.2
Finance and insurance	0.0	0.1	0.2	0.4
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	4.2	0.7	0.1	5.0
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.5	0.2	0.6
Educational services	0.0	0.0	0.1	0.2
Health care and social assistance	0.0	0.0	0.8	0.8
Arts, entertainment, and recreation	0.0	0.1	0.1	0.2
Accommodation and food services	0.0	0.1	0.4	0.5
Other services (except public administration)	0.0	0.1	0.3	0.4
Public administration	0.4	0.0	0.0	0.5
Average	7.4	2.4	3.6	13.4

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 86: Main Street—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$285	\$711	\$996
Mining	\$0	\$2,241	\$350	\$2,591
Utilities	\$0	\$7,647	\$11,015	\$18,662
Construction	\$360,000	\$8,641	\$4,461	\$373,102
Manufacturing	\$0	\$21,006	\$14,506	\$35,512
Wholesale trade	\$0	\$15,814	\$21,477	\$37,291
Retail trade	\$0	\$5,594	\$40,933	\$46,527
Transportation and warehousing	\$0	\$13,830	\$9,599	\$23,430
Information	\$0	\$31,727	\$19,255	\$50,982
Finance and insurance	\$0	\$30,265	\$58,329	\$88,593
Real estate and rental and leasing	\$0	\$39,369	\$100,481	\$139,850
Professional, scientific, and technical services	\$540,000	\$93,618	\$20,147	\$653,765
Management of companies and enterprises	\$0	\$5,231	\$3,291	\$8,521
Administrative and support and waste management and remediation services	\$0	\$33,101	\$12,583	\$45,684
Educational services	\$0	\$125	\$10,979	\$11,104
Health care and social assistance	\$0	\$5	\$83,394	\$83,398
Arts, entertainment, and recreation	\$0	\$3,207	\$5,879	\$9,086
Accommodation and food services	\$0	\$8,497	\$23,997	\$32,494
Other services (except public administration)	\$0	\$10,675	\$23,671	\$34,346
Public administration	\$100,000	\$8,046	\$9,734	\$117,780
Average	\$1,000,000	\$338,922	\$474,792	\$1,813,714

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 87: Main Street—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$36	\$90	\$126
Mining	\$0	\$405	\$22	\$426
Utilities	\$0	\$985	\$1,481	\$2,466
Construction	\$139,082	\$3,349	\$1,562	\$143,992
Manufacturing	\$0	\$4,236	\$2,112	\$6,348
Wholesale trade	\$0	\$5,928	\$8,051	\$13,978
Retail trade	\$0	\$2,915	\$20,614	\$23,530
Transportation and warehousing	\$0	\$4,854	\$3,300	\$8,155
Information	\$0	\$6,910	\$4,124	\$11,034
Finance and insurance	\$0	\$8,426	\$16,212	\$24,638
Real estate and rental and leasing	\$0	\$3,689	\$3,483	\$7,172
Professional, scientific, and technical services	\$253,180	\$43,707	\$8,852	\$305,739
Management of companies and enterprises	\$0	\$2,827	\$1,779	\$4,606
Administrative and support and waste management and remediation services	\$0	\$15,663	\$5,530	\$21,193
Educational services	\$0	\$64	\$6,178	\$6,242
Health care and social assistance	\$0	\$2	\$40,144	\$40,145
Arts, entertainment, and recreation	\$0	\$999	\$2,142	\$3,141
Accommodation and food services	\$0	\$2,950	\$8,375	\$11,324
Other services (except public administration)	\$0	\$4,190	\$10,202	\$14,391
Public administration	\$25,247	\$3,460	\$3,497	\$32,203
Average	\$417,508	\$115,596	\$147,748	\$680,851

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 88: Main Street—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.4	0.4
Mining	0.0	0.0	0.1	0.1
Utilities	0.0	0.3	0.5	0.8
Construction	0.0	0.7	1.5	2.2
Manufacturing	0.0	1.5	1.5	2.9
Wholesale trade	0.0	0.9	4.5	5.5
Retail trade	0.0	0.1	28.8	29.0
Transportation and warehousing	0.0	1.7	3.7	5.4
Information	0.0	8.1	2.7	10.8
Finance and insurance	0.0	4.6	10.7	15.3
Real estate and rental and leasing	0.0	7.1	10.3	17.4
Professional, scientific, and technical services	0.0	23.9	6.4	30.4
Management of companies and enterprises	137.3	0.3	0.7	138.2
Administrative and support and waste management and remediation services	0.0	7.6	7.6	15.2
Educational services	0.0	0.0	6.4	6.4
Health care and social assistance	0.0	0.0	34.5	34.5
Arts, entertainment, and recreation	0.0	4.8	5.0	9.8
Accommodation and food services	0.0	3.3	16.2	19.5
Other services (except public administration)	0.0	4.5	14.3	18.7
Public administration	0.0	0.6	2.1	2.8
Total	137.3	70.2	157.9	365.3

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 89: Main Street—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$1,890	\$31,648	\$33,538
Mining	\$0	\$5,463	\$15,637	\$21,100
Utilities	\$0	\$248,271	\$498,956	\$747,227
Construction	\$0	\$90,645	\$193,501	\$284,146
Manufacturing	\$0	\$310,797	\$649,859	\$960,656
Wholesale trade	\$0	\$195,652	\$942,157	\$1,137,810
Retail trade	\$0	\$9,048	\$1,755,183	\$1,764,231
Transportation and warehousing	\$0	\$192,885	\$419,397	\$612,282
Information	\$0	\$2,526,511	\$852,001	\$3,378,512
Finance and insurance	\$0	\$998,952	\$2,518,521	\$3,517,473
Real estate and rental and leasing	\$0	\$1,626,534	\$4,385,721	\$6,012,255
Professional, scientific, and technical services	\$0	\$3,252,028	\$885,146	\$4,137,174
Management of companies and enterprises	\$29,647,361	\$64,730	\$145,276	\$29,857,366
Administrative and support and waste management and remediation services	\$0	\$599,053	\$552,316	\$1,151,369
Educational services	\$0	\$3,193	\$475,665	\$478,857
Health care and social assistance	\$0	\$159	\$3,695,891	\$3,696,051
Arts, entertainment, and recreation	\$0	\$199,732	\$254,982	\$454,715
Accommodation and food services	\$0	\$217,572	\$1,047,228	\$1,264,800
Other services (except public administration)	\$0	\$391,322	\$1,029,330	\$1,420,652
Public administration	\$0	\$96,748	\$431,677	\$528,425
Total	\$29,647,361	\$11,031,186	\$20,780,091	\$61,458,638

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 90: Main Street—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$313	\$3,984	\$4,297
Mining	\$0	\$272	\$946	\$1,217
Utilities	\$0	\$34,192	\$67,094	\$101,286
Construction	\$0	\$35,727	\$67,875	\$103,602
Manufacturing	\$0	\$94,777	\$94,104	\$188,881
Wholesale trade	\$0	\$73,339	\$353,162	\$426,501
Retail trade	\$0	\$4,715	\$883,942	\$888,657
Transportation and warehousing	\$0	\$65,749	\$144,418	\$210,168
Information	\$0	\$571,625	\$182,064	\$753,689
Finance and insurance	\$0	\$303,870	\$702,203	\$1,006,073
Real estate and rental and leasing	\$0	\$138,880	\$157,550	\$296,430
Professional, scientific, and technical services	\$0	\$1,510,103	\$388,812	\$1,898,915
Management of companies and enterprises	\$16,024,919	\$34,987	\$78,524	\$16,138,431
Administrative and support and waste management and remediation services	\$0	\$271,138	\$242,768	\$513,906
Educational services	\$0	\$1,546	\$266,429	\$267,975
Health care and social assistance	\$0	\$58	\$1,778,337	\$1,778,395
Arts, entertainment, and recreation	\$0	\$59,764	\$93,110	\$152,874
Accommodation and food services	\$0	\$75,544	\$365,433	\$440,976
Other services (except public administration)	\$0	\$193,911	\$442,371	\$636,282
Public administration	\$0	\$50,092	\$154,509	\$204,601
Total	\$16,024,919	\$3,520,603	\$6,467,633	\$26,013,155

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 91: Weatherization and Energy Efficiency for Low-Income Houses—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.2	0.0	0.0	0.2
Construction	1.4	0.1	0.0	1.5
Manufacturing	0.0	0.1	0.0	0.1
Wholesale trade	0.0	0.1	0.1	0.2
Retail trade	0.0	0.2	0.6	0.8
Transportation and warehousing	0.0	0.1	0.1	0.2
Information	0.0	0.1	0.1	0.2
Finance and insurance	0.0	0.1	0.2	0.3
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	4.2	0.6	0.1	4.9
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.4	0.2	0.6
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.7	0.7
Arts, entertainment, and recreation	0.0	0.1	0.1	0.2
Accommodation and food services	0.0	0.2	0.3	0.5
Other services (except public administration)	0.0	0.1	0.3	0.4
Public administration	0.4	0.0	0.0	0.4
Average	6.1	2.3	3.3	11.7

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 92: Weatherization and Energy Efficiency for Low-Income Houses—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$267	\$644	\$911
Mining	\$0	\$3,082	\$317	\$3,399
Utilities	\$180,000	\$6,531	\$9,968	\$196,499
Construction	\$180,000	\$12,979	\$4,047	\$197,026
Manufacturing	\$0	\$17,747	\$13,132	\$30,879
Wholesale trade	\$0	\$12,510	\$19,426	\$31,937
Retail trade	\$0	\$9,404	\$37,140	\$46,544
Transportation and warehousing	\$0	\$17,694	\$8,706	\$26,401
Information	\$0	\$30,802	\$17,440	\$48,242
Finance and insurance	\$0	\$29,812	\$52,898	\$82,710
Real estate and rental and leasing	\$0	\$36,727	\$91,115	\$127,842
Professional, scientific, and technical services	\$540,000	\$79,971	\$18,257	\$638,228
Management of companies and enterprises	\$0	\$4,731	\$2,981	\$7,712
Administrative and support and waste management and remediation services	\$0	\$32,394	\$11,407	\$43,801
Educational services	\$0	\$139	\$9,982	\$10,121
Health care and social assistance	\$0	\$5	\$75,564	\$75,569
Arts, entertainment, and recreation	\$0	\$3,197	\$5,335	\$8,532
Accommodation and food services	\$0	\$9,990	\$21,749	\$31,738
Other services (except public administration)	\$0	\$8,658	\$21,477	\$30,136
Public administration	\$100,000	\$8,185	\$8,819	\$117,004
Average	\$1,000,000	\$324,826	\$430,405	\$1,755,231

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 93: Weatherization and Energy Efficiency for Low-Income Houses—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$36	\$82	\$118
Mining	\$0	\$350	\$20	\$369
Utilities	\$26,300	\$836	\$1,340	\$28,476
Construction	\$57,659	\$5,079	\$1,416	\$64,154
Manufacturing	\$0	\$3,666	\$1,912	\$5,578
Wholesale trade	\$0	\$4,689	\$7,282	\$11,971
Retail trade	\$0	\$4,901	\$18,704	\$23,605
Transportation and warehousing	\$0	\$5,906	\$2,993	\$8,899
Information	\$0	\$6,843	\$3,736	\$10,578
Finance and insurance	\$0	\$8,359	\$14,699	\$23,057
Real estate and rental and leasing	\$0	\$3,179	\$3,153	\$6,331
Professional, scientific, and technical services	\$253,180	\$36,379	\$8,022	\$297,580
Management of companies and enterprises	\$0	\$2,557	\$1,611	\$4,168
Administrative and support and waste management and remediation services	\$0	\$15,286	\$5,013	\$20,299
Educational services	\$0	\$72	\$5,618	\$5,690
Health care and social assistance	\$0	\$2	\$36,376	\$36,378
Arts, entertainment, and recreation	\$0	\$992	\$1,943	\$2,936
Accommodation and food services	\$0	\$3,473	\$7,590	\$11,063
Other services (except public administration)	\$0	\$3,363	\$9,258	\$12,620
Public administration	\$25,247	\$3,524	\$3,169	\$31,940
Average	\$362,385	\$109,490	\$133,936	\$605,811

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 94: Weatherization and Energy Efficiency for Low-Income Houses—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.0	0.0	0.0
Manufacturing	0.0	0.0	0.0	0.0
Wholesale trade	0.0	0.0	0.0	0.0
Retail trade	0.0	0.0	0.2	0.2
Transportation and warehousing	0.0	0.0	0.0	0.0
Information	0.0	0.0	0.0	0.0
Finance and insurance	0.0	0.0	0.1	0.1
Real estate and rental and leasing	0.0	0.0	0.1	0.1
Professional, scientific, and technical services	0.0	0.0	0.1	0.1
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.0	0.1	0.1
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.3	0.3
Arts, entertainment, and recreation	0.0	0.0	0.0	0.0
Accommodation and food services	0.0	0.0	0.1	0.1
Other services (except public administration)	0.0	0.0	0.1	0.1
Public administration	0.0	0.0	0.0	0.0
Total	0.0	0.0	1.3	1.3

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 95: Weatherization and Energy Efficiency for Low-Income Houses—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$0	\$268	\$268
Mining	\$0	\$0	\$134	\$134
Utilities	\$0	\$0	\$4,344	\$4,344
Construction	\$0	\$0	\$1,587	\$1,587
Manufacturing	\$0	\$0	\$5,549	\$5,549
Wholesale trade	\$0	\$0	\$7,529	\$7,529
Retail trade	\$0	\$0	\$14,068	\$14,068
Transportation and warehousing	\$0	\$0	\$3,495	\$3,495
Information	\$0	\$0	\$7,131	\$7,131
Finance and insurance	\$0	\$0	\$20,351	\$20,351
Real estate and rental and leasing	\$0	\$0	\$36,315	\$36,315
Professional, scientific, and technical services	\$0	\$0	\$7,355	\$7,355
Management of companies and enterprises	\$0	\$0	\$1,214	\$1,214
Administrative and support and waste management and remediation services	\$0	\$0	\$4,610	\$4,610
Educational services	\$0	\$0	\$4,065	\$4,065
Health care and social assistance	\$0	\$0	\$31,307	\$31,307
Arts, entertainment, and recreation	\$0	\$0	\$2,105	\$2,105
Accommodation and food services	\$0	\$0	\$8,579	\$8,579
Other services (except public administration)	\$0	\$0	\$8,544	\$8,544
Public administration	\$0	\$0	\$3,659	\$3,659
Total	\$0	\$0	\$172,209	\$172,209

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 96: Weatherization and Energy Efficiency for Low-Income Houses—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$0	\$34	\$34
Mining	\$0	\$0	\$8	\$8
Utilities	\$0	\$0	\$584	\$584
Construction	\$0	\$0	\$558	\$558
Manufacturing	\$0	\$0	\$798	\$798
Wholesale trade	\$0	\$0	\$2,822	\$2,822
Retail trade	\$0	\$0	\$7,085	\$7,085
Transportation and warehousing	\$0	\$0	\$1,204	\$1,204
Information	\$0	\$0	\$1,518	\$1,518
Finance and insurance	\$0	\$0	\$5,686	\$5,686
Real estate and rental and leasing	\$0	\$0	\$1,369	\$1,369
Professional, scientific, and technical services	\$0	\$0	\$3,230	\$3,230
Management of companies and enterprises	\$0	\$0	\$656	\$656
Administrative and support and waste management and remediation services	\$0	\$0	\$2,026	\$2,026
Educational services	\$0	\$0	\$2,266	\$2,266
Health care and social assistance	\$0	\$0	\$15,056	\$15,056
Arts, entertainment, and recreation	\$0	\$0	\$772	\$772
Accommodation and food services	\$0	\$0	\$2,993	\$2,993
Other services (except public administration)	\$0	\$0	\$3,656	\$3,656
Public administration	\$0	\$0	\$1,303	\$1,303
Total	\$0	\$0	\$53,626	\$53,626

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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A.2 Transportation**Figure 97: Maryland Clean Cars Program—Investment Phase, Employment Impacts**

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.1	0.0	0.1
Manufacturing	0.7	0.0	0.0	0.7
Wholesale trade	0.6	-0.2	0.1	0.5
Retail trade	1.6	0.0	0.4	2.1
Transportation and warehousing	0.9	0.2	0.1	1.1
Information	0.0	0.0	0.0	0.1
Finance and insurance	0.0	0.1	0.2	0.2
Real estate and rental and leasing	0.0	0.1	0.1	0.3
Professional, scientific, and technical services	1.0	0.3	0.1	1.4
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.3	0.1	0.5
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.5	0.5
Arts, entertainment, and recreation	0.0	0.0	0.1	0.1
Accommodation and food services	0.0	0.1	0.2	0.3
Other services (except public administration)	0.0	0.1	0.2	0.3
Public administration	0.4	0.1	0.0	0.5
Average	5.2	1.2	2.2	8.6

Source: RESI

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Figure 98: Maryland Clean Cars Program—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$157	\$438	\$595
Mining	\$0	\$983	\$216	\$1,199
Utilities	\$0	\$5,553	\$6,799	\$12,352
Construction	\$0	\$8,006	\$2,748	\$10,753
Manufacturing	-\$614,286	-\$6,657	\$8,951	-\$611,992
Wholesale trade	\$128,571	-\$33,049	\$13,262	\$108,784
Retail trade	\$128,571	\$2,443	\$25,202	\$156,217
Transportation and warehousing	\$128,571	\$19,200	\$5,912	\$153,683
Information	\$0	\$15,224	\$11,875	\$27,099
Finance and insurance	\$0	\$23,092	\$35,928	\$59,020
Real estate and rental and leasing	\$0	\$27,033	\$61,900	\$88,933
Professional, scientific, and technical services	\$128,571	\$40,006	\$12,419	\$180,997
Management of companies and enterprises	\$0	-\$1,791	\$2,029	\$238
Administrative and support and waste management and remediation services	\$0	\$25,305	\$7,754	\$33,058
Educational services	\$0	\$205	\$6,747	\$6,952
Health care and social assistance	\$0	\$3	\$51,409	\$51,412
Arts, entertainment, and recreation	\$0	\$1,146	\$3,620	\$4,765
Accommodation and food services	\$0	\$3,398	\$14,791	\$18,188
Other services (except public administration)	\$0	\$5,712	\$14,574	\$20,285
Public administration	\$100,000	\$12,282	\$6,001	\$118,283
Average	\$0	\$148,249	\$292,572	\$440,822

Source: RESI

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Figure 99: Maryland Clean Cars Program—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$24	\$55	\$79
Mining	\$0	\$131	\$13	\$144
Utilities	\$0	\$730	\$914	\$1,644
Construction	\$0	\$3,097	\$962	\$4,059
Manufacturing	\$24,063	-\$2,262	\$1,302	\$23,103
Wholesale trade	\$48,194	-\$12,388	\$4,971	\$40,777
Retail trade	\$83,537	\$1,286	\$12,692	\$97,515
Transportation and warehousing	\$33,812	\$7,647	\$2,033	\$43,493
Information	\$0	\$3,357	\$2,543	\$5,900
Finance and insurance	\$0	\$6,594	\$9,989	\$16,583
Real estate and rental and leasing	\$0	\$2,050	\$2,150	\$4,200
Professional, scientific, and technical services	\$71,272	\$18,633	\$5,457	\$95,362
Management of companies and enterprises	\$0	-\$968	\$1,097	\$129
Administrative and support and waste management and remediation services	\$0	\$11,996	\$3,408	\$15,404
Educational services	\$0	\$105	\$3,795	\$3,900
Health care and social assistance	\$0	\$1	\$24,746	\$24,747
Arts, entertainment, and recreation	\$0	\$389	\$1,319	\$1,708
Accommodation and food services	\$0	\$1,175	\$5,162	\$6,337
Other services (except public administration)	\$0	\$2,137	\$6,280	\$8,417
Public administration	\$25,247	\$5,867	\$2,155	\$33,269
Average	\$286,125	\$49,601	\$91,044	\$426,770

Source: RESI

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Figure 100: Maryland Clean Cars Program—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.2	0.2
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.3	0.3
Construction	0.0	0.0	0.8	0.8
Manufacturing	0.0	0.0	0.8	0.8
Wholesale trade	0.0	0.0	2.4	2.4
Retail trade	0.0	0.0	14.8	14.8
Transportation and warehousing	0.0	0.0	2.0	2.0
Information	0.0	0.0	1.5	1.5
Finance and insurance	0.0	0.0	5.6	5.6
Real estate and rental and leasing	0.0	0.0	6.1	6.1
Professional, scientific, and technical services	0.0	0.0	3.5	3.5
Management of companies and enterprises	0.0	0.0	0.4	0.4
Administrative and support and waste management and remediation services	0.0	0.0	4.1	4.1
Educational services	0.0	0.0	3.3	3.3
Health care and social assistance	0.0	0.0	19.0	19.0
Arts, entertainment, and recreation	0.0	0.0	2.6	2.6
Accommodation and food services	0.0	0.0	8.7	8.7
Other services (except public administration)	0.0	0.0	7.5	7.5
Public administration	0.0	0.0	1.2	1.2
Total	0.0	0.0	84.9	84.9

Source: RESI

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Figure 101: Maryland Clean Cars Program—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$0	\$17,810	\$17,810
Mining	\$0	\$0	\$8,887	\$8,887
Utilities	\$0	\$0	\$292,571	\$292,571
Construction	\$0	\$0	\$102,334	\$102,334
Manufacturing	\$0	\$0	\$371,077	\$371,077
Wholesale trade	\$0	\$0	\$507,209	\$507,209
Retail trade	\$0	\$0	\$903,608	\$903,608
Transportation and warehousing	\$0	\$0	\$225,986	\$225,986
Information	\$0	\$0	\$472,710	\$472,710
Finance and insurance	\$0	\$0	\$1,313,260	\$1,313,260
Real estate and rental and leasing	\$0	\$0	\$2,356,451	\$2,356,451
Professional, scientific, and technical services	\$0	\$0	\$482,297	\$482,297
Management of companies and enterprises	\$0	\$0	\$80,059	\$80,059
Administrative and support and waste management and remediation services	\$0	\$0	\$300,743	\$300,743
Educational services	\$0	\$0	\$254,268	\$254,268
Health care and social assistance	\$0	\$0	\$2,056,761	\$2,056,761
Arts, entertainment, and recreation	\$0	\$0	\$134,841	\$134,841
Accommodation and food services	\$0	\$0	\$561,277	\$561,277
Other services (except public administration)	\$0	\$0	\$547,692	\$547,692
Public administration	\$0	\$0	\$241,096	\$241,096
Total	\$0	\$0	\$11,230,937	\$11,230,937

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 102: Maryland Clean Cars Program—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$0	\$2,215	\$2,215
Mining	\$0	\$0	\$515	\$515
Utilities	\$0	\$0	\$39,363	\$39,363
Construction	\$0	\$0	\$36,078	\$36,078
Manufacturing	\$0	\$0	\$53,102	\$53,102
Wholesale trade	\$0	\$0	\$190,124	\$190,124
Retail trade	\$0	\$0	\$455,084	\$455,084
Transportation and warehousing	\$0	\$0	\$78,085	\$78,085
Information	\$0	\$0	\$100,453	\$100,453
Finance and insurance	\$0	\$0	\$368,850	\$368,850
Real estate and rental and leasing	\$0	\$0	\$91,901	\$91,901
Professional, scientific, and technical services	\$0	\$0	\$211,700	\$211,700
Management of companies and enterprises	\$0	\$0	\$43,273	\$43,273
Administrative and support and waste management and remediation services	\$0	\$0	\$132,219	\$132,219
Educational services	\$0	\$0	\$140,861	\$140,861
Health care and social assistance	\$0	\$0	\$988,503	\$988,503
Arts, entertainment, and recreation	\$0	\$0	\$49,551	\$49,551
Accommodation and food services	\$0	\$0	\$195,813	\$195,813
Other services (except public administration)	\$0	\$0	\$233,772	\$233,772
Public administration	\$0	\$0	\$85,522	\$85,522
Total	\$0	\$0	\$3,496,984	\$3,496,984

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 103: Federal Medium- and Heavy-Duty GHG Standards—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.1	0.0	0.1
Manufacturing	0.0	-0.1	0.0	0.0
Wholesale trade	0.7	-0.2	0.1	0.6
Retail trade	1.9	0.0	0.4	2.3
Transportation and warehousing	1.0	0.2	0.1	1.3
Information	0.0	0.0	0.0	0.1
Finance and insurance	0.0	0.1	0.2	0.2
Real estate and rental and leasing	0.0	0.1	0.1	0.3
Professional, scientific, and technical services	1.2	0.3	0.1	1.6
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.4	0.1	0.5
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.5	0.5
Arts, entertainment, and recreation	0.0	0.0	0.1	0.1
Accommodation and food services	0.0	0.1	0.2	0.3
Other services (except public administration)	0.0	0.1	0.2	0.3
Public administration	0.4	0.1	0.0	0.5
Average	5.2	1.1	2.2	8.6

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 104: Federal Medium- and Heavy-Duty GHG Standards—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$73	\$438	\$511
Mining	\$0	\$788	\$216	\$1,004
Utilities	\$0	\$1,624	\$6,787	\$8,411
Construction	\$0	\$7,153	\$2,747	\$9,900
Manufacturing	-\$700,000	-\$56,939	\$8,937	-\$748,002
Wholesale trade	\$150,000	-\$45,242	\$13,234	\$117,991
Retail trade	\$150,000	\$2,719	\$25,205	\$177,924
Transportation and warehousing	\$150,000	\$21,677	\$5,911	\$177,589
Information	\$0	\$13,336	\$11,861	\$25,198
Finance and insurance	\$0	\$23,448	\$35,921	\$59,369
Real estate and rental and leasing	\$0	\$27,460	\$61,881	\$89,341
Professional, scientific, and technical services	\$150,000	\$37,381	\$12,409	\$199,791
Management of companies and enterprises	\$0	-\$1,105	\$2,027	\$922
Administrative and support and waste management and remediation services	\$0	\$25,423	\$7,750	\$33,172
Educational services	\$0	\$226	\$6,757	\$6,983
Health care and social assistance	\$0	\$2	\$51,366	\$51,369
Arts, entertainment, and recreation	\$0	\$1,186	\$3,620	\$4,807
Accommodation and food services	\$0	\$3,514	\$14,780	\$18,295
Other services (except public administration)	\$0	\$5,337	\$14,576	\$19,913
Public administration	\$100,000	\$10,095	\$5,995	\$116,091
Average	\$0	\$78,159	\$292,419	\$370,578

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 105: Federal Medium- and Heavy-Duty GHG Standards—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$14	\$55	\$70
Mining	\$0	\$125	\$13	\$138
Utilities	\$0	\$381	\$912	\$1,293
Construction	\$0	\$2,759	\$962	\$3,721
Manufacturing	-\$9,616	-\$8,336	\$1,301	-\$16,651
Wholesale trade	\$56,227	-\$16,959	\$4,961	\$44,228
Retail trade	\$97,460	\$1,432	\$12,694	\$111,585
Transportation and warehousing	\$39,448	\$8,576	\$2,033	\$50,057
Information	\$0	\$2,878	\$2,540	\$5,418
Finance and insurance	\$0	\$6,562	\$9,985	\$16,547
Real estate and rental and leasing	\$0	\$2,093	\$2,146	\$4,239
Professional, scientific, and technical services	\$83,151	\$17,564	\$5,453	\$106,167
Management of companies and enterprises	\$0	-\$597	\$1,096	\$498
Administrative and support and waste management and remediation services	\$0	\$12,257	\$3,406	\$15,663
Educational services	\$0	\$115	\$3,802	\$3,917
Health care and social assistance	\$0	\$1	\$24,726	\$24,727
Arts, entertainment, and recreation	\$0	\$401	\$1,319	\$1,720
Accommodation and food services	\$0	\$1,216	\$5,158	\$6,374
Other services (except public administration)	\$0	\$1,938	\$6,282	\$8,220
Public administration	\$25,247	\$5,688	\$2,154	\$33,089
Average	\$291,915	\$38,109	\$90,996	\$421,020

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 106: Federal Medium- and Heavy-Duty GHG Standards—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.0	0.1	0.1
Manufacturing	0.0	0.0	0.1	0.1
Wholesale trade	0.0	0.0	0.2	0.2
Retail trade	0.0	0.0	1.2	1.2
Transportation and warehousing	0.0	0.0	0.2	0.2
Information	0.0	0.0	0.1	0.1
Finance and insurance	0.0	0.0	0.4	0.4
Real estate and rental and leasing	0.0	0.0	0.5	0.5
Professional, scientific, and technical services	0.0	0.0	0.3	0.3
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.0	0.3	0.3
Educational services	0.0	0.0	0.3	0.3
Health care and social assistance	0.0	0.0	1.5	1.5
Arts, entertainment, and recreation	0.0	0.0	0.2	0.2
Accommodation and food services	0.0	0.0	0.7	0.7
Other services (except public administration)	0.0	0.0	0.6	0.6
Public administration	0.0	0.0	0.1	0.1
Total	0.0	0.0	6.7	6.7

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 107: Federal Medium- and Heavy-Duty GHG Standards—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$0	\$1,411	\$1,411
Mining	\$0	\$0	\$704	\$704
Utilities	\$0	\$0	\$23,173	\$23,173
Construction	\$0	\$0	\$8,105	\$8,105
Manufacturing	\$0	\$0	\$29,391	\$29,391
Wholesale trade	\$0	\$0	\$40,173	\$40,173
Retail trade	\$0	\$0	\$71,570	\$71,570
Transportation and warehousing	\$0	\$0	\$17,899	\$17,899
Information	\$0	\$0	\$37,441	\$37,441
Finance and insurance	\$0	\$0	\$104,016	\$104,016
Real estate and rental and leasing	\$0	\$0	\$186,642	\$186,642
Professional, scientific, and technical services	\$0	\$0	\$38,200	\$38,200
Management of companies and enterprises	\$0	\$0	\$6,341	\$6,341
Administrative and support and waste management and remediation services	\$0	\$0	\$23,820	\$23,820
Educational services	\$0	\$0	\$20,139	\$20,139
Health care and social assistance	\$0	\$0	\$162,905	\$162,905
Arts, entertainment, and recreation	\$0	\$0	\$10,680	\$10,680
Accommodation and food services	\$0	\$0	\$44,456	\$44,456
Other services (except public administration)	\$0	\$0	\$43,380	\$43,380
Public administration	\$0	\$0	\$19,096	\$19,096
Total	\$0	\$0	\$889,541	\$889,541

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 108: Federal Medium- and Heavy-Duty GHG Standards—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$0	\$175	\$175
Mining	\$0	\$0	\$41	\$41
Utilities	\$0	\$0	\$3,118	\$3,118
Construction	\$0	\$0	\$2,858	\$2,858
Manufacturing	\$0	\$0	\$4,206	\$4,206
Wholesale trade	\$0	\$0	\$15,059	\$15,059
Retail trade	\$0	\$0	\$36,045	\$36,045
Transportation and warehousing	\$0	\$0	\$6,185	\$6,185
Information	\$0	\$0	\$7,956	\$7,956
Finance and insurance	\$0	\$0	\$29,215	\$29,215
Real estate and rental and leasing	\$0	\$0	\$7,279	\$7,279
Professional, scientific, and technical services	\$0	\$0	\$16,768	\$16,768
Management of companies and enterprises	\$0	\$0	\$3,427	\$3,427
Administrative and support and waste management and remediation services	\$0	\$0	\$10,472	\$10,472
Educational services	\$0	\$0	\$11,157	\$11,157
Health care and social assistance	\$0	\$0	\$78,294	\$78,294
Arts, entertainment, and recreation	\$0	\$0	\$3,925	\$3,925
Accommodation and food services	\$0	\$0	\$15,509	\$15,509
Other services (except public administration)	\$0	\$0	\$18,516	\$18,516
Public administration	\$0	\$0	\$6,774	\$6,774
Total	\$0	\$0	\$276,977	\$276,977

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 109: Clean Fuel Standard—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.0	0.0
Mining	-2.3	0.0	0.0	-2.4
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.0	0.0	0.0
Manufacturing	0.0	0.0	0.0	0.0
Wholesale trade	0.0	-0.1	0.1	0.0
Retail trade	-3.5	0.0	0.4	-3.1
Transportation and warehousing	0.0	0.0	0.1	0.0
Information	0.0	0.0	0.0	0.1
Finance and insurance	0.0	0.0	0.1	0.2
Real estate and rental and leasing	0.0	0.0	0.1	0.2
Professional, scientific, and technical services	7.3	0.2	0.1	7.6
Management of companies and enterprises	0.0	-0.1	0.0	-0.1
Administrative and support and waste management and remediation services	0.0	0.5	0.1	0.6
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.5	0.5
Arts, entertainment, and recreation	0.0	0.1	0.1	0.1
Accommodation and food services	0.0	0.1	0.2	0.3
Other services (except public administration)	0.0	0.1	0.2	0.3
Public administration	0.4	0.0	0.0	0.4
Average	1.8	0.8	2.2	4.8

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 110: Clean Fuel Standard—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	-\$395	\$430	\$35
Mining	-\$750,000	-\$5,636	\$212	-\$755,424
Utilities	\$0	-\$8,006	\$6,679	-\$1,327
Construction	\$0	-\$5,804	\$2,677	-\$3,127
Manufacturing	\$0	-\$23,408	\$8,783	-\$14,626
Wholesale trade	\$0	-\$15,214	\$13,050	-\$2,165
Retail trade	-\$250,000	-\$1,424	\$24,531	-\$226,893
Transportation and warehousing	\$0	-\$6,367	\$5,763	-\$605
Information	\$0	\$7,518	\$11,632	\$19,150
Finance and insurance	\$0	\$10,677	\$35,031	\$45,708
Real estate and rental and leasing	\$0	-\$19,345	\$60,380	\$41,035
Professional, scientific, and technical services	\$900,000	\$29,704	\$12,142	\$941,847
Management of companies and enterprises	\$0	-\$16,113	\$1,986	-\$14,127
Administrative and support and waste management and remediation services	\$0	\$38,753	\$7,571	\$46,324
Educational services	\$0	-\$233	\$6,520	\$6,287
Health care and social assistance	\$0	\$4	\$50,278	\$50,281
Arts, entertainment, and recreation	\$0	\$2,138	\$3,523	\$5,660
Accommodation and food services	\$0	\$6,631	\$14,455	\$21,086
Other services (except public administration)	\$0	\$11,527	\$14,185	\$25,712
Public administration	\$100,000	\$3,933	\$5,870	\$109,803
Average	\$0	\$8,939	\$285,697	\$294,636

Source: RESI

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Figure 111: Clean Fuel Standard—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	-\$57	\$54	-\$3
Mining	-\$94,231	-\$1,149	\$13	-\$95,367
Utilities	\$0	-\$960	\$898	-\$62
Construction	\$0	-\$2,402	\$938	-\$1,465
Manufacturing	\$0	-\$2,409	\$1,277	-\$1,133
Wholesale trade	\$0	-\$5,703	\$4,892	-\$811
Retail trade	-\$96,976	-\$717	\$12,354	-\$85,339
Transportation and warehousing	\$0	-\$1,657	\$1,983	\$326
Information	\$0	\$1,660	\$2,490	\$4,150
Finance and insurance	\$0	\$1,821	\$9,750	\$11,570
Real estate and rental and leasing	\$0	-\$732	\$2,111	\$1,379
Professional, scientific, and technical services	\$498,905	\$15,446	\$5,335	\$519,685
Management of companies and enterprises	\$0	-\$8,710	\$1,073	-\$7,636
Administrative and support and waste management and remediation services	\$0	\$19,426	\$3,328	\$22,754
Educational services	\$0	-\$121	\$3,663	\$3,542
Health care and social assistance	\$0	\$1	\$24,200	\$24,201
Arts, entertainment, and recreation	\$0	\$677	\$1,284	\$1,961
Accommodation and food services	\$0	\$2,308	\$5,044	\$7,353
Other services (except public administration)	\$0	\$3,233	\$6,110	\$9,343
Public administration	\$25,247	\$1,473	\$2,107	\$28,827
Average	\$332,944	\$21,429	\$88,903	\$443,277

Source: RESI

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Figure 112: Clean Fuel Standard—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.1	0.1
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.1	0.1
Construction	0.0	0.0	0.4	0.4
Manufacturing	0.0	0.0	0.4	0.4
Wholesale trade	0.0	0.0	1.2	1.2
Retail trade	0.0	0.0	7.0	7.0
Transportation and warehousing	0.0	0.0	1.0	1.0
Information	0.0	0.0	0.7	0.7
Finance and insurance	0.0	0.0	2.6	2.6
Real estate and rental and leasing	0.0	0.0	2.9	2.9
Professional, scientific, and technical services	0.0	0.0	1.7	1.7
Management of companies and enterprises	0.0	0.0	0.2	0.2
Administrative and support and waste management and remediation services	0.0	0.0	2.0	2.0
Educational services	0.0	0.0	1.5	1.5
Health care and social assistance	0.0	0.0	9.0	9.0
Arts, entertainment, and recreation	0.0	0.0	1.2	1.2
Accommodation and food services	0.0	0.0	4.1	4.1
Other services (except public administration)	0.0	0.0	3.5	3.5
Public administration	0.0	0.0	0.6	0.6
Total	0.0	0.0	40.1	40.1

Source: RESI

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Figure 113: Clean Fuel Standard—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$0	\$8,405	\$8,405
Mining	\$0	\$0	\$4,194	\$4,194
Utilities	\$0	\$0	\$138,084	\$138,084
Construction	\$0	\$0	\$48,298	\$48,298
Manufacturing	\$0	\$0	\$175,136	\$175,136
Wholesale trade	\$0	\$0	\$239,385	\$239,385
Retail trade	\$0	\$0	\$426,472	\$426,472
Transportation and warehousing	\$0	\$0	\$106,658	\$106,658
Information	\$0	\$0	\$223,103	\$223,103
Finance and insurance	\$0	\$0	\$619,814	\$619,814
Real estate and rental and leasing	\$0	\$0	\$1,112,164	\$1,112,164
Professional, scientific, and technical services	\$0	\$0	\$227,628	\$227,628
Management of companies and enterprises	\$0	\$0	\$37,785	\$37,785
Administrative and support and waste management and remediation services	\$0	\$0	\$141,940	\$141,940
Educational services	\$0	\$0	\$120,006	\$120,006
Health care and social assistance	\$0	\$0	\$970,720	\$970,720
Arts, entertainment, and recreation	\$0	\$0	\$63,640	\$63,640
Accommodation and food services	\$0	\$0	\$264,903	\$264,903
Other services (except public administration)	\$0	\$0	\$258,492	\$258,492
Public administration	\$0	\$0	\$113,789	\$113,789
Total	\$0	\$0	\$5,300,615	\$5,300,615

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 114: Clean Fuel Standard—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$0	\$1,045	\$1,045
Mining	\$0	\$0	\$243	\$243
Utilities	\$0	\$0	\$18,578	\$18,578
Construction	\$0	\$0	\$17,028	\$17,028
Manufacturing	\$0	\$0	\$25,062	\$25,062
Wholesale trade	\$0	\$0	\$89,732	\$89,732
Retail trade	\$0	\$0	\$214,784	\$214,784
Transportation and warehousing	\$0	\$0	\$36,854	\$36,854
Information	\$0	\$0	\$47,410	\$47,410
Finance and insurance	\$0	\$0	\$174,085	\$174,085
Real estate and rental and leasing	\$0	\$0	\$43,374	\$43,374
Professional, scientific, and technical services	\$0	\$0	\$99,915	\$99,915
Management of companies and enterprises	\$0	\$0	\$20,424	\$20,424
Administrative and support and waste management and remediation services	\$0	\$0	\$62,403	\$62,403
Educational services	\$0	\$0	\$66,482	\$66,482
Health care and social assistance	\$0	\$0	\$466,539	\$466,539
Arts, entertainment, and recreation	\$0	\$0	\$23,386	\$23,386
Accommodation and food services	\$0	\$0	\$92,417	\$92,417
Other services (except public administration)	\$0	\$0	\$110,332	\$110,332
Public administration	\$0	\$0	\$40,364	\$40,364
Total	\$0	\$0	\$1,650,456	\$1,650,456

Source: RESI

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Figure 115: Transportation Climate Initiative—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.1	0.0	0.1
Manufacturing	0.0	0.0	0.0	0.1
Wholesale trade	0.0	0.1	0.1	0.2
Retail trade	0.0	0.0	0.6	0.6
Transportation and warehousing	6.4	0.6	0.1	7.0
Information	0.0	0.1	0.1	0.1
Finance and insurance	0.0	0.2	0.2	0.4
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	0.9	0.4	0.1	1.4
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.5	0.1	0.7
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.7	0.7
Arts, entertainment, and recreation	0.0	0.1	0.1	0.2
Accommodation and food services	0.0	0.1	0.3	0.4
Other services (except public administration)	0.0	0.1	0.3	0.4
Public administration	0.4	0.1	0.0	0.5
Average	7.6	2.6	3.1	13.3

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 116: Transportation Climate Initiative—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$183	\$606	\$790
Mining	\$0	\$1,506	\$299	\$1,805
Utilities	\$0	\$7,881	\$9,413	\$17,294
Construction	\$0	\$14,484	\$3,791	\$18,275
Manufacturing	\$0	\$14,271	\$12,386	\$26,657
Wholesale trade	\$0	\$14,078	\$18,373	\$32,451
Retail trade	\$0	\$1,993	\$34,760	\$36,753
Transportation and warehousing	\$787,500	\$58,623	\$8,159	\$854,282
Information	\$0	\$19,576	\$16,421	\$35,997
Finance and insurance	\$0	\$48,255	\$49,589	\$97,845
Real estate and rental and leasing	\$0	\$43,378	\$85,450	\$128,828
Professional, scientific, and technical services	\$112,500	\$49,377	\$17,160	\$179,038
Management of companies and enterprises	\$0	\$7,348	\$2,805	\$10,153
Administrative and support and waste management and remediation services	\$0	\$39,376	\$10,709	\$50,084
Educational services	\$0	\$177	\$9,278	\$9,455
Health care and social assistance	\$0	\$3	\$71,044	\$71,047
Arts, entertainment, and recreation	\$0	\$2,215	\$4,992	\$7,207
Accommodation and food services	\$0	\$5,813	\$20,434	\$26,247
Other services (except public administration)	\$0	\$7,628	\$20,101	\$27,728
Public administration	\$100,000	\$22,423	\$8,293	\$130,717
Average	\$1,000,000	\$358,588	\$404,065	\$1,762,653

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 117: Transportation Climate Initiative—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$23	\$77	\$100
Mining	\$0	\$156	\$18	\$175
Utilities	\$0	\$1,010	\$1,265	\$2,275
Construction	\$0	\$5,673	\$1,327	\$7,001
Manufacturing	\$0	\$2,341	\$1,802	\$4,143
Wholesale trade	\$0	\$5,277	\$6,887	\$12,164
Retail trade	\$0	\$1,039	\$17,506	\$18,544
Transportation and warehousing	\$264,657	\$25,254	\$2,806	\$292,717
Information	\$0	\$4,177	\$3,516	\$7,693
Finance and insurance	\$0	\$13,634	\$13,793	\$27,427
Real estate and rental and leasing	\$0	\$5,187	\$2,976	\$8,163
Professional, scientific, and technical services	\$62,363	\$23,605	\$7,540	\$93,508
Management of companies and enterprises	\$0	\$3,972	\$1,516	\$5,488
Administrative and support and waste management and remediation services	\$0	\$18,001	\$4,706	\$22,707
Educational services	\$0	\$91	\$5,217	\$5,308
Health care and social assistance	\$0	\$1	\$34,197	\$34,198
Arts, entertainment, and recreation	\$0	\$656	\$1,819	\$2,475
Accommodation and food services	\$0	\$2,016	\$7,131	\$9,147
Other services (except public administration)	\$0	\$3,051	\$8,660	\$11,712
Public administration	\$25,247	\$11,650	\$2,978	\$39,874
Average	\$352,267	\$126,815	\$125,738	\$604,819

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 118: Transportation Climate Initiative—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.0	0.0	0.0
Manufacturing	0.0	0.0	0.0	0.0
Wholesale trade	0.0	0.0	0.1	0.1
Retail trade	0.0	0.0	0.4	0.4
Transportation and warehousing	0.0	0.0	0.0	0.0
Information	0.0	0.0	0.0	0.0
Finance and insurance	0.0	0.0	0.1	0.1
Real estate and rental and leasing	0.0	0.0	0.1	0.1
Professional, scientific, and technical services	0.0	0.0	0.1	0.1
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.0	0.1	0.1
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.5	0.5
Arts, entertainment, and recreation	0.0	0.0	0.1	0.1
Accommodation and food services	0.0	0.0	0.2	0.2
Other services (except public administration)	0.0	0.0	0.2	0.2
Public administration	0.0	0.0	0.0	0.0
Total	0.0	0.0	2.1	2.1

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 119: Transportation Climate Initiative—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$0	\$430	\$430
Mining	\$0	\$0	\$214	\$214
Utilities	\$0	\$0	\$6,963	\$6,963
Construction	\$0	\$0	\$2,544	\$2,544
Manufacturing	\$0	\$0	\$8,895	\$8,895
Wholesale trade	\$0	\$0	\$12,070	\$12,070
Retail trade	\$0	\$0	\$22,552	\$22,552
Transportation and warehousing	\$0	\$0	\$5,602	\$5,602
Information	\$0	\$0	\$11,430	\$11,430
Finance and insurance	\$0	\$0	\$32,623	\$32,623
Real estate and rental and leasing	\$0	\$0	\$58,213	\$58,213
Professional, scientific, and technical services	\$0	\$0	\$11,789	\$11,789
Management of companies and enterprises	\$0	\$0	\$1,946	\$1,946
Administrative and support and waste management and remediation services	\$0	\$0	\$7,390	\$7,390
Educational services	\$0	\$0	\$6,516	\$6,516
Health care and social assistance	\$0	\$0	\$50,185	\$50,185
Arts, entertainment, and recreation	\$0	\$0	\$3,374	\$3,374
Accommodation and food services	\$0	\$0	\$13,752	\$13,752
Other services (except public administration)	\$0	\$0	\$13,696	\$13,696
Public administration	\$0	\$0	\$5,865	\$5,865
Total	\$0	\$0	\$276,049	\$276,049

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 120: Transportation Climate Initiative—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$0	\$54	\$54
Mining	\$0	\$0	\$13	\$13
Utilities	\$0	\$0	\$937	\$937
Construction	\$0	\$0	\$895	\$895
Manufacturing	\$0	\$0	\$1,280	\$1,280
Wholesale trade	\$0	\$0	\$4,524	\$4,524
Retail trade	\$0	\$0	\$11,358	\$11,358
Transportation and warehousing	\$0	\$0	\$1,931	\$1,931
Information	\$0	\$0	\$2,434	\$2,434
Finance and insurance	\$0	\$0	\$9,114	\$9,114
Real estate and rental and leasing	\$0	\$0	\$2,195	\$2,195
Professional, scientific, and technical services	\$0	\$0	\$5,177	\$5,177
Management of companies and enterprises	\$0	\$0	\$1,052	\$1,052
Administrative and support and waste management and remediation services	\$0	\$0	\$3,248	\$3,248
Educational services	\$0	\$0	\$3,633	\$3,633
Health care and social assistance	\$0	\$0	\$24,134	\$24,134
Arts, entertainment, and recreation	\$0	\$0	\$1,237	\$1,237
Accommodation and food services	\$0	\$0	\$4,798	\$4,798
Other services (except public administration)	\$0	\$0	\$5,861	\$5,861
Public administration	\$0	\$0	\$2,088	\$2,088
Total	\$0	\$0	\$85,962	\$85,962

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 121: Public Transportation Initiatives—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.5	0.1	0.0	0.7
Manufacturing	0.1	0.1	0.0	0.2
Wholesale trade	0.1	0.1	0.1	0.3
Retail trade	0.0	0.1	0.6	0.7
Transportation and warehousing	3.5	0.1	0.1	3.7
Information	0.0	0.1	0.1	0.2
Finance and insurance	0.0	0.1	0.2	0.4
Real estate and rental and leasing	0.0	0.3	0.2	0.5
Professional, scientific, and technical services	2.7	0.5	0.1	3.3
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.4	0.2	0.6
Educational services	1.7	0.0	0.1	1.8
Health care and social assistance	0.0	0.0	0.7	0.7
Arts, entertainment, and recreation	0.0	0.1	0.1	0.2
Accommodation and food services	0.0	0.1	0.3	0.4
Other services (except public administration)	0.0	0.1	0.3	0.4
Public administration	0.6	0.1	0.0	0.7
Average	9.1	2.4	3.2	14.7

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 122: Public Transportation Initiatives—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$230	\$633	\$863
Mining	\$0	\$2,001	\$312	\$2,313
Utilities	\$0	\$17,611	\$9,821	\$27,433
Construction	\$76,154	\$13,738	\$3,958	\$93,850
Manufacturing	\$69,231	\$24,001	\$12,924	\$106,156
Wholesale trade	\$23,077	\$18,997	\$19,168	\$61,242
Retail trade	\$0	\$5,003	\$36,288	\$41,292
Transportation and warehousing	\$161,538	\$16,253	\$8,517	\$186,309
Information	\$0	\$35,859	\$17,137	\$52,996
Finance and insurance	\$0	\$32,957	\$51,764	\$84,721
Real estate and rental and leasing	\$0	\$54,837	\$89,195	\$144,033
Professional, scientific, and technical services	\$327,692	\$71,535	\$17,910	\$417,137
Management of companies and enterprises	\$0	\$6,841	\$2,927	\$9,768
Administrative and support and waste management and remediation services	\$0	\$31,448	\$11,177	\$42,625
Educational services	\$173,077	\$743	\$9,690	\$183,510
Health care and social assistance	\$0	\$4	\$74,147	\$74,151
Arts, entertainment, and recreation	\$0	\$3,307	\$5,211	\$8,518
Accommodation and food services	\$0	\$6,232	\$21,327	\$27,559
Other services (except public administration)	\$0	\$8,641	\$20,985	\$29,626
Public administration	\$169,231	\$17,155	\$8,655	\$195,041
Average	\$1,000,000	\$367,394	\$421,749	\$1,789,143

Source: RESI

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Figure 123: Public Transportation Initiatives—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$26	\$80	\$106
Mining	\$0	\$276	\$19	\$296
Utilities	\$0	\$2,245	\$1,320	\$3,565
Construction	\$26,054	\$5,313	\$1,386	\$32,753
Manufacturing	\$4,868	\$4,515	\$1,880	\$11,263
Wholesale trade	\$8,650	\$7,121	\$7,185	\$22,956
Retail trade	\$0	\$2,608	\$18,275	\$20,883
Transportation and warehousing	\$75,888	\$5,877	\$2,929	\$84,694
Information	\$0	\$8,127	\$3,670	\$11,796
Finance and insurance	\$0	\$9,360	\$14,397	\$23,757
Real estate and rental and leasing	\$0	\$4,678	\$3,105	\$7,783
Professional, scientific, and technical services	\$130,861	\$32,810	\$7,869	\$171,539
Management of companies and enterprises	\$0	\$3,697	\$1,582	\$5,280
Administrative and support and waste management and remediation services	\$0	\$13,907	\$4,912	\$18,819
Educational services	\$94,790	\$344	\$5,449	\$100,582
Health care and social assistance	\$0	\$2	\$35,690	\$35,692
Arts, entertainment, and recreation	\$0	\$961	\$1,899	\$2,860
Accommodation and food services	\$0	\$2,152	\$7,443	\$9,594
Other services (except public administration)	\$0	\$3,488	\$9,041	\$12,530
Public administration	\$42,725	\$6,361	\$3,108	\$52,194
Average	\$383,835	\$113,867	\$131,241	\$628,943

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 124: Public Transportation Initiatives—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	18.5	13.9	8.2	40.6
Mining	0.0	2.4	1.6	3.9
Utilities	0.0	0.1	2.3	2.3
Construction	0.0	0.7	5.0	5.7
Manufacturing	0.0	2.8	8.0	10.8
Wholesale trade	0.0	0.0	12.1	12.1
Retail trade	0.0	0.0	76.4	76.4
Transportation and warehousing	0.0	0.0	10.3	10.3
Information	0.0	0.2	7.4	7.5
Finance and insurance	0.0	0.1	28.7	28.8
Real estate and rental and leasing	0.0	0.1	30.2	30.4
Professional, scientific, and technical services	0.0	0.5	17.7	18.2
Management of companies and enterprises	2.8	0.0	1.9	4.6
Administrative and support and waste management and remediation services	0.0	0.2	21.1	21.3
Educational services	0.0	0.0	17.4	17.4
Health care and social assistance	0.0	0.0	96.4	96.4
Arts, entertainment, and recreation	0.0	0.1	13.6	13.7
Accommodation and food services	0.0	0.1	44.0	44.1
Other services (except public administration)	0.0	0.1	39.0	39.1
Public administration	0.0	0.0	5.9	5.9
Total	21.2	21.1	447.2	489.5

Source: RESI

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Figure 125: Public Transportation Initiatives—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$1,043	\$92,046	\$93,090
Mining	\$0	\$40,763	\$45,820	\$86,583
Utilities	\$0	\$155,313	\$1,492,052	\$1,647,365
Construction	\$0	\$355,038	\$542,964	\$898,002
Manufacturing	\$0	\$177,066	\$1,905,636	\$2,082,702
Wholesale trade	\$0	\$138,945	\$2,597,451	\$2,736,396
Retail trade	\$0	\$12,133	\$4,815,540	\$4,827,672
Transportation and warehousing	\$0	\$116,696	\$1,195,135	\$1,311,831
Information	\$0	\$147,945	\$2,447,689	\$2,595,634
Finance and insurance	\$0	\$364,010	\$6,968,006	\$7,332,016
Real estate and rental and leasing	\$0	\$437,433	\$12,429,332	\$12,866,765
Professional, scientific, and technical services	\$0	\$742,057	\$2,521,019	\$3,263,076
Management of companies and enterprises	\$598,500	\$19,502	\$416,420	\$1,034,422
Administrative and support and waste management and remediation services	\$0	\$312,714	\$1,578,512	\$1,891,226
Educational services	\$0	\$1,194	\$1,381,136	\$1,382,330
Health care and social assistance	\$0	\$40	\$10,724,045	\$10,724,086
Arts, entertainment, and recreation	\$0	\$12,835	\$719,077	\$731,912
Accommodation and food services	\$0	\$35,277	\$2,941,674	\$2,976,952
Other services (except public administration)	\$0	\$58,462	\$2,918,269	\$2,976,731
Public administration	\$5,157,928	\$203,888	\$1,253,873	\$6,615,689
Total	\$5,756,428	\$3,332,355	\$58,985,696	\$68,074,479

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 126: Public Transportation Initiatives—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$136	\$11,514	\$11,650
Mining	\$0	\$6,205	\$2,699	\$8,904
Utilities	\$0	\$18,190	\$200,684	\$218,874
Construction	\$0	\$137,108	\$191,027	\$328,135
Manufacturing	\$0	\$32,984	\$273,974	\$306,958
Wholesale trade	\$0	\$52,083	\$973,638	\$1,025,721
Retail trade	\$0	\$6,323	\$2,425,239	\$2,431,562
Transportation and warehousing	\$0	\$41,122	\$412,030	\$453,152
Information	\$0	\$32,913	\$521,088	\$554,000
Finance and insurance	\$0	\$106,976	\$1,948,216	\$2,055,192
Real estate and rental and leasing	\$0	\$34,638	\$470,070	\$504,708
Professional, scientific, and technical services	\$0	\$356,179	\$1,107,010	\$1,463,189
Management of companies and enterprises	\$323,500	\$10,541	\$225,083	\$559,123
Administrative and support and waste management and remediation services	\$0	\$126,394	\$693,808	\$820,202
Educational services	\$0	\$582	\$769,473	\$770,055
Health care and social assistance	\$0	\$15	\$5,156,946	\$5,156,961
Arts, entertainment, and recreation	\$0	\$4,255	\$263,740	\$267,995
Accommodation and food services	\$0	\$12,128	\$1,026,318	\$1,038,446
Other services (except public administration)	\$0	\$21,229	\$1,248,532	\$1,269,761
Public administration	\$1,302,197	\$56,460	\$446,332	\$1,804,989
Total	\$1,625,697	\$1,056,460	\$18,367,421	\$21,049,577

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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**Figure 127: Initiatives to Double Transit Ridership by 2020—Investment Phase,
Employment Impacts**

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	2.6	0.1	0.0	2.7
Manufacturing	0.2	0.1	0.0	0.3
Wholesale trade	0.3	0.1	0.1	0.5
Retail trade	0.0	0.1	0.7	0.7
Transportation and warehousing	0.0	0.1	0.1	0.2
Information	0.0	0.1	0.1	0.1
Finance and insurance	0.0	0.1	0.2	0.4
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	3.0	0.8	0.1	3.9
Management of companies and enterprises	0.0	0.0	0.0	0.1
Administrative and support and waste management and remediation services	0.0	0.5	0.2	0.7
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.8	0.8
Arts, entertainment, and recreation	0.0	0.0	0.1	0.2
Accommodation and food services	0.0	0.1	0.4	0.5
Other services (except public administration)	0.0	0.1	0.3	0.4
Public administration	0.4	0.0	0.0	0.4
Average	6.4	2.5	3.6	12.5

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 128: Initiatives to Double Transit Ridership by 2020—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$265	\$701	\$966
Mining	\$0	\$2,358	\$345	\$2,703
Utilities	\$0	\$8,336	\$10,870	\$19,206
Construction	\$360,000	\$9,131	\$4,400	\$373,531
Manufacturing	\$60,000	\$28,321	\$14,314	\$102,635
Wholesale trade	\$60,000	\$21,505	\$21,196	\$102,701
Retail trade	\$0	\$5,135	\$40,372	\$45,507
Transportation and warehousing	\$0	\$15,144	\$9,468	\$24,612
Information	\$0	\$23,571	\$18,998	\$42,569
Finance and insurance	\$0	\$33,092	\$57,534	\$90,626
Real estate and rental and leasing	\$0	\$37,599	\$99,115	\$136,714
Professional, scientific, and technical services	\$420,000	\$108,815	\$19,876	\$548,691
Management of companies and enterprises	\$0	\$8,322	\$3,247	\$11,569
Administrative and support and waste management and remediation services	\$0	\$35,730	\$12,413	\$48,143
Educational services	\$0	\$203	\$10,824	\$11,027
Health care and social assistance	\$0	\$4	\$82,273	\$82,277
Arts, entertainment, and recreation	\$0	\$2,022	\$5,799	\$7,821
Accommodation and food services	\$0	\$9,628	\$23,674	\$33,302
Other services (except public administration)	\$0	\$11,373	\$23,346	\$34,719
Public administration	\$100,000	\$8,027	\$9,603	\$117,630
Average	\$1,000,000	\$368,582	\$468,368	\$1,836,950

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 129: Initiatives to Double Transit Ridership by 2020—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$34	\$89	\$123
Mining	\$0	\$431	\$21	\$452
Utilities	\$0	\$1,070	\$1,461	\$2,531
Construction	\$127,616	\$3,545	\$1,540	\$132,701
Manufacturing	\$12,491	\$5,062	\$2,083	\$19,636
Wholesale trade	\$22,491	\$8,061	\$7,945	\$38,497
Retail trade	\$0	\$2,676	\$20,332	\$23,008
Transportation and warehousing	\$0	\$5,335	\$3,256	\$8,590
Information	\$0	\$5,074	\$4,069	\$9,143
Finance and insurance	\$0	\$9,099	\$15,992	\$25,092
Real estate and rental and leasing	\$0	\$3,706	\$3,438	\$7,143
Professional, scientific, and technical services	\$211,741	\$51,008	\$8,733	\$271,483
Management of companies and enterprises	\$0	\$4,498	\$1,755	\$6,253
Administrative and support and waste management and remediation services	\$0	\$16,911	\$5,455	\$22,366
Educational services	\$0	\$106	\$6,090	\$6,196
Health care and social assistance	\$0	\$2	\$39,604	\$39,606
Arts, entertainment, and recreation	\$0	\$733	\$2,112	\$2,845
Accommodation and food services	\$0	\$3,347	\$8,262	\$11,608
Other services (except public administration)	\$0	\$4,732	\$10,062	\$14,794
Public administration	\$25,247	\$3,421	\$3,450	\$32,117
Average	\$399,585	\$128,851	\$145,749	\$674,185

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 130: Initiatives to Double Transit Ridership by 2020—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.4	0.4
Mining	0.0	0.0	0.1	0.1
Utilities	0.0	0.0	0.5	0.5
Construction	0.0	0.0	1.4	1.4
Manufacturing	0.0	0.0	1.4	1.4
Wholesale trade	0.0	0.0	4.1	4.1
Retail trade	0.0	0.0	25.9	25.9
Transportation and warehousing	0.0	0.0	3.5	3.5
Information	0.0	0.0	2.5	2.5
Finance and insurance	0.0	0.0	9.7	9.7
Real estate and rental and leasing	0.0	0.0	10.2	10.2
Professional, scientific, and technical services	0.0	0.0	6.0	6.0
Management of companies and enterprises	0.0	0.0	0.6	0.6
Administrative and support and waste management and remediation services	0.0	0.0	7.1	7.1
Educational services	0.0	0.0	5.9	5.9
Health care and social assistance	0.0	0.0	32.6	32.6
Arts, entertainment, and recreation	0.0	0.0	4.6	4.6
Accommodation and food services	0.0	0.0	14.9	14.9
Other services (except public administration)	0.0	0.0	13.2	13.2
Public administration	0.0	0.0	2.0	2.0
Total	0.0	0.0	146.5	146.5

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 131: Initiatives to Double Transit Ridership by 2020—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$0	\$30,080	\$30,080
Mining	\$0	\$0	\$14,973	\$14,973
Utilities	\$0	\$0	\$487,072	\$487,072
Construction	\$0	\$0	\$177,979	\$177,979
Manufacturing	\$0	\$0	\$622,240	\$622,240
Wholesale trade	\$0	\$0	\$844,271	\$844,271
Retail trade	\$0	\$0	\$1,577,495	\$1,577,495
Transportation and warehousing	\$0	\$0	\$391,892	\$391,892
Information	\$0	\$0	\$799,564	\$799,564
Finance and insurance	\$0	\$0	\$2,281,964	\$2,281,964
Real estate and rental and leasing	\$0	\$0	\$4,072,022	\$4,072,022
Professional, scientific, and technical services	\$0	\$0	\$824,672	\$824,672
Management of companies and enterprises	\$0	\$0	\$136,137	\$136,137
Administrative and support and waste management and remediation services	\$0	\$0	\$516,908	\$516,908
Educational services	\$0	\$0	\$455,814	\$455,814
Health care and social assistance	\$0	\$0	\$3,510,438	\$3,510,438
Arts, entertainment, and recreation	\$0	\$0	\$236,027	\$236,027
Accommodation and food services	\$0	\$0	\$961,928	\$961,928
Other services (except public administration)	\$0	\$0	\$958,057	\$958,057
Public administration	\$0	\$0	\$410,250	\$410,250
Total	\$0	\$0	\$19,309,783	\$19,309,783

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 132: Initiatives to Double Transit Ridership by 2020—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$0	\$3,766	\$3,766
Mining	\$0	\$0	\$884	\$884
Utilities	\$0	\$0	\$65,509	\$65,509
Construction	\$0	\$0	\$62,603	\$62,603
Manufacturing	\$0	\$0	\$89,506	\$89,506
Wholesale trade	\$0	\$0	\$316,470	\$316,470
Retail trade	\$0	\$0	\$794,470	\$794,470
Transportation and warehousing	\$0	\$0	\$135,056	\$135,056
Information	\$0	\$0	\$170,242	\$170,242
Finance and insurance	\$0	\$0	\$637,559	\$637,559
Real estate and rental and leasing	\$0	\$0	\$153,529	\$153,529
Professional, scientific, and technical services	\$0	\$0	\$362,144	\$362,144
Management of companies and enterprises	\$0	\$0	\$73,585	\$73,585
Administrative and support and waste management and remediation services	\$0	\$0	\$227,187	\$227,187
Educational services	\$0	\$0	\$254,142	\$254,142
Health care and social assistance	\$0	\$0	\$1,688,217	\$1,688,217
Arts, entertainment, and recreation	\$0	\$0	\$86,561	\$86,561
Accommodation and food services	\$0	\$0	\$335,606	\$335,606
Other services (except public administration)	\$0	\$0	\$409,960	\$409,960
Public administration	\$0	\$0	\$146,088	\$146,088
Total	\$0	\$0	\$6,013,083	\$6,013,083

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 133: Intercity Transportation Initiatives—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	1.8	0.1	0.0	1.9
Manufacturing	0.4	0.1	0.0	0.5
Wholesale trade	0.2	0.1	0.1	0.4
Retail trade	0.0	0.1	0.6	0.7
Transportation and warehousing	2.5	0.1	0.1	2.7
Information	0.0	0.1	0.1	0.1
Finance and insurance	0.0	0.1	0.2	0.3
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	1.6	0.5	0.1	2.3
Management of companies and enterprises	0.0	0.0	0.0	0.1
Administrative and support and waste management and remediation services	0.0	0.4	0.2	0.5
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.7	0.7
Arts, entertainment, and recreation	0.0	0.0	0.1	0.1
Accommodation and food services	0.0	0.1	0.3	0.4
Other services (except public administration)	0.9	0.1	0.3	1.3
Public administration	0.4	0.0	0.0	0.4
Average	7.8	2.2	3.1	13.2

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 134: Intercity Transportation Initiatives—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$229	\$619	\$848
Mining	\$0	\$2,250	\$305	\$2,555
Utilities	\$0	\$9,280	\$9,598	\$18,878
Construction	\$242,857	\$8,858	\$3,879	\$255,594
Manufacturing	\$203,571	\$34,374	\$12,636	\$250,581
Wholesale trade	\$42,857	\$28,983	\$18,722	\$90,561
Retail trade	\$0	\$7,973	\$35,578	\$43,552
Transportation and warehousing	\$117,857	\$16,732	\$8,347	\$142,935
Information	\$0	\$20,455	\$16,764	\$37,219
Finance and insurance	\$0	\$30,485	\$50,721	\$81,206
Real estate and rental and leasing	\$0	\$31,943	\$87,385	\$119,328
Professional, scientific, and technical services	\$217,857	\$75,972	\$17,532	\$311,361
Management of companies and enterprises	\$0	\$10,582	\$2,865	\$13,447
Administrative and support and waste management and remediation services	\$0	\$28,886	\$10,946	\$39,832
Educational services	\$0	\$138	\$9,525	\$9,663
Health care and social assistance	\$0	\$3	\$72,575	\$72,579
Arts, entertainment, and recreation	\$0	\$1,639	\$5,110	\$6,748
Accommodation and food services	\$0	\$6,124	\$20,880	\$27,005
Other services (except public administration)	\$75,000	\$9,631	\$20,574	\$105,205
Public administration	\$100,000	\$8,193	\$8,471	\$116,665
Average	\$1,000,000	\$332,730	\$413,032	\$1,745,761

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 135: Intercity Transportation Initiatives—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$29	\$78	\$107
Mining	\$0	\$394	\$19	\$413
Utilities	\$0	\$1,203	\$1,290	\$2,493
Construction	\$90,512	\$3,438	\$1,358	\$95,308
Manufacturing	\$31,025	\$5,701	\$1,839	\$38,565
Wholesale trade	\$16,065	\$10,864	\$7,018	\$33,946
Retail trade	\$0	\$4,155	\$17,918	\$22,073
Transportation and warehousing	\$55,367	\$5,849	\$2,870	\$64,086
Information	\$0	\$4,421	\$3,590	\$8,012
Finance and insurance	\$0	\$8,575	\$14,102	\$22,676
Real estate and rental and leasing	\$0	\$3,117	\$3,035	\$6,152
Professional, scientific, and technical services	\$112,401	\$35,699	\$7,703	\$155,804
Management of companies and enterprises	\$0	\$5,720	\$1,548	\$7,268
Administrative and support and waste management and remediation services	\$0	\$13,326	\$4,811	\$18,137
Educational services	\$0	\$71	\$5,358	\$5,429
Health care and social assistance	\$0	\$1	\$34,935	\$34,936
Arts, entertainment, and recreation	\$0	\$561	\$1,862	\$2,422
Accommodation and food services	\$0	\$2,126	\$7,287	\$9,412
Other services (except public administration)	\$30,675	\$4,022	\$8,866	\$43,563
Public administration	\$25,247	\$3,363	\$3,043	\$31,652
Average	\$361,292	\$112,634	\$128,529	\$602,455

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 136: Intercity Transportation Initiatives—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.1	0.7	0.8
Mining	0.0	1.6	0.1	1.7
Utilities	0.0	1.2	1.0	2.2
Construction	0.0	24.0	2.8	26.8
Manufacturing	0.0	3.9	2.8	6.7
Wholesale trade	0.0	5.6	8.4	14.0
Retail trade	0.0	1.7	53.8	55.5
Transportation and warehousing	0.0	7.7	7.0	14.7
Information	0.0	2.5	5.0	7.6
Finance and insurance	0.0	13.1	20.1	33.2
Real estate and rental and leasing	0.0	19.2	20.0	39.2
Professional, scientific, and technical services	0.0	41.3	12.2	53.5
Management of companies and enterprises	0.0	0.7	1.3	2.0
Administrative and support and waste management and remediation services	0.0	29.6	14.5	44.1
Educational services	0.0	0.1	12.2	12.3
Health care and social assistance	0.0	0.0	65.7	65.7
Arts, entertainment, and recreation	0.0	2.0	9.4	11.4
Accommodation and food services	0.0	4.0	30.5	34.4
Other services (except public administration)	0.0	3.9	27.0	30.9
Public administration	158.3	6.6	4.0	169.0
Total	158.3	168.9	298.6	625.8

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 137: Intercity Transportation Initiatives—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$8,616	\$60,377	\$68,994
Mining	\$0	\$348,443	\$29,926	\$378,369
Utilities	\$0	\$1,288,276	\$962,061	\$2,250,337
Construction	\$0	\$3,027,448	\$364,858	\$3,392,306
Manufacturing	\$0	\$1,463,910	\$1,243,038	\$2,706,949
Wholesale trade	\$0	\$1,157,086	\$1,749,535	\$2,906,621
Retail trade	\$0	\$102,428	\$3,278,838	\$3,381,266
Transportation and warehousing	\$0	\$966,859	\$796,012	\$1,762,872
Information	\$0	\$830,914	\$1,616,714	\$2,447,629
Finance and insurance	\$0	\$2,947,187	\$4,717,338	\$7,664,525
Real estate and rental and leasing	\$0	\$3,467,928	\$8,298,708	\$11,766,636
Professional, scientific, and technical services	\$0	\$5,797,686	\$1,675,700	\$7,473,386
Management of companies and enterprises	\$0	\$155,955	\$275,585	\$431,541
Administrative and support and waste management and remediation services	\$0	\$2,576,711	\$1,048,198	\$3,624,908
Educational services	\$0	\$9,683	\$915,988	\$925,671
Health care and social assistance	\$0	\$319	\$7,054,396	\$7,054,715
Arts, entertainment, and recreation	\$0	\$75,456	\$482,336	\$557,792
Accommodation and food services	\$0	\$264,725	\$1,970,909	\$2,235,634
Other services (except public administration)	\$0	\$433,386	\$1,951,541	\$2,384,927
Public administration	\$44,210,136	\$1,730,846	\$824,082	\$46,765,064
Total	\$44,210,136	\$26,653,863	\$39,316,143	\$110,180,141

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 138: Intercity Transportation Initiatives—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$1,113	\$7,587	\$8,700
Mining	\$0	\$53,136	\$1,793	\$54,929
Utilities	\$0	\$149,993	\$129,374	\$279,367
Construction	\$0	\$1,169,008	\$128,110	\$1,297,117
Manufacturing	\$0	\$266,318	\$179,556	\$445,875
Wholesale trade	\$0	\$433,726	\$655,802	\$1,089,528
Retail trade	\$0	\$53,382	\$1,651,295	\$1,704,677
Transportation and warehousing	\$0	\$341,092	\$274,137	\$615,229
Information	\$0	\$183,195	\$344,989	\$528,184
Finance and insurance	\$0	\$864,347	\$1,315,813	\$2,180,159
Real estate and rental and leasing	\$0	\$272,862	\$303,587	\$576,449
Professional, scientific, and technical services	\$0	\$2,791,623	\$736,006	\$3,527,629
Management of companies and enterprises	\$0	\$84,296	\$148,959	\$233,255
Administrative and support and waste management and remediation services	\$0	\$1,036,445	\$460,696	\$1,497,141
Educational services	\$0	\$4,720	\$512,306	\$517,026
Health care and social assistance	\$0	\$117	\$3,393,701	\$3,393,818
Arts, entertainment, and recreation	\$0	\$26,132	\$176,432	\$202,564
Accommodation and food services	\$0	\$90,882	\$687,702	\$778,584
Other services (except public administration)	\$0	\$148,404	\$837,330	\$985,734
Public administration	\$11,161,520	\$475,264	\$294,391	\$11,931,175
Total	\$11,161,520	\$8,446,056	\$12,239,566	\$31,847,142

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 139: Bike and Pedestrian Initiatives—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.8	0.1	0.0	1.0
Manufacturing	0.3	0.1	0.0	0.4
Wholesale trade	0.5	0.1	0.1	0.7
Retail trade	0.0	0.0	0.6	0.6
Transportation and warehousing	0.0	0.2	0.1	0.2
Information	0.0	0.1	0.1	0.1
Finance and insurance	0.0	0.1	0.2	0.4
Real estate and rental and leasing	0.4	0.2	0.2	0.8
Professional, scientific, and technical services	2.0	0.6	0.1	2.8
Management of companies and enterprises	0.0	0.1	0.0	0.1
Administrative and support and waste management and remediation services	0.0	0.5	0.1	0.6
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.7	0.7
Arts, entertainment, and recreation	0.0	0.0	0.1	0.1
Accommodation and food services	0.0	0.1	0.3	0.4
Other services (except public administration)	0.0	0.1	0.3	0.4
Public administration	0.8	0.1	0.0	0.9
Average	4.9	2.5	3.1	10.4

Source: RESI

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Figure 140: Bike and Pedestrian Initiatives—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$148	\$609	\$756
Mining	\$0	\$2,412	\$300	\$2,712
Utilities	\$0	\$12,033	\$9,444	\$21,477
Construction	\$117,857	\$17,476	\$3,813	\$139,147
Manufacturing	\$235,714	\$31,582	\$12,432	\$279,728
Wholesale trade	\$107,143	\$29,647	\$18,425	\$155,216
Retail trade	\$0	\$2,212	\$34,974	\$37,186
Transportation and warehousing	\$0	\$18,132	\$8,206	\$26,338
Information	\$0	\$26,085	\$16,491	\$42,576
Finance and insurance	\$0	\$35,230	\$49,868	\$85,099
Real estate and rental and leasing	\$42,857	\$43,378	\$85,920	\$172,156
Professional, scientific, and technical services	\$267,857	\$86,430	\$17,243	\$371,530
Management of companies and enterprises	\$0	\$12,244	\$2,818	\$15,061
Administrative and support and waste management and remediation services	\$0	\$35,529	\$10,764	\$46,293
Educational services	\$0	\$179	\$9,356	\$9,534
Health care and social assistance	\$0	\$4	\$71,379	\$71,383
Arts, entertainment, and recreation	\$0	\$2,163	\$5,023	\$7,186
Accommodation and food services	\$0	\$7,027	\$20,534	\$27,561
Other services (except public administration)	\$0	\$9,287	\$20,225	\$29,512
Public administration	\$228,571	\$12,953	\$8,332	\$249,856
Average	\$1,000,000	\$384,152	\$406,156	\$1,790,308

Source: RESI

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Figure 141: Bike and Pedestrian Initiatives—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$19	\$77	\$96
Mining	\$0	\$381	\$18	\$399
Utilities	\$0	\$1,494	\$1,270	\$2,764
Construction	\$41,779	\$6,763	\$1,335	\$49,877
Manufacturing	\$50,066	\$4,924	\$1,809	\$56,799
Wholesale trade	\$40,162	\$11,113	\$6,907	\$58,182
Retail trade	\$0	\$1,153	\$17,613	\$18,766
Transportation and warehousing	\$0	\$6,571	\$2,822	\$9,393
Information	\$0	\$5,791	\$3,532	\$9,322
Finance and insurance	\$0	\$10,086	\$13,866	\$23,952
Real estate and rental and leasing	\$18,119	\$3,695	\$2,986	\$24,801
Professional, scientific, and technical services	\$135,221	\$40,738	\$7,576	\$183,535
Management of companies and enterprises	\$0	\$6,618	\$1,523	\$8,141
Administrative and support and waste management and remediation services	\$0	\$16,080	\$4,731	\$20,811
Educational services	\$0	\$91	\$5,262	\$5,353
Health care and social assistance	\$0	\$2	\$34,359	\$34,361
Arts, entertainment, and recreation	\$0	\$734	\$1,830	\$2,564
Accommodation and food services	\$0	\$2,436	\$7,166	\$9,602
Other services (except public administration)	\$0	\$3,575	\$8,715	\$12,290
Public administration	\$57,706	\$4,790	\$2,992	\$65,489
Average	\$343,053	\$127,053	\$126,389	\$596,495

Source: RESI

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Figure 142: Bike and Pedestrian Initiatives—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.3	0.3
Mining	0.0	0.0	0.1	0.1
Utilities	0.0	0.0	0.5	0.5
Construction	0.0	0.0	1.3	1.3
Manufacturing	0.0	0.0	1.3	1.3
Wholesale trade	0.0	0.0	3.8	3.8
Retail trade	0.0	0.0	24.0	24.0
Transportation and warehousing	0.0	0.0	3.2	3.2
Information	0.0	0.0	2.3	2.3
Finance and insurance	0.0	0.0	9.0	9.0
Real estate and rental and leasing	0.0	0.0	9.4	9.4
Professional, scientific, and technical services	0.0	0.0	5.5	5.5
Management of companies and enterprises	0.0	0.0	0.6	0.6
Administrative and support and waste management and remediation services	0.0	0.0	6.6	6.6
Educational services	0.0	0.0	5.5	5.5
Health care and social assistance	0.0	0.0	30.2	30.2
Arts, entertainment, and recreation	0.0	0.0	4.3	4.3
Accommodation and food services	0.0	0.0	13.8	13.8
Other services (except public administration)	0.0	0.0	12.2	12.2
Public administration	0.0	0.0	1.8	1.8
Total	0.0	0.0	135.6	135.6

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 143: Bike and Pedestrian Initiatives—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$0	\$27,842	\$27,842
Mining	\$0	\$0	\$13,859	\$13,859
Utilities	\$0	\$0	\$450,829	\$450,829
Construction	\$0	\$0	\$164,736	\$164,736
Manufacturing	\$0	\$0	\$575,939	\$575,939
Wholesale trade	\$0	\$0	\$781,448	\$781,448
Retail trade	\$0	\$0	\$1,460,112	\$1,460,112
Transportation and warehousing	\$0	\$0	\$362,731	\$362,731
Information	\$0	\$0	\$740,068	\$740,068
Finance and insurance	\$0	\$0	\$2,112,162	\$2,112,162
Real estate and rental and leasing	\$0	\$0	\$3,769,020	\$3,769,020
Professional, scientific, and technical services	\$0	\$0	\$763,308	\$763,308
Management of companies and enterprises	\$0	\$0	\$126,007	\$126,007
Administrative and support and waste management and remediation services	\$0	\$0	\$478,445	\$478,445
Educational services	\$0	\$0	\$421,896	\$421,896
Health care and social assistance	\$0	\$0	\$3,249,225	\$3,249,225
Arts, entertainment, and recreation	\$0	\$0	\$218,464	\$218,464
Accommodation and food services	\$0	\$0	\$890,350	\$890,350
Other services (except public administration)	\$0	\$0	\$886,767	\$886,767
Public administration	\$0	\$0	\$379,723	\$379,723
Total	\$0	\$0	\$17,872,933	\$17,872,933

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 144: Bike and Pedestrian Initiatives—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$0	\$3,486	\$3,486
Mining	\$0	\$0	\$818	\$818
Utilities	\$0	\$0	\$60,635	\$60,635
Construction	\$0	\$0	\$57,945	\$57,945
Manufacturing	\$0	\$0	\$82,846	\$82,846
Wholesale trade	\$0	\$0	\$292,921	\$292,921
Retail trade	\$0	\$0	\$735,353	\$735,353
Transportation and warehousing	\$0	\$0	\$125,007	\$125,007
Information	\$0	\$0	\$157,574	\$157,574
Finance and insurance	\$0	\$0	\$590,118	\$590,118
Real estate and rental and leasing	\$0	\$0	\$142,105	\$142,105
Professional, scientific, and technical services	\$0	\$0	\$335,197	\$335,197
Management of companies and enterprises	\$0	\$0	\$68,109	\$68,109
Administrative and support and waste management and remediation services	\$0	\$0	\$210,282	\$210,282
Educational services	\$0	\$0	\$235,231	\$235,231
Health care and social assistance	\$0	\$0	\$1,562,596	\$1,562,596
Arts, entertainment, and recreation	\$0	\$0	\$80,120	\$80,120
Accommodation and food services	\$0	\$0	\$310,633	\$310,633
Other services (except public administration)	\$0	\$0	\$379,454	\$379,454
Public administration	\$0	\$0	\$135,217	\$135,217
Total	\$0	\$0	\$5,565,646	\$5,565,646

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 145: Pricing Initiatives—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.8	0.2	0.0	0.9
Manufacturing	0.2	0.1	0.0	0.3
Wholesale trade	0.0	0.1	0.1	0.2
Retail trade	0.0	0.0	0.6	0.7
Transportation and warehousing	1.1	0.1	0.1	1.3
Information	0.0	0.1	0.1	0.2
Finance and insurance	0.0	0.2	0.2	0.4
Real estate and rental and leasing	0.0	0.3	0.2	0.5
Professional, scientific, and technical services	3.6	0.7	0.1	4.4
Management of companies and enterprises	0.0	0.0	0.0	0.1
Administrative and support and waste management and remediation services	0.0	0.6	0.2	0.7
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.7	0.7
Arts, entertainment, and recreation	0.0	0.1	0.1	0.2
Accommodation and food services	0.0	0.1	0.4	0.5
Other services (except public administration)	0.4	0.1	0.3	0.8
Public administration	0.9	0.1	0.0	1.0
Average	6.9	2.8	3.4	13.0

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 146: Pricing Initiatives—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$164	\$672	\$835
Mining	\$0	\$2,681	\$331	\$3,012
Utilities	\$0	\$11,714	\$10,408	\$22,123
Construction	\$100,000	\$19,014	\$4,212	\$123,226
Manufacturing	\$75,000	\$19,345	\$13,705	\$108,050
Wholesale trade	\$0	\$18,025	\$20,297	\$38,322
Retail trade	\$0	\$3,000	\$38,642	\$41,643
Transportation and warehousing	\$50,000	\$15,409	\$9,063	\$74,473
Information	\$0	\$35,555	\$18,189	\$53,744
Finance and insurance	\$0	\$40,749	\$55,074	\$95,823
Real estate and rental and leasing	\$0	\$49,293	\$94,878	\$144,170
Professional, scientific, and technical services	\$475,000	\$100,617	\$19,028	\$594,645
Management of companies and enterprises	\$0	\$8,495	\$3,108	\$11,603
Administrative and support and waste management and remediation services	\$0	\$42,577	\$11,883	\$54,460
Educational services	\$0	\$166	\$10,357	\$10,523
Health care and social assistance	\$0	\$6	\$78,764	\$78,769
Arts, entertainment, and recreation	\$0	\$3,345	\$5,550	\$8,895
Accommodation and food services	\$0	\$9,331	\$22,663	\$31,994
Other services (except public administration)	\$50,000	\$9,465	\$22,346	\$81,811
Public administration	\$250,000	\$14,051	\$9,193	\$273,245
Average	\$1,000,000	\$403,003	\$448,364	\$1,851,367

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 147: Pricing Initiatives—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$22	\$85	\$107
Mining	\$0	\$427	\$20	\$447
Utilities	\$0	\$1,458	\$1,399	\$2,857
Construction	\$37,660	\$7,356	\$1,475	\$46,490
Manufacturing	\$21,711	\$3,890	\$1,995	\$27,595
Wholesale trade	\$0	\$6,756	\$7,608	\$14,365
Retail trade	\$0	\$1,564	\$19,461	\$21,024
Transportation and warehousing	\$23,489	\$5,590	\$3,116	\$32,195
Information	\$0	\$7,886	\$3,896	\$11,782
Finance and insurance	\$0	\$11,395	\$15,309	\$26,704
Real estate and rental and leasing	\$0	\$4,227	\$3,291	\$7,519
Professional, scientific, and technical services	\$217,522	\$46,628	\$8,361	\$272,510
Management of companies and enterprises	\$0	\$4,592	\$1,680	\$6,272
Administrative and support and waste management and remediation services	\$0	\$19,610	\$5,222	\$24,833
Educational services	\$0	\$85	\$5,827	\$5,912
Health care and social assistance	\$0	\$2	\$37,915	\$37,917
Arts, entertainment, and recreation	\$0	\$1,033	\$2,022	\$3,054
Accommodation and food services	\$0	\$3,236	\$7,909	\$11,145
Other services (except public administration)	\$9,308	\$3,793	\$9,630	\$22,731
Public administration	\$63,116	\$5,165	\$3,303	\$71,584
Average	\$372,806	\$134,713	\$139,524	\$647,044

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 148: Pricing Initiatives—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	1.4	5.1	6.5
Mining	0.0	27.2	0.9	28.1
Utilities	0.0	20.8	6.8	27.6
Construction	0.0	404.1	20.3	424.3
Manufacturing	0.0	65.6	19.4	85.0
Wholesale trade	0.0	93.7	61.1	154.9
Retail trade	0.0	28.3	392.7	421.0
Transportation and warehousing	0.0	128.9	49.6	178.5
Information	0.0	42.9	35.6	78.5
Finance and insurance	0.0	220.7	145.4	366.1
Real estate and rental and leasing	0.0	323.7	135.2	458.9
Professional, scientific, and technical services	0.0	696.4	86.5	782.8
Management of companies and enterprises	0.0	12.2	9.0	21.1
Administrative and support and waste management and remediation services	0.0	499.2	102.5	601.7
Educational services	0.0	2.2	86.9	89.1
Health care and social assistance	0.0	0.0	460.1	460.1
Arts, entertainment, and recreation	0.0	33.6	67.1	100.7
Accommodation and food services	0.0	66.7	218.3	285.0
Other services (except public administration)	0.0	65.7	192.8	258.4
Public administration	2,666.5	111.9	28.2	2806.6
Total	2,666.5	2845.3	2123.2	7635.0

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 149: Pricing Initiatives—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$145,132	\$420,142	\$565,274
Mining	\$0	\$5,869,017	\$206,969	\$6,075,987
Utilities	\$0	\$21,699,125	\$6,540,438	\$28,239,563
Construction	\$0	\$50,992,937	\$2,614,190	\$53,607,126
Manufacturing	\$0	\$24,657,431	\$8,591,200	\$33,248,630
Wholesale trade	\$0	\$19,489,420	\$12,717,047	\$32,206,468
Retail trade	\$0	\$1,725,246	\$23,927,921	\$25,653,167
Transportation and warehousing	\$0	\$16,285,335	\$5,632,067	\$21,917,402
Information	\$0	\$13,995,541	\$11,366,919	\$25,362,460
Finance and insurance	\$0	\$49,641,067	\$34,179,852	\$83,820,919
Real estate and rental and leasing	\$0	\$58,412,180	\$58,985,990	\$117,398,169
Professional, scientific, and technical services	\$0	\$97,653,558	\$11,862,269	\$109,515,827
Management of companies and enterprises	\$0	\$2,626,835	\$1,940,716	\$4,567,551
Administrative and support and waste management and remediation services	\$0	\$43,400,929	\$7,399,303	\$50,800,232
Educational services	\$0	\$163,103	\$6,384,600	\$6,547,703
Health care and social assistance	\$0	\$5,378	\$49,169,826	\$49,175,204
Arts, entertainment, and recreation	\$0	\$1,270,946	\$3,441,202	\$4,712,148
Accommodation and food services	\$0	\$4,458,905	\$14,111,325	\$18,570,230
Other services (except public administration)	\$0	\$7,299,752	\$13,861,905	\$21,161,657
Public administration	\$744,655,182	\$29,153,570	\$5,740,618	\$779,549,370
Total	\$744,655,182	\$448,945,407	\$279,094,498	\$1,472,695,087

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 150: Pricing Initiatives—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$18,750	\$53,074	\$71,824
Mining	\$0	\$894,992	\$12,673	\$907,665
Utilities	\$0	\$2,526,413	\$879,338	\$3,405,751
Construction	\$0	\$19,690,226	\$915,699	\$20,605,925
Manufacturing	\$0	\$4,485,745	\$1,248,462	\$5,734,207
Wholesale trade	\$0	\$7,305,485	\$4,766,904	\$12,072,389
Retail trade	\$0	\$899,149	\$12,050,441	\$12,949,590
Transportation and warehousing	\$0	\$5,745,191	\$1,937,760	\$7,682,951
Information	\$0	\$3,085,653	\$2,433,043	\$5,518,696
Finance and insurance	\$0	\$14,558,659	\$9,513,029	\$24,071,689
Real estate and rental and leasing	\$0	\$4,595,962	\$2,067,298	\$6,663,260
Professional, scientific, and technical services	\$0	\$47,020,808	\$5,211,588	\$52,232,396
Management of companies and enterprises	\$0	\$1,419,851	\$1,048,991	\$2,468,842
Administrative and support and waste management and remediation services	\$0	\$17,457,398	\$3,252,095	\$20,709,494
Educational services	\$0	\$79,507	\$3,586,578	\$3,666,086
Health care and social assistance	\$0	\$1,974	\$23,665,739	\$23,667,712
Arts, entertainment, and recreation	\$0	\$440,158	\$1,254,280	\$1,694,438
Accommodation and food services	\$0	\$1,530,782	\$4,924,530	\$6,455,311
Other services (except public administration)	\$0	\$2,499,649	\$5,969,524	\$8,469,173
Public administration	\$187,999,507	\$8,005,126	\$2,060,028	\$198,064,661
Total	\$187,999,507	\$142,261,478	\$86,851,074	\$417,112,058

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 151: Transportation Technology Initiatives—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.0	0.0
Mining	-0.5	0.0	0.0	-0.5
Utilities	0.1	0.0	0.0	0.1
Construction	0.0	0.1	0.0	0.1
Manufacturing	1.0	0.1	0.0	1.1
Wholesale trade	0.1	0.2	0.1	0.3
Retail trade	-0.1	0.1	0.6	0.6
Transportation and warehousing	0.0	0.1	0.1	0.2
Information	0.0	0.1	0.1	0.2
Finance and insurance	0.0	0.1	0.2	0.3
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	4.0	0.5	0.1	4.7
Management of companies and enterprises	-0.1	0.1	0.0	-0.1
Administrative and support and waste management and remediation services	0.2	0.5	0.1	0.8
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.7	0.7
Arts, entertainment, and recreation	0.0	0.1	0.1	0.2
Accommodation and food services	0.0	0.2	0.3	0.5
Other services (except public administration)	0.0	0.1	0.3	0.4
Public administration	0.4	0.0	0.0	0.5
Average	5.1	2.4	3.1	10.6

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 152: Transportation Technology Initiatives—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$10	\$609	\$619
Mining	-\$166,667	\$292	\$300	-\$166,075
Utilities	\$75,000	\$7,226	\$9,443	\$91,668
Construction	\$0	\$9,631	\$3,811	\$13,442
Manufacturing	\$431,667	\$28,187	\$12,429	\$472,282
Wholesale trade	\$20,000	\$33,141	\$18,424	\$71,564
Retail trade	-\$7,778	\$7,357	\$34,951	\$34,530
Transportation and warehousing	\$0	\$15,814	\$8,201	\$24,015
Information	\$0	\$31,690	\$16,485	\$48,176
Finance and insurance	\$0	\$28,961	\$49,840	\$78,800
Real estate and rental and leasing	\$0	\$30,495	\$85,873	\$116,368
Professional, scientific, and technical services	\$533,333	\$77,000	\$17,235	\$627,569
Management of companies and enterprises	-\$27,778	\$13,115	\$2,817	-\$11,846
Administrative and support and waste management and remediation services	\$20,000	\$36,542	\$10,759	\$67,301
Educational services	\$0	\$151	\$9,346	\$9,497
Health care and social assistance	\$0	\$14	\$71,349	\$71,363
Arts, entertainment, and recreation	\$0	\$2,810	\$5,020	\$7,829
Accommodation and food services	\$0	\$9,911	\$20,525	\$30,436
Other services (except public administration)	\$0	\$7,908	\$20,211	\$28,119
Public administration	\$122,222	\$8,888	\$8,329	\$139,439
Average	\$1,000,000	\$349,142	\$405,955	\$1,755,096

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 153: Transportation Technology Initiatives—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$4	\$77	\$81
Mining	-\$20,940	-\$111	\$18	-\$21,033
Utilities	\$10,958	\$943	\$1,269	\$13,170
Construction	\$0	\$3,725	\$1,334	\$5,060
Manufacturing	\$74,455	\$5,181	\$1,808	\$81,444
Wholesale trade	\$7,497	\$12,423	\$6,906	\$26,825
Retail trade	-\$3,017	\$3,835	\$17,602	\$18,420
Transportation and warehousing	\$0	\$5,686	\$2,820	\$8,507
Information	\$0	\$7,284	\$3,530	\$10,814
Finance and insurance	\$0	\$7,899	\$13,859	\$21,758
Real estate and rental and leasing	\$0	\$2,657	\$2,986	\$5,643
Professional, scientific, and technical services	\$260,729	\$35,136	\$7,573	\$303,438
Management of companies and enterprises	-\$15,014	\$7,089	\$1,522	-\$6,403
Administrative and support and waste management and remediation services	\$6,056	\$17,339	\$4,728	\$28,124
Educational services	\$0	\$78	\$5,256	\$5,335
Health care and social assistance	\$0	\$5	\$34,345	\$34,349
Arts, entertainment, and recreation	\$0	\$924	\$1,829	\$2,753
Accommodation and food services	\$0	\$3,445	\$7,163	\$10,608
Other services (except public administration)	\$0	\$2,963	\$8,709	\$11,672
Public administration	\$30,857	\$3,789	\$2,991	\$37,637
Average	\$351,581	\$120,293	\$126,326	\$598,200

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 154: Transportation Technology Initiatives—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.1	1.8	1.9
Mining	0.0	0.7	0.3	1.0
Utilities	0.0	0.8	2.5	3.3
Construction	0.0	7.5	7.1	14.6
Manufacturing	39.4	4.1	7.0	50.5
Wholesale trade	0.0	12.6	21.0	33.6
Retail trade	0.0	10.7	135.2	145.8
Transportation and warehousing	470.2	80.1	17.7	568.0
Information	0.0	5.9	12.6	18.5
Finance and insurance	0.0	16.2	50.3	66.5
Real estate and rental and leasing	0.0	16.7	50.1	66.7
Professional, scientific, and technical services	32.9	31.5	30.6	94.9
Management of companies and enterprises	0.0	5.4	3.2	8.6
Administrative and support and waste management and remediation services	0.0	71.4	36.4	107.8
Educational services	0.0	0.1	30.7	30.8
Health care and social assistance	0.0	0.0	165.0	165.0
Arts, entertainment, and recreation	0.0	2.3	23.7	26.0
Accommodation and food services	0.0	5.6	76.4	82.0
Other services (except public administration)	0.0	9.0	68.0	77.1
Public administration	38.7	20.6	10.1	69.4
Total	581.2	301.3	749.7	1,632.2

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 155: Transportation Technology Initiatives—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$6,118	\$151,384	\$157,501
Mining	\$0	\$160,060	\$75,047	\$235,107
Utilities	\$0	\$790,032	\$2,411,163	\$3,201,195
Construction	\$0	\$948,819	\$916,698	\$1,865,517
Manufacturing	\$14,175,000	\$2,021,356	\$3,115,049	\$19,311,405
Wholesale trade	\$0	\$2,625,926	\$4,365,484	\$6,991,410
Retail trade	\$0	\$649,805	\$8,236,390	\$8,886,194
Transportation and warehousing	\$67,943,662	\$9,053,027	\$2,000,634	\$78,997,323
Information	\$0	\$2,066,909	\$4,052,375	\$6,119,284
Finance and insurance	\$0	\$4,291,461	\$11,840,801	\$16,132,262
Real estate and rental and leasing	\$0	\$3,206,870	\$20,843,453	\$24,050,322
Professional, scientific, and technical services	\$4,725,000	\$4,415,798	\$4,203,570	\$13,344,368
Management of companies and enterprises	\$0	\$1,161,157	\$691,032	\$1,852,189
Administrative and support and waste management and remediation services	\$0	\$4,851,537	\$2,631,844	\$7,483,381
Educational services	\$0	\$8,545	\$2,315,725	\$2,324,270
Health care and social assistance	\$0	\$231	\$17,705,997	\$17,706,228
Arts, entertainment, and recreation	\$0	\$99,711	\$1,212,974	\$1,312,684
Accommodation and food services	\$0	\$369,353	\$4,942,733	\$5,312,086
Other services (except public administration)	\$0	\$838,358	\$4,908,110	\$5,746,467
Public administration	\$10,803,625	\$2,691,022	\$2,068,218	\$15,562,865
Total	\$97,647,287	\$40,256,093	\$98,688,679	\$236,592,059

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 156: Transportation Technology Initiatives—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$929	\$19,034	\$19,962
Mining	\$0	\$14,504	\$4,502	\$19,006
Utilities	\$0	\$100,217	\$324,230	\$424,447
Construction	\$0	\$367,941	\$321,824	\$689,765
Manufacturing	\$2,670,746	\$291,791	\$450,119	\$3,412,656
Wholesale trade	\$0	\$984,312	\$1,636,374	\$2,620,686
Retail trade	\$0	\$338,660	\$4,148,026	\$4,486,686
Transportation and warehousing	\$17,868,165	\$3,267,371	\$688,797	\$21,824,334
Information	\$0	\$441,459	\$864,790	\$1,306,249
Finance and insurance	\$0	\$1,156,344	\$3,300,950	\$4,457,294
Real estate and rental and leasing	\$0	\$262,213	\$760,946	\$1,023,159
Professional, scientific, and technical services	\$2,342,565	\$2,061,320	\$1,846,367	\$6,250,253
Management of companies and enterprises	\$0	\$627,626	\$373,515	\$1,001,141
Administrative and support and waste management and remediation services	\$0	\$2,459,593	\$1,156,658	\$3,616,251
Educational services	\$0	\$4,301	\$1,295,866	\$1,300,167
Health care and social assistance	\$0	\$85	\$8,518,231	\$8,518,316
Arts, entertainment, and recreation	\$0	\$34,060	\$443,678	\$477,738
Accommodation and food services	\$0	\$127,699	\$1,724,644	\$1,852,343
Other services (except public administration)	\$0	\$336,570	\$2,106,157	\$2,442,727
Public administration	\$2,727,539	\$1,713,431	\$738,988	\$5,179,958
Total	\$25,609,015	\$14,590,424	\$30,723,697	\$70,923,137

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 157: Electric Vehicle Initiatives—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.1	0.0	0.0	0.1
Construction	1.0	0.1	0.0	1.1
Manufacturing	0.6	0.1	0.0	0.7
Wholesale trade	0.3	0.2	0.1	0.5
Retail trade	0.2	0.2	0.5	0.9
Transportation and warehousing	0.0	0.1	0.1	0.2
Information	0.0	0.1	0.0	0.1
Finance and insurance	0.0	0.1	0.2	0.3
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	2.1	0.5	0.1	2.7
Management of companies and enterprises	0.0	0.1	0.0	0.1
Administrative and support and waste management and remediation services	0.1	0.4	0.1	0.7
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.6	0.6
Arts, entertainment, and recreation	0.0	0.0	0.1	0.1
Accommodation and food services	0.0	0.1	0.3	0.4
Other services (except public administration)	0.5	0.1	0.3	0.9
Public administration	0.4	0.0	0.0	0.4
Average	5.2	2.3	2.8	10.4

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 158: Electric Vehicle Initiatives—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$154	\$558	\$712
Mining	\$0	\$2,147	\$275	\$2,422
Utilities	\$90,000	\$9,065	\$8,648	\$107,713
Construction	\$135,000	\$11,128	\$3,501	\$149,629
Manufacturing	\$270,000	\$37,469	\$11,388	\$318,857
Wholesale trade	\$52,500	\$31,339	\$16,864	\$100,703
Retail trade	\$15,000	\$9,608	\$32,115	\$56,723
Transportation and warehousing	\$0	\$18,740	\$7,532	\$26,272
Information	\$0	\$23,627	\$15,114	\$38,741
Finance and insurance	\$0	\$27,413	\$45,768	\$73,182
Real estate and rental and leasing	\$0	\$34,210	\$78,846	\$113,056
Professional, scientific, and technical services	\$277,500	\$74,324	\$15,812	\$367,636
Management of companies and enterprises	\$0	\$11,518	\$2,583	\$14,101
Administrative and support and waste management and remediation services	\$15,000	\$28,910	\$9,875	\$53,785
Educational services	\$0	\$167	\$8,609	\$8,776
Health care and social assistance	\$0	\$10	\$65,451	\$65,461
Arts, entertainment, and recreation	\$0	\$2,037	\$4,613	\$6,649
Accommodation and food services	\$0	\$7,601	\$18,833	\$26,434
Other services (except public administration)	\$45,000	\$8,435	\$18,571	\$72,006
Public administration	\$100,000	\$8,109	\$7,639	\$115,748
Average	\$1,000,000	\$346,012	\$372,594	\$1,718,606

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 159: Electric Vehicle Initiatives—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$21	\$71	\$92
Mining	\$0	\$252	\$17	\$269
Utilities	\$13,150	\$1,164	\$1,163	\$15,476
Construction	\$47,856	\$4,342	\$1,225	\$53,423
Manufacturing	\$32,361	\$6,128	\$1,657	\$40,147
Wholesale trade	\$19,679	\$11,747	\$6,321	\$37,748
Retail trade	\$5,819	\$5,006	\$16,173	\$26,998
Transportation and warehousing	\$0	\$6,450	\$2,590	\$9,040
Information	\$0	\$5,249	\$3,237	\$8,486
Finance and insurance	\$0	\$7,757	\$12,722	\$20,479
Real estate and rental and leasing	\$0	\$3,059	\$2,735	\$5,794
Professional, scientific, and technical services	\$138,502	\$34,297	\$6,948	\$179,746
Management of companies and enterprises	\$0	\$6,225	\$1,396	\$7,622
Administrative and support and waste management and remediation services	\$4,542	\$13,426	\$4,340	\$22,308
Educational services	\$0	\$86	\$4,844	\$4,930
Health care and social assistance	\$0	\$4	\$31,506	\$31,510
Arts, entertainment, and recreation	\$0	\$688	\$1,680	\$2,369
Accommodation and food services	\$0	\$2,641	\$6,572	\$9,213
Other services (except public administration)	\$18,405	\$3,392	\$8,004	\$29,801
Public administration	\$25,247	\$3,422	\$2,744	\$31,413
Average	\$305,561	\$115,357	\$115,946	\$536,863

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 160: Electric Vehicle Initiatives—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.1	0.1
Mining	0.0	0.1	0.0	0.1
Utilities	0.0	0.1	0.1	0.2
Construction	0.0	2.0	0.2	2.2
Manufacturing	0.0	0.3	0.2	0.5
Wholesale trade	0.0	0.5	0.6	1.1
Retail trade	0.0	0.1	4.1	4.2
Transportation and warehousing	0.0	0.6	0.5	1.2
Information	0.0	0.2	0.4	0.6
Finance and insurance	0.0	1.1	1.5	2.6
Real estate and rental and leasing	0.0	1.6	1.5	3.1
Professional, scientific, and technical services	0.0	3.4	0.9	4.3
Management of companies and enterprises	0.0	0.1	0.1	0.2
Administrative and support and waste management and remediation services	0.0	2.4	1.1	3.5
Educational services	0.0	0.0	0.9	0.9
Health care and social assistance	0.0	0.0	5.0	5.0
Arts, entertainment, and recreation	0.0	0.2	0.7	0.9
Accommodation and food services	0.0	0.3	2.3	2.6
Other services (except public administration)	0.0	0.3	2.0	2.3
Public administration	12.8	0.5	0.3	13.7
Total	12.9	13.8	22.5	49.2

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 161: Electric Vehicle Initiatives—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$702	\$4,568	\$5,271
Mining	\$0	\$28,562	\$2,264	\$30,826
Utilities	\$39,446	\$104,590	\$72,902	\$216,938
Construction	\$0	\$246,686	\$27,502	\$274,188
Manufacturing	\$0	\$119,000	\$94,145	\$213,145
Wholesale trade	\$0	\$94,169	\$133,060	\$227,229
Retail trade	\$0	\$8,348	\$247,268	\$255,616
Transportation and warehousing	\$0	\$79,706	\$59,988	\$139,694
Information	\$0	\$68,065	\$122,360	\$190,424
Finance and insurance	\$0	\$239,849	\$355,887	\$595,736
Real estate and rental and leasing	\$0	\$281,955	\$625,972	\$907,927
Professional, scientific, and technical services	\$0	\$472,044	\$126,615	\$598,659
Management of companies and enterprises	\$0	\$12,703	\$20,838	\$33,541
Administrative and support and waste management and remediation services	\$0	\$209,452	\$79,112	\$288,564
Educational services	\$0	\$791	\$68,547	\$69,339
Health care and social assistance	\$0	\$26	\$532,729	\$532,755
Arts, entertainment, and recreation	\$0	\$6,170	\$36,305	\$42,475
Accommodation and food services	\$0	\$22,007	\$148,957	\$170,964
Other services (except public administration)	\$0	\$35,251	\$146,869	\$182,120
Public administration	\$3,587,397	\$140,554	\$62,266	\$3,790,217
Total	\$3,626,843	\$2,170,631	\$2,968,155	\$8,765,629

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 162: Electric Vehicle Initiatives—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$91	\$573	\$664
Mining	\$0	\$4,315	\$135	\$4,450
Utilities	\$5,763	\$12,178	\$9,804	\$27,746
Construction	\$0	\$95,267	\$9,659	\$104,926
Manufacturing	\$0	\$21,647	\$13,590	\$35,237
Wholesale trade	\$0	\$35,299	\$49,877	\$85,175
Retail trade	\$0	\$4,351	\$124,530	\$128,880
Transportation and warehousing	\$0	\$28,036	\$20,668	\$48,704
Information	\$0	\$15,017	\$26,105	\$41,122
Finance and insurance	\$0	\$70,338	\$99,349	\$169,687
Real estate and rental and leasing	\$0	\$22,190	\$22,991	\$45,181
Professional, scientific, and technical services	\$0	\$227,134	\$55,609	\$282,743
Management of companies and enterprises	\$0	\$6,866	\$11,264	\$18,130
Administrative and support and waste management and remediation services	\$0	\$84,263	\$34,773	\$119,036
Educational services	\$0	\$386	\$38,304	\$38,690
Health care and social assistance	\$0	\$10	\$256,260	\$256,269
Arts, entertainment, and recreation	\$0	\$2,138	\$13,282	\$15,420
Accommodation and food services	\$0	\$7,558	\$51,975	\$59,533
Other services (except public administration)	\$0	\$12,084	\$63,001	\$75,085
Public administration	\$905,693	\$38,620	\$22,233	\$966,546
Total	\$911,456	\$687,788	\$923,982	\$2,523,226

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 163: Low-Emitting Vehicles Initiatives—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.1	0.0	0.1
Manufacturing	1.3	0.1	0.0	1.4
Wholesale trade	0.7	0.3	0.1	1.0
Retail trade	0.0	0.2	0.4	0.6
Transportation and warehousing	0.0	0.2	0.0	0.2
Information	0.0	0.1	0.0	0.1
Finance and insurance	0.0	0.1	0.1	0.2
Real estate and rental and leasing	0.0	0.1	0.1	0.3
Professional, scientific, and technical services	0.4	0.3	0.1	0.9
Management of companies and enterprises	0.0	0.1	0.0	0.1
Administrative and support and waste management and remediation services	0.0	0.3	0.1	0.4
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.5	0.5
Arts, entertainment, and recreation	0.0	0.0	0.1	0.1
Accommodation and food services	0.0	0.1	0.2	0.3
Other services (except public administration)	0.8	0.1	0.2	1.0
Public administration	0.4	0.0	0.0	0.4
Average	3.6	2.1	2.1	7.8

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 164: Low-Emitting Vehicles Initiatives—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$101	\$419	\$520
Mining	\$0	\$1,069	\$206	\$1,275
Utilities	\$0	\$11,363	\$6,505	\$17,868
Construction	\$0	\$9,182	\$2,619	\$11,802
Manufacturing	\$621,429	\$58,870	\$8,559	\$688,857
Wholesale trade	\$150,000	\$54,032	\$12,697	\$216,729
Retail trade	\$0	\$11,033	\$24,014	\$35,047
Transportation and warehousing	\$0	\$21,598	\$5,637	\$27,235
Information	\$0	\$19,555	\$11,346	\$30,901
Finance and insurance	\$0	\$22,026	\$34,260	\$56,286
Real estate and rental and leasing	\$0	\$28,834	\$59,036	\$87,870
Professional, scientific, and technical services	\$64,286	\$47,731	\$11,856	\$123,873
Management of companies and enterprises	\$0	\$20,693	\$1,938	\$22,631
Administrative and support and waste management and remediation services	\$0	\$21,768	\$7,399	\$29,166
Educational services	\$0	\$174	\$6,408	\$6,582
Health care and social assistance	\$0	\$3	\$49,087	\$49,090
Arts, entertainment, and recreation	\$0	\$1,307	\$3,449	\$4,755
Accommodation and food services	\$0	\$4,136	\$14,118	\$18,254
Other services (except public administration)	\$64,286	\$5,556	\$13,886	\$83,728
Public administration	\$100,000	\$8,420	\$5,730	\$114,150
Average	\$1,000,000	\$347,450	\$279,168	\$1,626,619

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 165: Low-Emitting Vehicles Initiatives—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$14	\$53	\$67
Mining	\$0	\$142	\$13	\$155
Utilities	\$0	\$1,435	\$874	\$2,310
Construction	\$0	\$3,568	\$917	\$4,485
Manufacturing	\$80,666	\$8,864	\$1,245	\$90,774
Wholesale trade	\$56,227	\$20,254	\$4,759	\$81,239
Retail trade	\$0	\$5,750	\$12,094	\$17,844
Transportation and warehousing	\$0	\$7,696	\$1,939	\$9,635
Information	\$0	\$4,390	\$2,430	\$6,820
Finance and insurance	\$0	\$6,347	\$9,529	\$15,876
Real estate and rental and leasing	\$0	\$2,396	\$2,057	\$4,452
Professional, scientific, and technical services	\$31,872	\$21,732	\$5,209	\$58,813
Management of companies and enterprises	\$0	\$11,185	\$1,048	\$12,233
Administrative and support and waste management and remediation services	\$0	\$9,726	\$3,252	\$12,978
Educational services	\$0	\$89	\$3,603	\$3,692
Health care and social assistance	\$0	\$1	\$23,628	\$23,629
Arts, entertainment, and recreation	\$0	\$463	\$1,257	\$1,720
Accommodation and food services	\$0	\$1,433	\$4,927	\$6,360
Other services (except public administration)	\$26,293	\$2,310	\$5,983	\$34,586
Public administration	\$25,247	\$3,603	\$2,058	\$30,907
Average	\$220,303	\$111,399	\$86,872	\$418,574

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 166: Low-Emitting Vehicles Initiatives—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.0	0.0	0.0
Manufacturing	0.0	0.0	0.0	0.0
Wholesale trade	0.0	0.0	0.0	0.0
Retail trade	0.0	0.0	0.0	0.0
Transportation and warehousing	0.0	0.0	0.0	0.0
Information	0.0	0.0	0.0	0.0
Finance and insurance	0.0	0.0	0.0	0.0
Real estate and rental and leasing	0.0	0.0	0.0	0.0
Professional, scientific, and technical services	0.0	0.0	0.0	0.0
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.0	0.0	0.0
Educational services	0.0	0.0	0.0	0.0
Health care and social assistance	0.0	0.0	0.0	0.0
Arts, entertainment, and recreation	0.0	0.0	0.0	0.0
Accommodation and food services	0.0	0.0	0.0	0.0
Other services (except public administration)	0.0	0.0	0.0	0.0
Public administration	0.1	0.0	0.0	0.1
Total	0.1	0.1	0.0	0.2

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 167: Low-Emitting Vehicles Initiatives—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$3	\$9	\$12
Mining	\$0	\$132	\$4	\$137
Utilities	\$0	\$488	\$141	\$630
Construction	\$0	\$1,148	\$57	\$1,204
Manufacturing	\$0	\$555	\$186	\$741
Wholesale trade	\$0	\$439	\$276	\$714
Retail trade	\$0	\$39	\$519	\$558
Transportation and warehousing	\$0	\$367	\$122	\$488
Information	\$0	\$315	\$246	\$561
Finance and insurance	\$0	\$1,117	\$741	\$1,858
Real estate and rental and leasing	\$0	\$1,315	\$1,277	\$2,592
Professional, scientific, and technical services	\$0	\$2,198	\$257	\$2,455
Management of companies and enterprises	\$0	\$59	\$42	\$101
Administrative and support and waste management and remediation services	\$0	\$977	\$160	\$1,137
Educational services	\$0	\$4	\$138	\$142
Health care and social assistance	\$0	\$0	\$1,063	\$1,063
Arts, entertainment, and recreation	\$0	\$29	\$75	\$103
Accommodation and food services	\$0	\$100	\$306	\$406
Other services (except public administration)	\$0	\$164	\$300	\$464
Public administration	\$16,760	\$656	\$124	\$17,540
Total	\$16,760	\$10,105	\$6,042	\$32,907

Source: RESI

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Figure 168: Low-Emitting Vehicles Initiatives—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$0	\$1	\$2
Mining	\$0	\$20	\$0	\$20
Utilities	\$0	\$57	\$19	\$76
Construction	\$0	\$443	\$20	\$463
Manufacturing	\$0	\$101	\$27	\$128
Wholesale trade	\$0	\$164	\$103	\$268
Retail trade	\$0	\$20	\$261	\$282
Transportation and warehousing	\$0	\$129	\$42	\$171
Information	\$0	\$69	\$53	\$122
Finance and insurance	\$0	\$328	\$206	\$534
Real estate and rental and leasing	\$0	\$103	\$45	\$148
Professional, scientific, and technical services	\$0	\$1,058	\$113	\$1,171
Management of companies and enterprises	\$0	\$32	\$23	\$55
Administrative and support and waste management and remediation services	\$0	\$393	\$70	\$463
Educational services	\$0	\$2	\$78	\$79
Health care and social assistance	\$0	\$0	\$512	\$512
Arts, entertainment, and recreation	\$0	\$10	\$27	\$37
Accommodation and food services	\$0	\$34	\$107	\$141
Other services (except public administration)	\$0	\$56	\$129	\$186
Public administration	\$4,231	\$180	\$45	\$4,456
Total	\$4,231	\$3,202	\$1,880	\$9,313

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 169: Airport Initiatives—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.2	0.0	0.0	0.2
Construction	0.1	0.1	0.0	0.3
Manufacturing	0.6	0.0	0.0	0.6
Wholesale trade	0.2	0.1	0.1	0.3
Retail trade	0.0	0.0	0.6	0.6
Transportation and warehousing	0.2	0.1	0.1	0.4
Information	0.0	0.1	0.1	0.1
Finance and insurance	0.0	0.1	0.2	0.3
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	3.4	0.5	0.1	4.1
Management of companies and enterprises	0.0	0.0	0.0	0.1
Administrative and support and waste management and remediation services	0.0	0.5	0.1	0.6
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.7	0.7
Arts, entertainment, and recreation	0.0	0.1	0.1	0.1
Accommodation and food services	0.0	0.1	0.3	0.5
Other services (except public administration)	0.0	0.1	0.3	0.4
Public administration	0.4	0.0	0.0	0.4
Average	5.1	2.2	3.1	10.4

Source: RESI

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Figure 170: Airport Initiatives—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$176	\$609	\$785
Mining	\$0	\$7,929	\$300	\$8,229
Utilities	\$195,000	\$8,051	\$9,444	\$212,495
Construction	\$18,367	\$12,710	\$3,820	\$34,897
Manufacturing	\$163,469	\$21,228	\$12,434	\$197,132
Wholesale trade	\$32,143	\$19,482	\$18,418	\$70,043
Retail trade	\$0	\$2,702	\$35,039	\$37,741
Transportation and warehousing	\$64,286	\$17,315	\$8,219	\$89,819
Information	\$0	\$21,392	\$16,500	\$37,892
Finance and insurance	\$0	\$31,755	\$49,944	\$81,699
Real estate and rental and leasing	\$0	\$36,873	\$86,043	\$122,916
Professional, scientific, and technical services	\$426,735	\$73,593	\$17,259	\$517,587
Management of companies and enterprises	\$0	\$8,599	\$2,820	\$11,418
Administrative and support and waste management and remediation services	\$0	\$34,863	\$10,777	\$45,640
Educational services	\$0	\$249	\$9,387	\$9,636
Health care and social assistance	\$0	\$4	\$71,442	\$71,446
Arts, entertainment, and recreation	\$0	\$2,161	\$5,033	\$7,193
Accommodation and food services	\$0	\$8,655	\$20,556	\$29,210
Other services (except public administration)	\$0	\$10,581	\$20,262	\$30,844
Public administration	\$100,000	\$8,740	\$8,339	\$117,079
Average	\$1,000,000	\$327,058	\$406,645	\$1,733,703

Source: RESI

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Figure 171: Airport Initiatives—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$23	\$77	\$100
Mining	\$0	\$211	\$18	\$229
Utilities	\$22,851	\$1,015	\$1,270	\$25,136
Construction	\$7,323	\$4,971	\$1,337	\$13,631
Manufacturing	\$33,020	\$3,448	\$1,810	\$38,277
Wholesale trade	\$12,049	\$7,303	\$6,904	\$26,255
Retail trade	\$0	\$1,408	\$17,646	\$19,054
Transportation and warehousing	\$18,050	\$6,655	\$2,826	\$27,530
Information	\$0	\$4,707	\$3,534	\$8,241
Finance and insurance	\$0	\$9,046	\$13,884	\$22,930
Real estate and rental and leasing	\$0	\$3,200	\$2,986	\$6,186
Professional, scientific, and technical services	\$235,480	\$34,740	\$7,583	\$277,803
Management of companies and enterprises	\$0	\$4,648	\$1,524	\$6,172
Administrative and support and waste management and remediation services	\$0	\$16,328	\$4,736	\$21,064
Educational services	\$0	\$132	\$5,281	\$5,412
Health care and social assistance	\$0	\$1	\$34,390	\$34,392
Arts, entertainment, and recreation	\$0	\$734	\$1,833	\$2,567
Accommodation and food services	\$0	\$3,008	\$7,174	\$10,182
Other services (except public administration)	\$0	\$3,786	\$8,732	\$12,518
Public administration	\$25,247	\$3,487	\$2,995	\$31,729
Average	\$354,019	\$108,850	\$126,542	\$589,410

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 172: Airport Initiatives—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.2	0.1	0.3
Mining	0.0	0.1	0.0	0.1
Utilities	0.0	0.1	0.1	0.2
Construction	0.0	6.6	0.4	7.1
Manufacturing	0.0	0.9	0.4	1.3
Wholesale trade	0.0	2.4	1.3	3.7
Retail trade	0.0	0.6	8.2	8.9
Transportation and warehousing	44.1	6.1	1.0	51.2
Information	0.0	1.2	0.7	1.9
Finance and insurance	0.0	9.5	3.0	12.6
Real estate and rental and leasing	0.0	5.4	2.8	8.2
Professional, scientific, and technical services	0.0	10.6	1.8	12.4
Management of companies and enterprises	0.0	0.4	0.2	0.6
Administrative and support and waste management and remediation services	0.0	6.9	2.1	9.0
Educational services	0.0	0.2	1.8	2.0
Health care and social assistance	0.0	0.0	9.6	9.6
Arts, entertainment, and recreation	0.0	5.6	1.4	7.0
Accommodation and food services	0.0	1.0	4.6	5.6
Other services (except public administration)	0.0	1.7	4.0	5.7
Public administration	0.0	0.8	0.6	1.4
Total	44.1	60.4	44.3	148.8

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 173: Airport Initiatives—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$19,988	\$8,765	\$28,753
Mining	\$0	\$25,730	\$4,316	\$30,047
Utilities	\$0	\$62,720	\$136,253	\$198,974
Construction	\$0	\$831,268	\$54,627	\$885,894
Manufacturing	\$0	\$388,205	\$179,170	\$567,375
Wholesale trade	\$0	\$503,314	\$266,188	\$769,502
Retail trade	\$0	\$38,659	\$500,585	\$539,244
Transportation and warehousing	\$16,699,786	\$568,438	\$117,591	\$17,385,816
Information	\$0	\$372,931	\$237,311	\$610,242
Finance and insurance	\$0	\$2,309,031	\$714,808	\$3,023,839
Real estate and rental and leasing	\$0	\$1,248,038	\$1,232,018	\$2,480,056
Professional, scientific, and technical services	\$0	\$1,408,627	\$247,736	\$1,656,363
Management of companies and enterprises	\$0	\$95,836	\$40,519	\$136,356
Administrative and support and waste management and remediation services	\$0	\$548,305	\$154,485	\$702,790
Educational services	\$0	\$15,297	\$133,081	\$148,378
Health care and social assistance	\$0	\$62	\$1,025,799	\$1,025,861
Arts, entertainment, and recreation	\$0	\$146,977	\$71,881	\$218,858
Accommodation and food services	\$0	\$68,742	\$294,925	\$363,667
Other services (except public administration)	\$0	\$150,661	\$289,470	\$440,131
Public administration	\$0	\$114,834	\$119,760	\$234,594
Total	\$16,699,786	\$8,917,663	\$5,829,291	\$31,446,741

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 174: Airport Initiatives—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$2,443	\$1,108	\$3,550
Mining	\$0	\$2,696	\$265	\$2,960
Utilities	\$0	\$8,504	\$18,319	\$26,822
Construction	\$0	\$331,266	\$19,132	\$350,398
Manufacturing	\$0	\$55,428	\$26,046	\$81,474
Wholesale trade	\$0	\$188,664	\$99,779	\$288,443
Retail trade	\$0	\$20,148	\$252,101	\$272,250
Transportation and warehousing	\$4,217,273	\$239,661	\$40,457	\$4,497,391
Information	\$0	\$82,731	\$50,805	\$133,536
Finance and insurance	\$0	\$651,142	\$198,933	\$850,075
Real estate and rental and leasing	\$0	\$236,087	\$43,071	\$279,158
Professional, scientific, and technical services	\$0	\$696,591	\$108,842	\$805,433
Management of companies and enterprises	\$0	\$51,801	\$21,901	\$73,703
Administrative and support and waste management and remediation services	\$0	\$224,835	\$67,899	\$292,734
Educational services	\$0	\$8,181	\$74,776	\$82,956
Health care and social assistance	\$0	\$23	\$493,737	\$493,759
Arts, entertainment, and recreation	\$0	\$42,635	\$26,194	\$68,829
Accommodation and food services	\$0	\$23,832	\$102,923	\$126,755
Other services (except public administration)	\$0	\$71,642	\$124,685	\$196,327
Public administration	\$0	\$55,197	\$42,987	\$98,184
Total	\$4,217,273	\$2,993,504	\$1,813,959	\$9,024,737

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 175: Port Initiatives—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.1	0.0	0.1
Manufacturing	1.2	0.1	0.0	1.3
Wholesale trade	0.5	0.2	0.1	0.8
Retail trade	0.0	0.1	0.4	0.5
Transportation and warehousing	0.0	0.2	0.1	0.2
Information	0.0	0.1	0.0	0.1
Finance and insurance	0.0	0.1	0.2	0.3
Real estate and rental and leasing	0.0	0.2	0.2	0.3
Professional, scientific, and technical services	1.7	0.4	0.1	2.2
Management of companies and enterprises	0.0	0.1	0.0	0.1
Administrative and support and waste management and remediation services	0.0	0.4	0.1	0.5
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.5	0.5
Arts, entertainment, and recreation	0.0	0.0	0.1	0.1
Accommodation and food services	0.0	0.1	0.2	0.3
Other services (except public administration)	0.0	0.1	0.2	0.3
Public administration	0.4	0.0	0.0	0.4
Average	3.8	2.1	2.4	8.3

Source: RESI

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Figure 176: Port Initiatives—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$82	\$477	\$558
Mining	\$0	\$1,057	\$235	\$1,291
Utilities	\$0	\$10,759	\$7,397	\$18,156
Construction	\$0	\$9,091	\$2,979	\$12,070
Manufacturing	\$562,500	\$53,239	\$9,733	\$625,472
Wholesale trade	\$112,500	\$48,961	\$14,438	\$175,899
Retail trade	\$0	\$5,654	\$27,312	\$32,966
Transportation and warehousing	\$0	\$18,676	\$6,411	\$25,087
Information	\$0	\$20,529	\$12,904	\$33,432
Finance and insurance	\$0	\$24,995	\$38,965	\$63,960
Real estate and rental and leasing	\$0	\$30,423	\$67,143	\$97,566
Professional, scientific, and technical services	\$225,000	\$59,274	\$13,484	\$297,758
Management of companies and enterprises	\$0	\$17,804	\$2,204	\$20,008
Administrative and support and waste management and remediation services	\$0	\$27,026	\$8,414	\$35,440
Educational services	\$0	\$163	\$7,290	\$7,453
Health care and social assistance	\$0	\$3	\$55,825	\$55,828
Arts, entertainment, and recreation	\$0	\$1,638	\$3,922	\$5,560
Accommodation and food services	\$0	\$5,662	\$16,056	\$21,718
Other services (except public administration)	\$0	\$6,856	\$15,794	\$22,650
Public administration	\$100,000	\$8,423	\$6,517	\$114,939
Average	\$1,000,000	\$350,315	\$317,498	\$1,667,813

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 177: Port Initiatives—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$12	\$60	\$72
Mining	\$0	\$139	\$14	\$153
Utilities	\$0	\$1,342	\$994	\$2,337
Construction	\$0	\$3,531	\$1,043	\$4,574
Manufacturing	\$77,238	\$8,039	\$1,416	\$86,693
Wholesale trade	\$42,170	\$18,353	\$5,412	\$65,935
Retail trade	\$0	\$2,947	\$13,755	\$16,702
Transportation and warehousing	\$0	\$6,664	\$2,205	\$8,869
Information	\$0	\$4,557	\$2,763	\$7,320
Finance and insurance	\$0	\$7,167	\$10,838	\$18,005
Real estate and rental and leasing	\$0	\$2,563	\$2,339	\$4,902
Professional, scientific, and technical services	\$118,138	\$27,573	\$5,924	\$151,636
Management of companies and enterprises	\$0	\$9,623	\$1,191	\$10,815
Administrative and support and waste management and remediation services	\$0	\$12,455	\$3,698	\$16,153
Educational services	\$0	\$83	\$4,099	\$4,182
Health care and social assistance	\$0	\$1	\$26,871	\$26,872
Arts, entertainment, and recreation	\$0	\$575	\$1,429	\$2,005
Accommodation and food services	\$0	\$1,965	\$5,603	\$7,568
Other services (except public administration)	\$0	\$2,677	\$6,805	\$9,482
Public administration	\$25,247	\$3,636	\$2,340	\$31,223
Average	\$262,793	\$113,904	\$98,800	\$475,497

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 178: Port Initiatives—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.0	0.0	0.0
Manufacturing	0.0	0.0	0.0	0.0
Wholesale trade	0.0	0.0	0.0	0.0
Retail trade	0.0	0.0	0.0	0.0
Transportation and warehousing	0.1	0.1	0.0	0.2
Information	0.0	0.0	0.0	0.0
Finance and insurance	0.0	0.0	0.0	0.0
Real estate and rental and leasing	0.0	0.0	0.0	0.0
Professional, scientific, and technical services	0.0	0.0	0.0	0.0
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.0	0.0	0.0
Educational services	0.0	0.0	0.0	0.0
Health care and social assistance	0.0	0.0	0.0	0.0
Arts, entertainment, and recreation	0.0	0.0	0.0	0.0
Accommodation and food services	0.0	0.0	0.0	0.0
Other services (except public administration)	0.0	0.0	0.0	0.0
Public administration	0.0	0.0	0.0	0.0
Total	0.1	0.2	0.1	0.4

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 179: Port Initiatives—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$2	\$24	\$26
Mining	\$0	\$24	\$12	\$36
Utilities	\$0	\$559	\$365	\$923
Construction	\$0	\$195	\$148	\$343
Manufacturing	\$0	\$749	\$480	\$1,229
Wholesale trade	\$0	\$407	\$711	\$1,119
Retail trade	\$0	\$24	\$1,353	\$1,377
Transportation and warehousing	\$54,184	\$7,940	\$317	\$62,441
Information	\$0	\$1,246	\$637	\$1,883
Finance and insurance	\$0	\$2,643	\$1,929	\$4,572
Real estate and rental and leasing	\$0	\$3,953	\$3,323	\$7,276
Professional, scientific, and technical services	\$0	\$1,644	\$667	\$2,311
Management of companies and enterprises	\$0	\$522	\$109	\$630
Administrative and support and waste management and remediation services	\$0	\$2,454	\$416	\$2,871
Educational services	\$0	\$2	\$363	\$365
Health care and social assistance	\$0	\$0	\$2,759	\$2,759
Arts, entertainment, and recreation	\$0	\$52	\$194	\$246
Accommodation and food services	\$0	\$140	\$794	\$934
Other services (except public administration)	\$0	\$161	\$783	\$944
Public administration	\$0	\$2,821	\$322	\$3,143
Total	\$54,184	\$25,538	\$15,705	\$95,426

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 180: Port Initiatives—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$0	\$3	\$3
Mining	\$0	\$2	\$1	\$3
Utilities	\$0	\$75	\$49	\$124
Construction	\$0	\$75	\$52	\$127
Manufacturing	\$0	\$169	\$70	\$239
Wholesale trade	\$0	\$153	\$267	\$419
Retail trade	\$0	\$12	\$682	\$694
Transportation and warehousing	\$8,511	\$3,840	\$109	\$12,460
Information	\$0	\$273	\$136	\$410
Finance and insurance	\$0	\$819	\$536	\$1,355
Real estate and rental and leasing	\$0	\$323	\$115	\$438
Professional, scientific, and technical services	\$0	\$749	\$293	\$1,042
Management of companies and enterprises	\$0	\$282	\$59	\$341
Administrative and support and waste management and remediation services	\$0	\$978	\$183	\$1,161
Educational services	\$0	\$1	\$204	\$205
Health care and social assistance	\$0	\$0	\$1,328	\$1,328
Arts, entertainment, and recreation	\$0	\$17	\$71	\$88
Accommodation and food services	\$0	\$47	\$277	\$324
Other services (except public administration)	\$0	\$61	\$337	\$398
Public administration	\$0	\$1,434	\$116	\$1,550
Total	\$8,511	\$9,312	\$4,887	\$22,710

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 181: Freight and Freight Rail Strategies—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.1	0.0	0.1
Manufacturing	0.4	0.1	0.0	0.5
Wholesale trade	0.6	0.2	0.1	0.8
Retail trade	0.0	0.1	0.6	0.7
Transportation and warehousing	3.8	0.2	0.1	4.1
Information	0.0	0.1	0.1	0.1
Finance and insurance	0.0	0.1	0.2	0.3
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	1.4	0.4	0.1	1.9
Management of companies and enterprises	0.0	0.1	0.0	0.1
Administrative and support and waste management and remediation services	0.0	0.4	0.1	0.6
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.7	0.7
Arts, entertainment, and recreation	0.0	0.0	0.1	0.1
Accommodation and food services	0.0	0.1	0.3	0.4
Other services (except public administration)	1.1	0.1	0.3	1.5
Public administration	0.4	0.1	0.0	0.5
Average	7.7	2.2	3.1	13.0

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 182: Freight and Freight Rail Strategies—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$105	\$607	\$712
Mining	\$0	\$1,070	\$299	\$1,369
Utilities	\$0	\$9,849	\$9,420	\$19,269
Construction	\$0	\$9,035	\$3,799	\$12,834
Manufacturing	\$241,071	\$32,966	\$12,398	\$286,436
Wholesale trade	\$120,536	\$32,493	\$18,382	\$171,411
Retail trade	\$0	\$5,501	\$34,837	\$40,338
Transportation and warehousing	\$241,071	\$26,817	\$8,176	\$276,064
Information	\$0	\$24,022	\$16,441	\$40,464
Finance and insurance	\$0	\$30,697	\$49,685	\$80,382
Real estate and rental and leasing	\$0	\$32,129	\$85,610	\$117,740
Professional, scientific, and technical services	\$176,786	\$52,204	\$17,186	\$246,176
Management of companies and enterprises	\$0	\$11,653	\$2,809	\$14,462
Administrative and support and waste management and remediation services	\$0	\$30,860	\$10,727	\$41,587
Educational services	\$0	\$142	\$9,309	\$9,452
Health care and social assistance	\$0	\$3	\$71,148	\$71,151
Arts, entertainment, and recreation	\$0	\$2,091	\$5,003	\$7,094
Accommodation and food services	\$0	\$4,753	\$20,466	\$25,219
Other services (except public administration)	\$120,536	\$8,175	\$20,145	\$148,856
Public administration	\$100,000	\$12,654	\$8,305	\$120,959
Average	\$1,000,000	\$327,222	\$404,753	\$1,731,975

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 183: Freight and Freight Rail Strategies—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$14	\$77	\$91
Mining	\$0	\$136	\$18	\$154
Utilities	\$0	\$1,275	\$1,266	\$2,542
Construction	\$0	\$3,507	\$1,330	\$4,837
Manufacturing	\$22,718	\$5,484	\$1,804	\$30,006
Wholesale trade	\$45,182	\$12,180	\$6,890	\$64,252
Retail trade	\$0	\$2,867	\$17,544	\$20,411
Transportation and warehousing	\$127,671	\$10,222	\$2,812	\$140,705
Information	\$0	\$5,296	\$3,521	\$8,816
Finance and insurance	\$0	\$8,668	\$13,817	\$22,485
Real estate and rental and leasing	\$0	\$2,885	\$2,978	\$5,864
Professional, scientific, and technical services	\$86,867	\$24,208	\$7,551	\$118,626
Management of companies and enterprises	\$0	\$6,299	\$1,518	\$7,817
Administrative and support and waste management and remediation services	\$0	\$14,183	\$4,714	\$18,897
Educational services	\$0	\$72	\$5,235	\$5,307
Health care and social assistance	\$0	\$1	\$34,247	\$34,249
Arts, entertainment, and recreation	\$0	\$637	\$1,823	\$2,459
Accommodation and food services	\$0	\$1,646	\$7,142	\$8,788
Other services (except public administration)	\$56,982	\$3,289	\$8,680	\$68,951
Public administration	\$25,247	\$6,369	\$2,983	\$34,598
Average	\$364,667	\$109,237	\$125,952	\$599,856

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 184: Freight and Freight Rail Strategies—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.1	0.3	0.4
Mining	0.0	0.1	0.0	0.2
Utilities	0.0	0.2	0.4	0.6
Construction	0.0	5.1	1.1	6.3
Manufacturing	0.0	1.2	1.1	2.3
Wholesale trade	0.0	2.6	3.5	6.1
Retail trade	0.0	1.1	22.2	23.3
Transportation and warehousing	396.3	14.7	2.8	413.8
Information	0.0	1.8	2.0	3.8
Finance and insurance	0.0	9.6	8.2	17.8
Real estate and rental and leasing	0.0	5.7	7.6	13.3
Professional, scientific, and technical services	0.0	12.2	4.9	17.1
Management of companies and enterprises	0.0	1.1	0.5	1.6
Administrative and support and waste management and remediation services	0.0	15.3	5.8	21.1
Educational services	0.0	0.1	4.9	5.0
Health care and social assistance	0.0	0.0	25.9	25.9
Arts, entertainment, and recreation	0.0	4.7	3.8	8.4
Accommodation and food services	0.0	1.4	12.3	13.7
Other services (except public administration)	0.0	4.0	10.9	14.9
Public administration	0.0	3.9	1.6	5.5
Total	396.3	85.2	119.8	601.3

Source: RESI

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Figure 185: Freight and Freight Rail Strategies—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$14,436	\$23,667	\$38,103
Mining	\$0	\$30,733	\$11,654	\$42,386
Utilities	\$0	\$207,245	\$367,819	\$575,064
Construction	\$0	\$640,785	\$147,559	\$788,344
Manufacturing	\$0	\$498,401	\$483,718	\$982,119
Wholesale trade	\$0	\$540,520	\$718,494	\$1,259,014
Retail trade	\$0	\$66,878	\$1,352,291	\$1,419,169
Transportation and warehousing	\$34,713,336	\$1,464,418	\$317,631	\$36,495,385
Information	\$0	\$613,022	\$640,771	\$1,253,794
Finance and insurance	\$0	\$2,355,675	\$1,930,748	\$4,286,423
Real estate and rental and leasing	\$0	\$1,234,563	\$3,327,665	\$4,562,229
Professional, scientific, and technical services	\$0	\$1,653,048	\$669,013	\$2,322,061
Management of companies and enterprises	\$0	\$241,636	\$109,414	\$351,050
Administrative and support and waste management and remediation services	\$0	\$1,166,113	\$417,229	\$1,583,343
Educational services	\$0	\$12,166	\$359,707	\$371,874
Health care and social assistance	\$0	\$91	\$2,770,121	\$2,770,212
Arts, entertainment, and recreation	\$0	\$137,229	\$194,184	\$331,413
Accommodation and food services	\$0	\$93,662	\$796,474	\$890,136
Other services (except public administration)	\$0	\$291,182	\$781,981	\$1,073,163
Public administration	\$0	\$520,954	\$323,401	\$844,354
Total	\$34,713,336	\$11,782,758	\$15,743,542	\$62,239,636

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 186: Freight and Freight Rail Strategies—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$1,793	\$2,991	\$4,784
Mining	\$0	\$2,483	\$715	\$3,198
Utilities	\$0	\$27,786	\$49,451	\$77,237
Construction	\$0	\$255,156	\$51,679	\$306,834
Manufacturing	\$0	\$79,870	\$70,323	\$150,193
Wholesale trade	\$0	\$202,610	\$269,323	\$471,933
Retail trade	\$0	\$34,855	\$681,032	\$715,887
Transportation and warehousing	\$15,178,233	\$597,753	\$109,276	\$15,885,262
Information	\$0	\$131,106	\$137,184	\$268,289
Finance and insurance	\$0	\$666,000	\$537,291	\$1,203,290
Real estate and rental and leasing	\$0	\$207,481	\$116,274	\$323,755
Professional, scientific, and technical services	\$0	\$799,087	\$293,931	\$1,093,017
Management of companies and enterprises	\$0	\$130,609	\$59,140	\$189,748
Administrative and support and waste management and remediation services	\$0	\$521,674	\$183,378	\$705,052
Educational services	\$0	\$6,463	\$202,130	\$208,593
Health care and social assistance	\$0	\$34	\$1,333,321	\$1,333,355
Arts, entertainment, and recreation	\$0	\$37,252	\$70,761	\$108,013
Accommodation and food services	\$0	\$32,404	\$277,954	\$310,358
Other services (except public administration)	\$0	\$133,941	\$336,839	\$470,781
Public administration	\$0	\$316,991	\$116,089	\$433,080
Total	\$15,178,233	\$4,185,347	\$4,899,082	\$24,262,661

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 187: Renewable Fuels Standard—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.0	0.0
Mining	1.7	0.0	0.0	1.7
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.1	0.0	0.2
Manufacturing	0.0	0.1	0.0	0.1
Wholesale trade	0.0	0.1	0.1	0.2
Retail trade	0.0	0.0	0.5	0.5
Transportation and warehousing	0.0	0.1	0.1	0.2
Information	0.0	0.1	0.0	0.1
Finance and insurance	0.0	0.2	0.2	0.4
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	1.5	0.7	0.1	2.2
Management of companies and enterprises	0.8	0.1	0.0	0.9
Administrative and support and waste management and remediation services	0.0	0.4	0.1	0.5
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.6	0.6
Arts, entertainment, and recreation	0.0	0.1	0.1	0.1
Accommodation and food services	0.0	0.1	0.3	0.4
Other services (except public administration)	0.0	0.1	0.2	0.3
Public administration	0.4	0.0	0.0	0.4
Average	4.3	2.3	2.7	9.4

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 188: Renewable Fuels Standard—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$335	\$538	\$873
Mining	\$540,000	\$5,529	\$265	\$545,794
Utilities	\$0	\$14,134	\$8,346	\$22,480
Construction	\$0	\$17,377	\$3,370	\$20,746
Manufacturing	\$0	\$28,059	\$10,986	\$39,045
Wholesale trade	\$0	\$20,269	\$16,282	\$36,550
Retail trade	\$0	\$1,643	\$30,905	\$32,548
Transportation and warehousing	\$0	\$14,259	\$7,251	\$21,511
Information	\$0	\$30,442	\$14,572	\$45,014
Finance and insurance	\$0	\$34,318	\$44,067	\$78,385
Real estate and rental and leasing	\$0	\$63,355	\$75,925	\$139,280
Professional, scientific, and technical services	\$180,000	\$94,532	\$15,237	\$289,769
Management of companies and enterprises	\$180,000	\$17,582	\$2,490	\$200,072
Administrative and support and waste management and remediation services	\$0	\$26,951	\$9,512	\$36,462
Educational services	\$0	\$89	\$8,267	\$8,356
Health care and social assistance	\$0	\$4	\$63,075	\$63,079
Arts, entertainment, and recreation	\$0	\$2,591	\$4,439	\$7,030
Accommodation and food services	\$0	\$5,781	\$18,145	\$23,927
Other services (except public administration)	\$0	\$9,133	\$17,872	\$27,005
Public administration	\$100,000	\$7,686	\$7,363	\$115,049
Average	\$1,000,000	\$394,069	\$358,906	\$1,752,974

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 189: Renewable Fuels Standard—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$42	\$68	\$110
Mining	\$67,846	\$1,042	\$16	\$68,904
Utilities	\$0	\$1,729	\$1,122	\$2,851
Construction	\$0	\$6,832	\$1,180	\$8,011
Manufacturing	\$0	\$4,150	\$1,598	\$5,748
Wholesale trade	\$0	\$7,598	\$6,103	\$13,701
Retail trade	\$0	\$856	\$15,564	\$16,421
Transportation and warehousing	\$0	\$4,613	\$2,494	\$7,107
Information	\$0	\$6,743	\$3,121	\$9,863
Finance and insurance	\$0	\$10,763	\$12,253	\$23,016
Real estate and rental and leasing	\$0	\$4,701	\$2,639	\$7,340
Professional, scientific, and technical services	\$99,781	\$44,941	\$6,695	\$151,417
Management of companies and enterprises	\$97,293	\$9,503	\$1,346	\$108,142
Administrative and support and waste management and remediation services	\$0	\$12,227	\$4,180	\$16,407
Educational services	\$0	\$44	\$4,650	\$4,694
Health care and social assistance	\$0	\$1	\$30,362	\$30,363
Arts, entertainment, and recreation	\$0	\$846	\$1,617	\$2,463
Accommodation and food services	\$0	\$2,003	\$6,332	\$8,336
Other services (except public administration)	\$0	\$3,818	\$7,701	\$11,520
Public administration	\$25,247	\$2,778	\$2,644	\$30,668
Average	\$290,167	\$125,229	\$111,685	\$527,081

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 190: Renewable Fuels Standard—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.2	0.2
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.3	0.3
Construction	0.0	0.0	0.7	0.7
Manufacturing	0.0	0.0	0.7	0.7
Wholesale trade	0.0	0.0	2.2	2.2
Retail trade	0.0	0.0	14.0	14.0
Transportation and warehousing	0.0	0.0	1.9	1.9
Information	0.0	0.0	1.3	1.3
Finance and insurance	0.0	0.0	5.3	5.3
Real estate and rental and leasing	0.0	0.0	5.5	5.5
Professional, scientific, and technical services	0.0	0.0	3.2	3.2
Management of companies and enterprises	0.0	0.0	0.3	0.3
Administrative and support and waste management and remediation services	0.0	0.0	3.9	3.9
Educational services	0.0	0.0	3.2	3.2
Health care and social assistance	0.0	0.0	17.7	17.7
Arts, entertainment, and recreation	0.0	0.0	2.5	2.5
Accommodation and food services	0.0	0.0	8.1	8.1
Other services (except public administration)	0.0	0.0	7.2	7.2
Public administration	0.0	0.0	1.1	1.1
Total	0.0	0.0	79.3	79.3

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 191: Renewable Fuels Standard—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$0	\$16,298	\$16,298
Mining	\$0	\$0	\$8,113	\$8,113
Utilities	\$0	\$0	\$263,900	\$263,900
Construction	\$0	\$0	\$96,431	\$96,431
Manufacturing	\$0	\$0	\$337,135	\$337,135
Wholesale trade	\$0	\$0	\$457,433	\$457,433
Retail trade	\$0	\$0	\$854,700	\$854,700
Transportation and warehousing	\$0	\$0	\$212,331	\$212,331
Information	\$0	\$0	\$433,210	\$433,210
Finance and insurance	\$0	\$0	\$1,236,388	\$1,236,388
Real estate and rental and leasing	\$0	\$0	\$2,206,256	\$2,206,256
Professional, scientific, and technical services	\$0	\$0	\$446,814	\$446,814
Management of companies and enterprises	\$0	\$0	\$73,760	\$73,760
Administrative and support and waste management and remediation services	\$0	\$0	\$280,065	\$280,065
Educational services	\$0	\$0	\$246,964	\$246,964
Health care and social assistance	\$0	\$0	\$1,901,985	\$1,901,985
Arts, entertainment, and recreation	\$0	\$0	\$127,881	\$127,881
Accommodation and food services	\$0	\$0	\$521,181	\$521,181
Other services (except public administration)	\$0	\$0	\$519,083	\$519,083
Public administration	\$0	\$0	\$222,277	\$222,277
Total	\$0	\$0	\$10,462,205	\$10,462,205

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 192: Renewable Fuels Standard—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$0	\$2,040	\$2,040
Mining	\$0	\$0	\$479	\$479
Utilities	\$0	\$0	\$35,493	\$35,493
Construction	\$0	\$0	\$33,919	\$33,919
Manufacturing	\$0	\$0	\$48,495	\$48,495
Wholesale trade	\$0	\$0	\$171,466	\$171,466
Retail trade	\$0	\$0	\$430,451	\$430,451
Transportation and warehousing	\$0	\$0	\$73,175	\$73,175
Information	\$0	\$0	\$92,238	\$92,238
Finance and insurance	\$0	\$0	\$345,435	\$345,435
Real estate and rental and leasing	\$0	\$0	\$83,183	\$83,183
Professional, scientific, and technical services	\$0	\$0	\$196,213	\$196,213
Management of companies and enterprises	\$0	\$0	\$39,869	\$39,869
Administrative and support and waste management and remediation services	\$0	\$0	\$123,092	\$123,092
Educational services	\$0	\$0	\$137,696	\$137,696
Health care and social assistance	\$0	\$0	\$914,691	\$914,691
Arts, entertainment, and recreation	\$0	\$0	\$46,899	\$46,899
Accommodation and food services	\$0	\$0	\$181,834	\$181,834
Other services (except public administration)	\$0	\$0	\$222,120	\$222,120
Public administration	\$0	\$0	\$79,152	\$79,152
Total	\$0	\$0	\$3,257,939	\$3,257,939

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 193: CAFÉ Standards: Model Years 2008-2011—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.1	0.0	0.1
Manufacturing	0.2	0.0	0.0	0.2
Wholesale trade	0.7	-0.2	0.1	0.6
Retail trade	1.9	0.0	0.4	2.3
Transportation and warehousing	1.0	0.2	0.1	1.3
Information	0.0	0.0	0.0	0.1
Finance and insurance	0.0	0.1	0.2	0.3
Real estate and rental and leasing	0.0	0.1	0.1	0.3
Professional, scientific, and technical services	1.2	0.3	0.1	1.6
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.4	0.1	0.5
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.5	0.5
Arts, entertainment, and recreation	0.0	0.0	0.1	0.1
Accommodation and food services	0.0	0.1	0.2	0.3
Other services (except public administration)	0.0	0.1	0.2	0.3
Public administration	0.4	0.1	0.0	0.5
Average	5.4	1.3	2.3	9.1

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 194: CAFÉ Standards: Model Years 2008-2011—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$94	\$462	\$556
Mining	\$0	\$987	\$227	\$1,214
Utilities	\$0	\$5,380	\$7,156	\$12,536
Construction	\$0	\$7,892	\$2,895	\$10,787
Manufacturing	-\$700,000	-\$10,474	\$9,422	-\$701,052
Wholesale trade	\$150,000	-\$36,539	\$13,955	\$127,415
Retail trade	\$150,000	\$2,823	\$26,561	\$179,384
Transportation and warehousing	\$150,000	\$21,630	\$6,230	\$177,860
Information	\$0	\$15,781	\$12,504	\$28,285
Finance and insurance	\$0	\$24,378	\$37,856	\$62,234
Real estate and rental and leasing	\$0	\$28,087	\$65,217	\$93,304
Professional, scientific, and technical services	\$150,000	\$40,120	\$13,080	\$203,200
Management of companies and enterprises	\$0	-\$1,297	\$2,137	\$840
Administrative and support and waste management and remediation services	\$0	\$27,358	\$8,168	\$35,526
Educational services	\$0	\$235	\$7,118	\$7,352
Health care and social assistance	\$0	\$3	\$54,144	\$54,146
Arts, entertainment, and recreation	\$0	\$1,209	\$3,815	\$5,024
Accommodation and food services	\$0	\$3,580	\$15,579	\$19,159
Other services (except public administration)	\$0	\$6,213	\$15,359	\$21,572
Public administration	\$100,000	\$11,255	\$6,320	\$117,574
Average	\$0	\$148,712	\$308,204	\$456,915

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 195: CAFÉ Standards: Model Years 2008-2011—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$17	\$58	\$75
Mining	\$0	\$129	\$14	\$143
Utilities	\$0	\$701	\$962	\$1,663
Construction	\$0	\$3,053	\$1,014	\$4,066
Manufacturing	-\$3,246	-\$2,857	\$1,371	-\$4,732
Wholesale trade	\$56,227	-\$13,696	\$5,231	\$47,761
Retail trade	\$97,460	\$1,486	\$13,376	\$112,322
Transportation and warehousing	\$39,448	\$8,632	\$2,142	\$50,222
Information	\$0	\$3,474	\$2,678	\$6,152
Finance and insurance	\$0	\$6,844	\$10,523	\$17,367
Real estate and rental and leasing	\$0	\$2,166	\$2,263	\$4,429
Professional, scientific, and technical services	\$83,151	\$18,823	\$5,747	\$107,721
Management of companies and enterprises	\$0	-\$701	\$1,155	\$454
Administrative and support and waste management and remediation services	\$0	\$13,081	\$3,590	\$16,670
Educational services	\$0	\$120	\$4,005	\$4,124
Health care and social assistance	\$0	\$1	\$26,063	\$26,064
Arts, entertainment, and recreation	\$0	\$407	\$1,390	\$1,797
Accommodation and food services	\$0	\$1,239	\$5,437	\$6,675
Other services (except public administration)	\$0	\$2,299	\$6,619	\$8,918
Public administration	\$25,247	\$6,044	\$2,270	\$33,560
Average	\$298,285	\$51,260	\$95,908	\$445,453

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 196: CAFÉ Standards: Model Years 2008-2011—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.1	0.1
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.1	0.1
Construction	0.0	0.0	0.3	0.3
Manufacturing	0.0	0.0	0.3	0.3
Wholesale trade	0.0	0.0	1.0	1.0
Retail trade	0.0	0.0	6.5	6.5
Transportation and warehousing	0.0	0.0	0.9	0.9
Information	0.0	0.0	0.6	0.6
Finance and insurance	0.0	0.0	2.4	2.4
Real estate and rental and leasing	0.0	0.0	2.6	2.6
Professional, scientific, and technical services	0.0	0.0	1.5	1.5
Management of companies and enterprises	0.0	0.0	0.2	0.2
Administrative and support and waste management and remediation services	0.0	0.0	1.8	1.8
Educational services	0.0	0.0	1.5	1.5
Health care and social assistance	0.0	0.0	8.2	8.2
Arts, entertainment, and recreation	0.0	0.0	1.2	1.2
Accommodation and food services	0.0	0.0	3.7	3.7
Other services (except public administration)	0.0	0.0	3.3	3.3
Public administration	0.0	0.0	0.5	0.5
Total	0.0	0.0	36.9	36.9

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 197: CAFÉ Standards: Model Years 2008-2011—Operation Phase, Output Impacts

Agriculture, forestry, fishing and hunting	\$0	\$0	\$7,575	\$7,575
Mining	\$0	\$0	\$3,771	\$3,771
Utilities	\$0	\$0	\$122,656	\$122,656
Construction	\$0	\$0	\$44,819	\$44,819
Manufacturing	\$0	\$0	\$156,694	\$156,694
Wholesale trade	\$0	\$0	\$212,606	\$212,606
Retail trade	\$0	\$0	\$397,249	\$397,249
Transportation and warehousing	\$0	\$0	\$98,687	\$98,687
Information	\$0	\$0	\$201,348	\$201,348
Finance and insurance	\$0	\$0	\$574,650	\$574,650
Real estate and rental and leasing	\$0	\$0	\$1,025,426	\$1,025,426
Professional, scientific, and technical services	\$0	\$0	\$207,671	\$207,671
Management of companies and enterprises	\$0	\$0	\$34,282	\$34,282
Administrative and support and waste management and remediation services	\$0	\$0	\$130,169	\$130,169
Educational services	\$0	\$0	\$114,784	\$114,784
Health care and social assistance	\$0	\$0	\$884,007	\$884,007
Arts, entertainment, and recreation	\$0	\$0	\$59,437	\$59,437
Accommodation and food services	\$0	\$0	\$242,235	\$242,235
Other services (except public administration)	\$0	\$0	\$241,260	\$241,260
Public administration	\$0	\$0	\$103,310	\$103,310
Total	\$0	\$0	\$4,862,636	\$4,862,636

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 198: CAFÉ Standards: Model Years 2008-2011—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$0	\$948	\$948
Mining	\$0	\$0	\$223	\$223
Utilities	\$0	\$0	\$16,497	\$16,497
Construction	\$0	\$0	\$15,765	\$15,765
Manufacturing	\$0	\$0	\$22,540	\$22,540
Wholesale trade	\$0	\$0	\$79,694	\$79,694
Retail trade	\$0	\$0	\$200,065	\$200,065
Transportation and warehousing	\$0	\$0	\$34,010	\$34,010
Information	\$0	\$0	\$42,871	\$42,871
Finance and insurance	\$0	\$0	\$160,552	\$160,552
Real estate and rental and leasing	\$0	\$0	\$38,662	\$38,662
Professional, scientific, and technical services	\$0	\$0	\$91,196	\$91,196
Management of companies and enterprises	\$0	\$0	\$18,530	\$18,530
Administrative and support and waste management and remediation services	\$0	\$0	\$57,211	\$57,211
Educational services	\$0	\$0	\$63,999	\$63,999
Health care and social assistance	\$0	\$0	\$425,131	\$425,131
Arts, entertainment, and recreation	\$0	\$0	\$21,798	\$21,798
Accommodation and food services	\$0	\$0	\$84,513	\$84,513
Other services (except public administration)	\$0	\$0	\$103,237	\$103,237
Public administration	\$0	\$0	\$36,788	\$36,788
Total	\$0	\$0	\$1,514,229	\$1,514,229

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 199: Promoting Hybrid and Electric Vehicles—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.4	0.1	0.0	0.5
Manufacturing	0.5	0.1	0.0	0.6
Wholesale trade	1.4	0.2	0.1	1.6
Retail trade	0.0	0.1	0.5	0.6
Transportation and warehousing	0.0	0.2	0.1	0.3
Information	0.0	0.1	0.0	0.1
Finance and insurance	0.0	0.1	0.2	0.3
Real estate and rental and leasing	0.0	0.2	0.2	0.3
Professional, scientific, and technical services	0.8	0.4	0.1	1.4
Management of companies and enterprises	0.0	0.1	0.0	0.1
Administrative and support and waste management and remediation services	0.5	0.4	0.1	1.0
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.6	0.6
Arts, entertainment, and recreation	0.0	0.0	0.1	0.1
Accommodation and food services	0.0	0.1	0.3	0.4
Other services (except public administration)	0.7	0.1	0.2	1.0
Public administration	0.4	0.1	0.0	0.5
Average	4.7	2.2	2.6	9.5

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 200: Promoting Hybrid and Electric Vehicles—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$112	\$514	\$626
Mining	\$0	\$1,290	\$253	\$1,543
Utilities	\$0	\$11,221	\$7,974	\$19,195
Construction	\$56,250	\$9,086	\$3,218	\$68,554
Manufacturing	\$337,500	\$49,537	\$10,496	\$397,533
Wholesale trade	\$281,250	\$45,018	\$15,559	\$341,827
Retail trade	\$0	\$4,700	\$29,514	\$34,214
Transportation and warehousing	\$0	\$23,149	\$6,925	\$30,075
Information	\$0	\$24,722	\$13,921	\$38,643
Finance and insurance	\$0	\$27,278	\$42,087	\$69,365
Real estate and rental and leasing	\$0	\$34,173	\$72,515	\$106,688
Professional, scientific, and technical services	\$112,500	\$57,910	\$14,555	\$184,965
Management of companies and enterprises	\$0	\$14,819	\$2,378	\$17,198
Administrative and support and waste management and remediation services	\$56,250	\$28,413	\$9,085	\$93,748
Educational services	\$0	\$238	\$7,892	\$8,129
Health care and social assistance	\$0	\$28	\$60,252	\$60,280
Arts, entertainment, and recreation	\$0	\$1,851	\$4,239	\$6,090
Accommodation and food services	\$0	\$5,631	\$17,333	\$22,964
Other services (except public administration)	\$56,250	\$7,676	\$17,067	\$80,993
Public administration	\$100,000	\$10,194	\$7,033	\$117,227
Average	\$1,000,000	\$357,047	\$342,810	\$1,699,857

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 201: Promoting Hybrid and Electric Vehicles—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$15	\$65	\$80
Mining	\$0	\$180	\$16	\$195
Utilities	\$0	\$1,375	\$1,072	\$2,447
Construction	\$19,940	\$3,527	\$1,127	\$24,594
Manufacturing	\$33,503	\$7,698	\$1,527	\$42,728
Wholesale trade	\$105,425	\$16,875	\$5,832	\$128,132
Retail trade	\$0	\$2,450	\$14,863	\$17,313
Transportation and warehousing	\$0	\$8,697	\$2,382	\$11,078
Information	\$0	\$5,566	\$2,981	\$8,548
Finance and insurance	\$0	\$7,531	\$11,703	\$19,235
Real estate and rental and leasing	\$0	\$3,038	\$2,521	\$5,559
Professional, scientific, and technical services	\$59,069	\$26,913	\$6,395	\$92,377
Management of companies and enterprises	\$0	\$8,010	\$1,286	\$9,296
Administrative and support and waste management and remediation services	\$17,034	\$13,042	\$3,993	\$34,068
Educational services	\$0	\$121	\$4,438	\$4,559
Health care and social assistance	\$0	\$10	\$29,003	\$29,013
Arts, entertainment, and recreation	\$0	\$642	\$1,544	\$2,186
Accommodation and food services	\$0	\$1,953	\$6,049	\$8,002
Other services (except public administration)	\$23,006	\$3,063	\$7,354	\$33,423
Public administration	\$25,247	\$4,783	\$2,526	\$32,555
Average	\$283,223	\$115,488	\$106,677	\$505,388

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 202: Promoting Hybrid and Electric Vehicles—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.3	0.3
Mining	0.0	0.0	0.0	0.1
Utilities	0.0	0.0	0.4	0.4
Construction	0.0	0.0	1.1	1.1
Manufacturing	0.0	0.0	1.1	1.1
Wholesale trade	0.0	0.0	3.2	3.2
Retail trade	0.0	0.1	20.4	20.5
Transportation and warehousing	3.7	0.6	2.7	7.1
Information	0.0	0.0	2.0	2.0
Finance and insurance	0.0	0.1	7.6	7.7
Real estate and rental and leasing	0.0	0.1	8.0	8.1
Professional, scientific, and technical services	0.0	0.1	4.7	4.8
Management of companies and enterprises	0.0	0.0	0.5	0.5
Administrative and support and waste management and remediation services	0.0	0.5	5.6	6.1
Educational services	0.0	0.0	4.7	4.7
Health care and social assistance	0.0	0.0	25.6	25.6
Arts, entertainment, and recreation	0.0	0.0	3.6	3.6
Accommodation and food services	0.0	0.0	11.7	11.7
Other services (except public administration)	0.0	0.1	10.4	10.5
Public administration	0.0	0.1	1.6	1.7
Total	3.7	1.7	115.3	120.8

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 203: Promoting Hybrid and Electric Vehicles—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$21	\$23,662	\$23,683
Mining	\$0	\$553	\$11,777	\$12,330
Utilities	\$0	\$2,576	\$382,907	\$385,482
Construction	\$0	\$1,274	\$140,135	\$141,409
Manufacturing	\$0	\$6,077	\$489,375	\$495,452
Wholesale trade	\$0	\$9,921	\$664,788	\$674,709
Retail trade	\$0	\$3,343	\$1,242,728	\$1,246,071
Transportation and warehousing	\$538,454	\$67,713	\$308,457	\$914,625
Information	\$0	\$10,412	\$629,134	\$639,547
Finance and insurance	\$0	\$25,270	\$1,797,241	\$1,822,512
Real estate and rental and leasing	\$0	\$14,379	\$3,205,381	\$3,219,759
Professional, scientific, and technical services	\$0	\$14,200	\$649,042	\$663,242
Management of companies and enterprises	\$0	\$5,150	\$107,126	\$112,276
Administrative and support and waste management and remediation services	\$0	\$30,010	\$406,810	\$436,820
Educational services	\$0	\$30	\$358,731	\$358,761
Health care and social assistance	\$0	\$1	\$2,761,719	\$2,761,720
Arts, entertainment, and recreation	\$0	\$394	\$185,826	\$186,220
Accommodation and food services	\$0	\$1,400	\$757,300	\$758,700
Other services (except public administration)	\$0	\$5,064	\$754,194	\$759,259
Public administration	\$0	\$17,375	\$322,744	\$340,119
Total	\$538,454	\$215,163	\$15,199,078	\$15,952,694

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 204: Promoting Hybrid and Electric Vehicles—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$3	\$2,963	\$2,966
Mining	\$0	\$9	\$695	\$704
Utilities	\$0	\$346	\$51,499	\$51,845
Construction	\$0	\$501	\$49,288	\$49,789
Manufacturing	\$0	\$663	\$70,407	\$71,069
Wholesale trade	\$0	\$3,719	\$249,191	\$252,910
Retail trade	\$0	\$1,742	\$625,872	\$627,614
Transportation and warehousing	\$141,605	\$24,476	\$106,298	\$272,379
Information	\$0	\$2,124	\$133,966	\$136,090
Finance and insurance	\$0	\$6,610	\$502,085	\$508,695
Real estate and rental and leasing	\$0	\$1,217	\$120,701	\$121,918
Professional, scientific, and technical services	\$0	\$6,621	\$285,021	\$291,642
Management of companies and enterprises	\$0	\$2,784	\$57,904	\$60,687
Administrative and support and waste management and remediation services	\$0	\$15,824	\$178,797	\$194,621
Educational services	\$0	\$15	\$200,043	\$200,057
Health care and social assistance	\$0	\$0	\$1,328,168	\$1,328,168
Arts, entertainment, and recreation	\$0	\$128	\$68,143	\$68,271
Accommodation and food services	\$0	\$483	\$264,214	\$264,698
Other services (except public administration)	\$0	\$2,051	\$322,762	\$324,812
Public administration	\$0	\$12,317	\$114,943	\$127,260
Total	\$141,605	\$81,632	\$4,732,959	\$4,956,197

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 205: PAYD Insurance in Maryland—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.1	0.0	0.1
Manufacturing	0.0	0.0	0.0	0.1
Wholesale trade	0.0	0.0	0.1	0.1
Retail trade	0.0	0.0	0.6	0.7
Transportation and warehousing	0.0	0.1	0.1	0.2
Information	0.0	0.1	0.1	0.1
Finance and insurance	2.7	0.8	0.2	3.8
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	2.4	0.5	0.1	3.0
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.6	0.2	0.8
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.7	0.7
Arts, entertainment, and recreation	0.0	0.0	0.1	0.2
Accommodation and food services	0.0	0.1	0.4	0.4
Other services (except public administration)	0.0	0.1	0.3	0.4
Public administration	0.4	0.0	0.0	0.4
Average	5.5	2.7	3.5	11.7

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 206: PAYD Insurance in Maryland—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$49	\$683	\$732
Mining	\$0	\$871	\$336	\$1,207
Utilities	\$0	\$5,789	\$10,596	\$16,384
Construction	\$0	\$8,046	\$4,273	\$12,319
Manufacturing	\$0	\$6,675	\$13,945	\$20,620
Wholesale trade	\$0	\$5,508	\$20,677	\$26,185
Retail trade	\$0	\$491	\$39,179	\$39,670
Transportation and warehousing	\$0	\$8,233	\$9,195	\$17,428
Information	\$0	\$24,926	\$18,492	\$43,418
Finance and insurance	\$600,000	\$144,141	\$55,880	\$800,021
Real estate and rental and leasing	\$0	\$40,758	\$96,284	\$137,042
Professional, scientific, and technical services	\$300,000	\$65,093	\$19,330	\$384,423
Management of companies and enterprises	\$0	\$4,159	\$3,159	\$7,318
Administrative and support and waste management and remediation services	\$0	\$44,602	\$12,064	\$56,666
Educational services	\$0	\$55	\$10,468	\$10,524
Health care and social assistance	\$0	\$3	\$80,022	\$80,026
Arts, entertainment, and recreation	\$0	\$1,999	\$5,627	\$7,626
Accommodation and food services	\$0	\$5,979	\$23,018	\$28,998
Other services (except public administration)	\$0	\$9,846	\$22,656	\$32,502
Public administration	\$100,000	\$7,088	\$9,341	\$116,429
Average	\$1,000,000	\$384,311	\$455,225	\$1,839,536

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 207: PAYD Insurance in Maryland—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$7	\$86	\$93
Mining	\$0	\$125	\$21	\$146
Utilities	\$0	\$736	\$1,424	\$2,160
Construction	\$0	\$3,110	\$1,496	\$4,606
Manufacturing	\$0	\$1,480	\$2,029	\$3,508
Wholesale trade	\$0	\$2,065	\$7,751	\$9,815
Retail trade	\$0	\$256	\$19,731	\$19,987
Transportation and warehousing	\$0	\$3,087	\$3,162	\$6,249
Information	\$0	\$5,342	\$3,960	\$9,302
Finance and insurance	\$201,018	\$57,082	\$15,540	\$273,641
Real estate and rental and leasing	\$0	\$3,413	\$3,350	\$6,763
Professional, scientific, and technical services	\$166,302	\$30,936	\$8,493	\$205,730
Management of companies and enterprises	\$0	\$2,248	\$1,708	\$3,955
Administrative and support and waste management and remediation services	\$0	\$22,060	\$5,302	\$27,362
Educational services	\$0	\$27	\$5,887	\$5,914
Health care and social assistance	\$0	\$1	\$38,519	\$38,520
Arts, entertainment, and recreation	\$0	\$710	\$2,050	\$2,760
Accommodation and food services	\$0	\$2,068	\$8,033	\$10,101
Other services (except public administration)	\$0	\$3,580	\$9,762	\$13,342
Public administration	\$25,247	\$2,833	\$3,355	\$31,434
Average	\$392,566	\$141,165	\$141,658	\$675,389

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 208: PAYD Insurance in Maryland—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.0	0.1	0.1
Manufacturing	0.0	0.0	0.1	0.1
Wholesale trade	0.0	0.0	0.4	0.4
Retail trade	0.0	0.0	2.3	2.3
Transportation and warehousing	0.0	0.0	0.3	0.3
Information	0.0	0.0	0.2	0.2
Finance and insurance	0.0	0.0	0.8	0.8
Real estate and rental and leasing	0.0	0.0	0.9	0.9
Professional, scientific, and technical services	0.0	0.0	0.5	0.5
Management of companies and enterprises	0.0	0.0	0.1	0.1
Administrative and support and waste management and remediation services	0.0	0.0	0.6	0.6
Educational services	0.0	0.0	0.5	0.5
Health care and social assistance	0.0	0.0	2.9	2.9
Arts, entertainment, and recreation	0.0	0.0	0.4	0.4
Accommodation and food services	0.0	0.0	1.3	1.3
Other services (except public administration)	0.0	0.0	1.2	1.2
Public administration	0.0	0.0	0.2	0.2
Total	0.0	0.0	12.8	12.8

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 209: PAYD Insurance in Maryland—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$0	\$2,634	\$2,634
Mining	\$0	\$0	\$1,311	\$1,311
Utilities	\$0	\$0	\$42,646	\$42,646
Construction	\$0	\$0	\$15,583	\$15,583
Manufacturing	\$0	\$0	\$54,481	\$54,481
Wholesale trade	\$0	\$0	\$73,921	\$73,921
Retail trade	\$0	\$0	\$138,120	\$138,120
Transportation and warehousing	\$0	\$0	\$34,313	\$34,313
Information	\$0	\$0	\$70,007	\$70,007
Finance and insurance	\$0	\$0	\$199,800	\$199,800
Real estate and rental and leasing	\$0	\$0	\$356,531	\$356,531
Professional, scientific, and technical services	\$0	\$0	\$72,205	\$72,205
Management of companies and enterprises	\$0	\$0	\$11,920	\$11,920
Administrative and support and waste management and remediation services	\$0	\$0	\$45,259	\$45,259
Educational services	\$0	\$0	\$39,909	\$39,909
Health care and social assistance	\$0	\$0	\$307,361	\$307,361
Arts, entertainment, and recreation	\$0	\$0	\$20,666	\$20,666
Accommodation and food services	\$0	\$0	\$84,223	\$84,223
Other services (except public administration)	\$0	\$0	\$83,884	\$83,884
Public administration	\$0	\$0	\$35,920	\$35,920
Total	\$0	\$0	\$1,690,694	\$1,690,694

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 210: PAYD Insurance in Maryland—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$0	\$330	\$330
Mining	\$0	\$0	\$77	\$77
Utilities	\$0	\$0	\$5,736	\$5,736
Construction	\$0	\$0	\$5,481	\$5,481
Manufacturing	\$0	\$0	\$7,837	\$7,837
Wholesale trade	\$0	\$0	\$27,709	\$27,709
Retail trade	\$0	\$0	\$69,561	\$69,561
Transportation and warehousing	\$0	\$0	\$11,825	\$11,825
Information	\$0	\$0	\$14,906	\$14,906
Finance and insurance	\$0	\$0	\$55,822	\$55,822
Real estate and rental and leasing	\$0	\$0	\$13,442	\$13,442
Professional, scientific, and technical services	\$0	\$0	\$31,708	\$31,708
Management of companies and enterprises	\$0	\$0	\$6,443	\$6,443
Administrative and support and waste management and remediation services	\$0	\$0	\$19,892	\$19,892
Educational services	\$0	\$0	\$22,252	\$22,252
Health care and social assistance	\$0	\$0	\$147,814	\$147,814
Arts, entertainment, and recreation	\$0	\$0	\$7,579	\$7,579
Accommodation and food services	\$0	\$0	\$29,384	\$29,384
Other services (except public administration)	\$0	\$0	\$35,895	\$35,895
Public administration	\$0	\$0	\$12,791	\$12,791
Total	\$0	\$0	\$526,484	\$526,484

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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A.3 Agriculture and Forestry**Figure 211: Managing Forests to Capture Carbon—Investment Phase, Employment Impacts**

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	8.2	1.8	0.0	10.1
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.1	0.0	0.1
Manufacturing	0.6	0.1	0.0	0.7
Wholesale trade	0.0	0.1	0.1	0.2
Retail trade	0.0	0.0	0.6	0.6
Transportation and warehousing	0.0	0.2	0.1	0.2
Information	0.0	0.1	0.1	0.1
Finance and insurance	0.0	0.2	0.2	0.4
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	1.2	0.4	0.1	1.8
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.4	0.2	0.5
Educational services	0.0	0.1	0.1	0.2
Health care and social assistance	0.0	0.0	0.7	0.7
Arts, entertainment, and recreation	0.0	0.0	0.1	0.2
Accommodation and food services	0.0	0.1	0.3	0.4
Other services (except public administration)	1.5	0.1	0.3	1.9
Public administration	0.4	0.0	0.0	0.4
Average	11.9	3.8	3.4	19.1

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 212: Managing Forests to Capture Carbon—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$450,000	\$105,860	\$660	\$556,520
Mining	\$0	\$1,075	\$325	\$1,400
Utilities	\$0	\$10,339	\$10,202	\$20,541
Construction	\$0	\$9,344	\$4,157	\$13,501
Manufacturing	\$150,000	\$25,939	\$13,447	\$189,386
Wholesale trade	\$0	\$30,037	\$19,868	\$49,905
Retail trade	\$0	\$742	\$38,166	\$38,908
Transportation and warehousing	\$0	\$20,074	\$8,942	\$29,016
Information	\$0	\$21,080	\$17,872	\$38,952
Finance and insurance	\$0	\$31,649	\$54,320	\$85,969
Real estate and rental and leasing	\$0	\$34,493	\$93,546	\$128,039
Professional, scientific, and technical services	\$150,000	\$59,355	\$18,725	\$228,080
Management of companies and enterprises	\$0	\$4,949	\$3,056	\$8,005
Administrative and support and waste management and remediation services	\$0	\$27,657	\$11,706	\$39,363
Educational services	\$0	\$3,809	\$10,290	\$14,099
Health care and social assistance	\$0	\$65	\$77,492	\$77,557
Arts, entertainment, and recreation	\$0	\$1,996	\$5,483	\$7,479
Accommodation and food services	\$0	\$5,284	\$22,310	\$27,594
Other services (except public administration)	\$150,000	\$10,421	\$22,071	\$182,492
Public administration	\$100,000	\$8,031	\$9,043	\$117,074
Average	\$1,000,000	\$412,201	\$441,679	\$1,853,879

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 213: Managing Forests to Capture Carbon—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$128,740	\$27,218	\$84	\$156,042
Mining	\$0	\$137	\$20	\$157
Utilities	\$0	\$1,321	\$1,371	\$2,693
Construction	\$0	\$3,629	\$1,455	\$5,084
Manufacturing	\$24,916	\$3,267	\$1,959	\$30,142
Wholesale trade	\$0	\$11,259	\$7,447	\$18,706
Retail trade	\$0	\$387	\$19,221	\$19,608
Transportation and warehousing	\$0	\$6,643	\$3,073	\$9,716
Information	\$0	\$4,858	\$3,829	\$8,686
Finance and insurance	\$0	\$9,855	\$15,087	\$24,942
Real estate and rental and leasing	\$0	\$3,063	\$3,227	\$6,290
Professional, scientific, and technical services	\$83,151	\$28,310	\$8,228	\$119,689
Management of companies and enterprises	\$0	\$2,675	\$1,652	\$4,327
Administrative and support and waste management and remediation services	\$0	\$12,369	\$5,144	\$17,512
Educational services	\$0	\$1,838	\$5,795	\$7,633
Health care and social assistance	\$0	\$24	\$37,305	\$37,329
Arts, entertainment, and recreation	\$0	\$672	\$1,997	\$2,669
Accommodation and food services	\$0	\$1,828	\$7,786	\$9,614
Other services (except public administration)	\$77,397	\$4,170	\$9,516	\$91,083
Public administration	\$25,247	\$3,244	\$3,250	\$31,741
Average	\$339,451	\$126,767	\$137,445	\$603,663

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 214: Managing Forests to Capture Carbon—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.0	0.0	0.1
Manufacturing	0.0	0.1	0.0	0.1
Wholesale trade	0.0	0.0	0.1	0.1
Retail trade	0.0	0.0	0.7	0.7
Transportation and warehousing	0.0	0.1	0.1	0.2
Information	0.0	0.3	0.1	0.3
Finance and insurance	0.0	0.2	0.3	0.4
Real estate and rental and leasing	0.0	0.2	0.3	0.5
Professional, scientific, and technical services	0.0	0.8	0.2	1.0
Management of companies and enterprises	4.8	0.0	0.0	4.8
Administrative and support and waste management and remediation services	0.0	0.3	0.2	0.5
Educational services	0.0	0.0	0.2	0.2
Health care and social assistance	0.0	0.0	0.8	0.8
Arts, entertainment, and recreation	0.0	0.2	0.1	0.3
Accommodation and food services	0.0	0.1	0.4	0.5
Other services (except public administration)	0.0	0.2	0.4	0.5
Public administration	0.0	0.0	0.1	0.1
Total	4.8	2.5	3.9	11.2

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 215: Managing Forests to Capture Carbon—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$66	\$778	\$844
Mining	\$0	\$191	\$383	\$575
Utilities	\$0	\$8,697	\$12,125	\$20,822
Construction	\$0	\$3,175	\$4,822	\$7,997
Manufacturing	\$0	\$10,888	\$15,925	\$26,813
Wholesale trade	\$0	\$6,854	\$23,724	\$30,578
Retail trade	\$0	\$317	\$44,145	\$44,462
Transportation and warehousing	\$0	\$6,757	\$10,384	\$17,141
Information	\$0	\$88,506	\$21,057	\$109,563
Finance and insurance	\$0	\$34,994	\$63,141	\$98,135
Real estate and rental and leasing	\$0	\$56,979	\$108,874	\$165,853
Professional, scientific, and technical services	\$0	\$113,922	\$21,942	\$135,864
Management of companies and enterprises	\$1,038,575	\$2,268	\$3,593	\$1,044,435
Administrative and support and waste management and remediation services	\$0	\$20,985	\$13,666	\$34,651
Educational services	\$0	\$112	\$11,652	\$11,764
Health care and social assistance	\$0	\$6	\$90,881	\$90,887
Arts, entertainment, and recreation	\$0	\$6,997	\$6,338	\$13,335
Accommodation and food services	\$0	\$7,622	\$26,111	\$33,733
Other services (except public administration)	\$0	\$13,708	\$25,527	\$39,235
Public administration	\$0	\$3,389	\$10,612	\$14,001
Total	\$1,038,575	\$386,433	\$515,680	\$1,940,687

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 216: Managing Forests to Capture Carbon—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$11	\$98	\$109
Mining	\$0	\$10	\$23	\$33
Utilities	\$0	\$1,198	\$1,630	\$2,828
Construction	\$0	\$1,252	\$1,690	\$2,941
Manufacturing	\$0	\$3,320	\$2,313	\$5,633
Wholesale trade	\$0	\$2,569	\$8,893	\$11,462
Retail trade	\$0	\$165	\$22,232	\$22,397
Transportation and warehousing	\$0	\$2,303	\$3,574	\$5,878
Information	\$0	\$20,025	\$4,506	\$24,531
Finance and insurance	\$0	\$10,645	\$17,590	\$28,235
Real estate and rental and leasing	\$0	\$4,865	\$3,831	\$8,697
Professional, scientific, and technical services	\$0	\$52,900	\$9,640	\$62,540
Management of companies and enterprises	\$561,368	\$1,226	\$1,942	\$564,535
Administrative and support and waste management and remediation services	\$0	\$9,498	\$6,007	\$15,505
Educational services	\$0	\$54	\$6,540	\$6,594
Health care and social assistance	\$0	\$2	\$43,739	\$43,741
Arts, entertainment, and recreation	\$0	\$2,094	\$2,310	\$4,404
Accommodation and food services	\$0	\$2,646	\$9,112	\$11,759
Other services (except public administration)	\$0	\$6,793	\$10,990	\$17,783
Public administration	\$0	\$1,755	\$3,807	\$5,561
Total	\$561,368	\$123,330	\$160,467	\$845,165

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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**Figure 217: Creating Ecosystem Markets to Encourage GHG Emissions Reductions—
Investment Phase, Employment Impacts**

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	59.9	2.2	0.0	62.1
Mining	0.0	0.1	0.0	0.1
Utilities	2.9	0.0	0.0	3.0
Construction	13.1	1.0	0.0	14.1
Manufacturing	0.0	0.0	0.0	0.0
Wholesale trade	0.0	0.4	0.1	0.5
Retail trade	0.0	0.6	0.8	1.4
Transportation and warehousing	0.0	0.5	0.1	0.6
Information	0.0	-1.9	0.1	-1.8
Finance and insurance	0.0	-0.2	0.3	0.1
Real estate and rental and leasing	0.0	-0.4	0.2	-0.2
Professional, scientific, and technical services	30.0	-1.4	0.2	28.8
Management of companies and enterprises	-41.7	0.1	0.0	-41.5
Administrative and support and waste management and remediation services	0.0	2.0	0.2	2.2
Educational services	0.0	0.1	0.2	0.3
Health care and social assistance	0.0	0.0	0.8	0.8
Arts, entertainment, and recreation	0.0	-1.0	0.1	-0.9
Accommodation and food services	0.0	0.2	0.4	0.5
Other services (except public administration)	1.3	-0.3	0.4	1.4
Public administration	3.6	0.2	0.1	3.8
Average	69.1	2.2	4.0	75.3

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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**Figure 218: Creating Ecosystem Markets to Encourage GHG Emissions Reductions—
Investment Phase, Output Impacts**

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$1,830,000	\$65,415	\$710	\$1,896,126
Mining	\$0	\$25,655	\$348	\$26,003
Utilities	\$1,508,571	\$1,156	\$10,290	\$1,520,017
Construction	\$1,731,429	\$121,385	\$5,078	\$1,857,891
Manufacturing	\$0	\$143,327	\$13,985	\$157,312
Wholesale trade	\$0	\$92,864	\$19,205	\$112,069
Retail trade	\$0	\$35,107	\$47,579	\$82,686
Transportation and warehousing	\$0	\$80,214	\$10,836	\$91,050
Information	\$0	-\$577,785	\$19,397	-\$558,388
Finance and insurance	\$0	-\$12,732	\$65,380	\$52,648
Real estate and rental and leasing	\$0	-\$163,420	\$111,579	-\$51,841
Professional, scientific, and technical services	\$3,801,429	-\$151,031	\$21,222	\$3,671,619
Management of companies and enterprises	-\$9,000,000	\$24,252	\$3,378	-\$8,972,370
Administrative and support and waste management and remediation services	\$0	\$134,979	\$13,648	\$148,627
Educational services	\$0	\$7,910	\$14,690	\$22,600
Health care and social assistance	\$0	\$40	\$87,251	\$87,291
Arts, entertainment, and recreation	\$0	-\$41,171	\$6,863	-\$34,308
Accommodation and food services	\$0	\$9,959	\$25,522	\$35,482
Other services (except public administration)	\$128,571	-\$11,994	\$27,527	\$144,104
Public administration	\$1,000,000	\$44,381	\$10,135	\$1,054,517
Average	\$1,000,000	-\$171,489	\$514,625	\$1,343,136

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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**Figure 219: Creating Ecosystem Markets to Encourage GHG Emissions Reductions—
Investment Phase, Wage Impacts**

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$1,021,024	\$35,758	\$93	\$1,056,875
Mining	\$0	\$3,503	\$23	\$3,526
Utilities	\$276,509	-\$960	\$1,380	\$276,929
Construction	\$652,055	\$47,576	\$1,761	\$701,392
Manufacturing	\$0	\$3,963	\$2,091	\$6,054
Wholesale trade	\$0	\$34,809	\$7,199	\$42,008
Retail trade	\$0	\$18,297	\$23,961	\$42,258
Transportation and warehousing	\$0	\$26,053	\$3,682	\$29,735
Information	\$0	-\$131,989	\$4,191	-\$127,798
Finance and insurance	\$0	-\$9,871	\$17,757	\$7,887
Real estate and rental and leasing	\$0	-\$11,926	\$3,284	-\$8,643
Professional, scientific, and technical services	\$2,067,124	-\$62,618	\$9,341	\$2,013,847
Management of companies and enterprises	-\$4,864,658	\$13,109	\$1,826	-\$4,849,723
Administrative and support and waste management and remediation services	\$0	\$66,442	\$5,984	\$72,426
Educational services	\$0	\$4,147	\$8,441	\$12,588
Health care and social assistance	\$0	\$15	\$42,097	\$42,112
Arts, entertainment, and recreation	\$0	-\$11,478	\$2,484	-\$8,994
Accommodation and food services	\$0	\$3,473	\$8,908	\$12,382
Other services (except public administration)	\$66,340	-\$19,085	\$11,983	\$59,238
Public administration	\$252,465	\$13,841	\$3,700	\$270,007
Average	-\$529,140	\$23,059	\$160,188	-\$345,894

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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**Figure 220: Creating Ecosystem Markets to Encourage GHG Emissions Reductions—
Operation Phase, Employment Impacts**

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.5	3.9	4.4
Mining	0.0	1.8	0.7	2.5
Utilities	0.0	4.6	5.2	9.8
Construction	0.0	32.7	15.4	48.1
Manufacturing	0.0	23.7	14.8	38.5
Wholesale trade	0.0	17.9	47.0	64.9
Retail trade	0.0	3.6	298.7	302.3
Transportation and warehousing	0.0	29.8	37.7	67.5
Information	0.0	111.0	27.2	138.2
Finance and insurance	0.0	73.7	110.8	184.5
Real estate and rental and leasing	0.0	113.4	103.3	216.7
Professional, scientific, and technical services	0.0	360.5	65.9	426.4
Management of companies and enterprises	1,839.2	4.7	6.9	1,850.7
Administrative and support and waste management and remediation services	0.0	130.3	78.0	208.3
Educational services	0.0	0.7	65.4	66.1
Health care and social assistance	0.0	0.0	350.1	350.2
Arts, entertainment, and recreation	0.0	66.5	50.9	117.5
Accommodation and food services	0.0	48.5	166.5	214.9
Other services (except public administration)	0.0	63.4	146.2	209.6
Public administration	151.8	14.9	21.4	188.2
Total	1,991.0	1,102.3	1,615.9	4,709.2

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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**Figure 221: Creating Ecosystem Markets to Encourage GHG Emissions Reductions—
Operation Phase, Output Impacts**

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$33,590	\$320,571	\$354,160
Mining	\$0	\$407,381	\$157,879	\$565,260
Utilities	\$0	\$4,562,223	\$4,994,859	\$9,557,082
Construction	\$0	\$4,118,093	\$1,987,714	\$6,105,807
Manufacturing	\$0	\$5,568,479	\$6,561,053	\$12,129,532
Wholesale trade	\$0	\$3,731,342	\$9,772,073	\$13,503,415
Retail trade	\$0	\$219,466	\$18,198,496	\$18,417,963
Transportation and warehousing	\$0	\$3,511,828	\$4,280,279	\$7,792,107
Information	\$0	\$34,650,705	\$8,676,535	\$43,327,240
Finance and insurance	\$0	\$16,211,916	\$26,026,332	\$42,238,247
Real estate and rental and leasing	\$0	\$25,120,583	\$44,875,364	\$69,995,947
Professional, scientific, and technical services	\$0	\$49,135,649	\$9,042,507	\$58,178,156
Management of companies and enterprises	\$397,257,785	\$1,016,910	\$1,480,426	\$399,755,121
Administrative and support and waste management and remediation services	\$0	\$10,498,184	\$5,632,367	\$16,130,551
Educational services	\$0	\$52,065	\$4,806,309	\$4,858,374
Health care and social assistance	\$0	\$2,440	\$37,452,034	\$37,454,474
Arts, entertainment, and recreation	\$0	\$2,748,668	\$2,612,728	\$5,361,396
Accommodation and food services	\$0	\$3,169,228	\$10,760,942	\$13,930,170
Other services (except public administration)	\$0	\$5,659,140	\$10,523,312	\$16,182,452
Public administration	\$42,400,106	\$2,956,352	\$4,373,240	\$49,729,699
Total	\$439,657,890	\$173,374,242	\$212,535,019	\$825,567,152

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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**Figure 222: Creating Ecosystem Markets to Encourage GHG Emissions Reductions—
Operation Phase, Wage Impacts**

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$5,258	\$40,456	\$45,714
Mining	\$0	\$54,599	\$9,649	\$64,248
Utilities	\$0	\$602,011	\$671,586	\$1,273,597
Construction	\$0	\$1,599,871	\$696,428	\$2,296,300
Manufacturing	\$0	\$1,525,374	\$952,873	\$2,478,247
Wholesale trade	\$0	\$1,398,670	\$3,662,999	\$5,061,669
Retail trade	\$0	\$114,380	\$9,165,022	\$9,279,401
Transportation and warehousing	\$0	\$1,208,133	\$1,473,345	\$2,681,478
Information	\$0	\$7,835,150	\$1,856,930	\$9,692,080
Finance and insurance	\$0	\$4,900,641	\$7,250,034	\$12,150,674
Real estate and rental and leasing	\$0	\$2,122,600	\$1,578,437	\$3,701,037
Professional, scientific, and technical services	\$0	\$22,911,848	\$3,972,528	\$26,884,377
Management of companies and enterprises	\$214,724,807	\$549,658	\$800,196	\$216,074,661
Administrative and support and waste management and remediation services	\$0	\$4,627,104	\$2,475,739	\$7,102,843
Educational services	\$0	\$25,241	\$2,697,651	\$2,722,892
Health care and social assistance	\$0	\$895	\$18,024,783	\$18,025,678
Arts, entertainment, and recreation	\$0	\$825,862	\$952,361	\$1,778,222
Accommodation and food services	\$0	\$1,099,402	\$3,755,334	\$4,854,736
Other services (except public administration)	\$0	\$2,740,623	\$4,530,796	\$7,271,418
Public administration	\$10,704,551	\$1,127,013	\$1,568,785	\$13,400,349
Total	\$225,429,357	\$55,274,334	\$66,135,931	\$346,839,622

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 223: Increasing Urban Trees to Capture Carbon—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	1.8	0.2	0.0	2.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.2	0.0	0.0	0.2
Construction	0.0	0.1	0.0	0.1
Manufacturing	0.0	0.0	0.0	0.1
Wholesale trade	0.9	0.1	0.1	1.0
Retail trade	0.0	0.0	0.6	0.6
Transportation and warehousing	0.0	0.2	0.1	0.2
Information	0.0	0.1	0.1	0.1
Finance and insurance	0.0	0.1	0.2	0.3
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	1.5	0.4	0.1	2.0
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	2.8	0.4	0.2	3.4
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.7	0.7
Arts, entertainment, and recreation	0.0	0.0	0.1	0.1
Accommodation and food services	0.0	0.1	0.3	0.4
Other services (except public administration)	0.0	0.1	0.3	0.4
Public administration	0.4	0.0	0.0	0.5
Average	7.4	2.2	3.2	12.9

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 224: Increasing Urban Trees to Capture Carbon—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$180,000	\$9,079	\$636	\$189,715
Mining	\$0	\$2,599	\$313	\$2,912
Utilities	\$180,000	\$9,086	\$9,830	\$198,916
Construction	\$0	\$13,266	\$4,013	\$17,280
Manufacturing	\$0	\$13,214	\$12,960	\$26,175
Wholesale trade	\$180,000	\$17,947	\$19,135	\$217,082
Retail trade	\$0	\$1,227	\$36,857	\$38,084
Transportation and warehousing	\$0	\$20,088	\$8,632	\$28,720
Information	\$0	\$25,946	\$17,232	\$43,179
Finance and insurance	\$0	\$29,488	\$52,435	\$81,923
Real estate and rental and leasing	\$0	\$37,420	\$90,291	\$127,711
Professional, scientific, and technical services	\$180,000	\$57,097	\$18,063	\$255,161
Management of companies and enterprises	\$0	\$6,754	\$2,947	\$9,701
Administrative and support and waste management and remediation services	\$180,000	\$29,834	\$11,296	\$221,130
Educational services	\$0	\$538	\$9,954	\$10,492
Health care and social assistance	\$0	\$3	\$74,748	\$74,751
Arts, entertainment, and recreation	\$0	\$1,843	\$5,295	\$7,138
Accommodation and food services	\$0	\$6,985	\$21,524	\$28,509
Other services (except public administration)	\$0	\$9,432	\$21,314	\$30,746
Public administration	\$100,000	\$8,899	\$8,723	\$117,622
Average	\$1,000,000	\$300,745	\$426,200	\$1,726,945

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 225: Increasing Urban Trees to Capture Carbon—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$59,920	\$4,296	\$81	\$64,296
Mining	\$0	\$150	\$19	\$169
Utilities	\$26,300	\$1,126	\$1,321	\$28,747
Construction	\$0	\$5,193	\$1,404	\$6,597
Manufacturing	\$0	\$1,997	\$1,888	\$3,885
Wholesale trade	\$67,472	\$6,727	\$7,173	\$81,372
Retail trade	\$0	\$639	\$18,562	\$19,201
Transportation and warehousing	\$0	\$7,116	\$2,966	\$10,083
Information	\$0	\$5,635	\$3,692	\$9,327
Finance and insurance	\$0	\$8,139	\$14,560	\$22,699
Real estate and rental and leasing	\$0	\$3,626	\$3,110	\$6,736
Professional, scientific, and technical services	\$99,781	\$26,333	\$7,937	\$134,052
Management of companies and enterprises	\$0	\$3,651	\$1,593	\$5,244
Administrative and support and waste management and remediation services	\$62,246	\$13,860	\$4,964	\$81,069
Educational services	\$0	\$272	\$5,607	\$5,879
Health care and social assistance	\$0	\$1	\$35,985	\$35,986
Arts, entertainment, and recreation	\$0	\$647	\$1,928	\$2,575
Accommodation and food services	\$0	\$2,425	\$7,512	\$9,937
Other services (except public administration)	\$0	\$3,615	\$9,190	\$12,806
Public administration	\$25,247	\$3,823	\$3,136	\$32,205
Average	\$340,965	\$99,271	\$132,628	\$572,864

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 226: Increasing Urban Trees to Capture Carbon—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.3	2.5	2.8
Mining	0.0	0.2	0.4	0.6
Utilities	0.0	2.4	3.3	5.7
Construction	0.0	6.7	9.9	16.5
Manufacturing	0.0	13.8	9.5	23.2
Wholesale trade	0.0	8.7	30.1	38.8
Retail trade	0.0	1.4	191.3	192.6
Transportation and warehousing	0.0	15.5	24.2	39.6
Information	0.0	74.9	17.4	92.3
Finance and insurance	0.0	42.2	71.0	113.1
Real estate and rental and leasing	0.0	65.5	66.2	131.7
Professional, scientific, and technical services	0.0	221.5	42.2	263.7
Management of companies and enterprises	1,269.2	2.8	4.4	1,276.4
Administrative and support and waste management and remediation services	0.0	70.3	49.9	120.3
Educational services	0.0	0.4	41.9	42.3
Health care and social assistance	0.0	0.0	224.3	224.3
Arts, entertainment, and recreation	0.0	44.6	32.6	77.2
Accommodation and food services	0.0	30.8	106.6	137.4
Other services (except public administration)	0.0	41.2	93.6	134.8
Public administration	0.0	5.9	13.7	19.7
Total	1,269.2	648.9	1,034.9	2,953.1

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 227: Increasing Urban Trees to Capture Carbon—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$17,478	\$205,373	\$222,851
Mining	\$0	\$50,519	\$101,146	\$151,665
Utilities	\$0	\$2,295,807	\$3,200,576	\$5,496,383
Construction	\$0	\$838,212	\$1,272,884	\$2,111,096
Manufacturing	\$0	\$2,873,996	\$4,203,774	\$7,077,771
Wholesale trade	\$0	\$1,809,232	\$6,262,436	\$8,071,668
Retail trade	\$0	\$83,664	\$11,652,998	\$11,736,662
Transportation and warehousing	\$0	\$1,783,645	\$2,741,066	\$4,524,711
Information	\$0	\$23,363,102	\$5,558,472	\$28,921,573
Finance and insurance	\$0	\$9,237,490	\$16,667,522	\$25,905,013
Real estate and rental and leasing	\$0	\$15,040,857	\$28,739,558	\$43,780,415
Professional, scientific, and technical services	\$0	\$30,072,091	\$5,792,114	\$35,864,205
Management of companies and enterprises	\$274,154,494	\$598,566	\$948,354	\$275,701,415
Administrative and support and waste management and remediation services	\$0	\$5,539,550	\$3,607,428	\$9,146,977
Educational services	\$0	\$29,522	\$3,075,901	\$3,105,423
Health care and social assistance	\$0	\$1,473	\$23,990,158	\$23,991,631
Arts, entertainment, and recreation	\$0	\$1,846,962	\$1,672,976	\$3,519,938
Accommodation and food services	\$0	\$2,011,928	\$6,892,631	\$8,904,558
Other services (except public administration)	\$0	\$3,618,629	\$6,738,355	\$10,356,984
Public administration	\$0	\$894,647	\$2,801,352	\$3,695,999
Total	\$274,154,494	\$102,007,371	\$136,125,073	\$512,286,938

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 228: Increasing Urban Trees to Capture Carbon—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$2,892	\$25,916	\$28,807
Mining	\$0	\$2,512	\$6,180	\$8,691
Utilities	\$0	\$316,183	\$430,338	\$746,521
Construction	\$0	\$330,376	\$445,990	\$776,366
Manufacturing	\$0	\$876,420	\$610,474	\$1,486,894
Wholesale trade	\$0	\$678,179	\$2,347,434	\$3,025,613
Retail trade	\$0	\$43,604	\$5,868,616	\$5,912,219
Transportation and warehousing	\$0	\$607,997	\$943,560	\$1,551,557
Information	\$0	\$5,285,923	\$1,189,578	\$6,475,501
Finance and insurance	\$0	\$2,809,938	\$4,643,360	\$7,453,299
Real estate and rental and leasing	\$0	\$1,284,246	\$1,011,395	\$2,295,641
Professional, scientific, and technical services	\$0	\$13,964,193	\$2,544,560	\$16,508,753
Management of companies and enterprises	\$148,185,317	\$323,536	\$512,602	\$149,021,455
Administrative and support and waste management and remediation services	\$0	\$2,507,261	\$1,585,677	\$4,092,938
Educational services	\$0	\$14,295	\$1,726,262	\$1,740,557
Health care and social assistance	\$0	\$540	\$11,545,814	\$11,546,354
Arts, entertainment, and recreation	\$0	\$552,646	\$609,827	\$1,162,473
Accommodation and food services	\$0	\$698,565	\$2,405,377	\$3,103,941
Other services (except public administration)	\$0	\$1,793,128	\$2,901,082	\$4,694,211
Public administration	\$0	\$463,212	\$1,004,859	\$1,468,071
Total	\$148,185,317	\$32,555,646	\$42,358,902	\$223,099,866

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 229: Creating and Protecting Wetlands and Waterway Borders to Capture Carbon—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	26.9	1.5	0.0	28.4
Mining	0.0	0.1	0.0	0.1
Utilities	2.4	0.1	0.1	2.5
Construction	9.5	0.8	0.2	10.5
Manufacturing	3.1	0.4	0.2	3.6
Wholesale trade	0.0	0.7	0.5	1.2
Retail trade	0.0	0.5	3.4	3.9
Transportation and warehousing	0.0	0.8	0.4	1.2
Information	0.0	0.4	0.3	0.7
Finance and insurance	0.0	0.8	1.3	2.0
Real estate and rental and leasing	0.0	1.0	1.1	2.2
Professional, scientific, and technical services	5.1	3.2	0.7	9.0
Management of companies and enterprises	0.0	0.2	0.1	0.3
Administrative and support and waste management and remediation services	0.0	2.0	0.9	2.9
Educational services	0.0	0.2	0.8	1.0
Health care and social assistance	0.0	0.0	4.0	4.0
Arts, entertainment, and recreation	0.0	0.2	0.6	0.8
Accommodation and food services	0.0	0.4	1.9	2.3
Other services (except public administration)	6.2	0.6	1.7	8.5
Public administration	2.0	0.2	0.2	2.5
Average	55.1	14.0	18.3	87.4

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 230: Creating and Protecting Wetlands and Waterway Borders to Capture Carbon—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$112,500	\$28,359	\$647	\$141,506
Mining	\$0	\$2,627	\$319	\$2,945
Utilities	\$112,500	\$13,249	\$10,024	\$135,773
Construction	\$225,000	\$18,522	\$4,062	\$247,584
Manufacturing	\$225,000	\$32,210	\$13,202	\$270,411
Wholesale trade	\$0	\$25,109	\$19,542	\$44,651
Retail trade	\$0	\$5,549	\$37,270	\$42,820
Transportation and warehousing	\$0	\$18,530	\$8,740	\$27,270
Information	\$0	\$21,901	\$17,525	\$39,426
Finance and insurance	\$0	\$29,339	\$53,104	\$82,443
Real estate and rental and leasing	\$0	\$35,583	\$91,477	\$127,060
Professional, scientific, and technical services	\$112,500	\$81,411	\$18,339	\$212,250
Management of companies and enterprises	\$0	\$7,962	\$2,995	\$10,957
Administrative and support and waste management and remediation services	\$0	\$26,949	\$11,455	\$38,404
Educational services	\$0	\$2,474	\$10,001	\$12,476
Health care and social assistance	\$0	\$50	\$75,909	\$75,958
Arts, entertainment, and recreation	\$0	\$1,610	\$5,353	\$6,963
Accommodation and food services	\$0	\$5,296	\$21,844	\$27,140
Other services (except public administration)	\$112,500	\$10,347	\$21,553	\$144,399
Public administration	\$100,000	\$8,034	\$8,860	\$116,894
Average	\$1,000,000	\$375,110	\$432,220	\$1,807,330

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 231: Creating and Protecting Wetlands and Waterway Borders to Capture Carbon—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$78,917	\$3,507	\$82	\$82,506
Mining	\$0	\$445	\$20	\$464
Utilities	\$29,584	\$1,678	\$1,347	\$32,609
Construction	\$84,735	\$7,289	\$1,422	\$93,446
Manufacturing	\$24,836	\$4,553	\$1,922	\$31,311
Wholesale trade	\$0	\$9,412	\$7,325	\$16,737
Retail trade	\$0	\$2,892	\$18,770	\$21,662
Transportation and warehousing	\$0	\$6,126	\$3,005	\$9,131
Information	\$0	\$4,914	\$3,754	\$8,667
Finance and insurance	\$0	\$8,955	\$14,759	\$23,714
Real estate and rental and leasing	\$0	\$3,293	\$3,170	\$6,463
Professional, scientific, and technical services	\$62,363	\$38,675	\$8,058	\$109,096
Management of companies and enterprises	\$0	\$4,304	\$1,619	\$5,923
Administrative and support and waste management and remediation services	\$0	\$12,031	\$5,034	\$17,065
Educational services	\$0	\$1,168	\$5,628	\$6,796
Health care and social assistance	\$0	\$18	\$36,541	\$36,559
Arts, entertainment, and recreation	\$0	\$582	\$1,950	\$2,532
Accommodation and food services	\$0	\$1,833	\$7,623	\$9,456
Other services (except public administration)	\$58,048	\$4,152	\$9,289	\$71,489
Public administration	\$25,247	\$3,206	\$3,183	\$31,636
Average	\$363,729	\$119,032	\$134,500	\$617,261

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 232: Creating and Protecting Wetlands and Waterway Borders to Capture Carbon—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	2.9	2.9
Mining	0.0	0.0	0.5	0.5
Utilities	0.0	0.0	4.1	4.1
Construction	0.0	0.0	11.1	11.1
Manufacturing	0.0	0.0	11.2	11.2
Wholesale trade	0.0	0.0	32.8	32.8
Retail trade	0.0	0.0	208.9	208.9
Transportation and warehousing	0.0	0.0	28.1	28.1
Information	0.0	0.0	20.0	20.0
Finance and insurance	0.0	0.0	78.3	78.3
Real estate and rental and leasing	0.0	0.0	81.9	81.9
Professional, scientific, and technical services	0.0	0.0	48.4	48.4
Management of companies and enterprises	0.0	0.0	5.1	5.1
Administrative and support and waste management and remediation services	0.0	0.0	57.6	57.6
Educational services	0.0	0.0	47.9	47.9
Health care and social assistance	0.0	0.0	262.9	262.9
Arts, entertainment, and recreation	0.0	0.0	37.2	37.2
Accommodation and food services	0.0	0.0	120.0	120.0
Other services (except public administration)	0.0	0.0	106.7	106.7
Public administration	0.0	0.0	16.1	16.1
Total	0.0	0.0	1,181.7	1,181.7

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 233: Creating and Protecting Wetlands and Waterway Borders to Capture Carbon—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$0	\$242,714	\$242,714
Mining	\$0	\$0	\$120,818	\$120,818
Utilities	\$0	\$0	\$3,930,150	\$3,930,150
Construction	\$0	\$0	\$1,436,104	\$1,436,104
Manufacturing	\$0	\$0	\$5,020,813	\$5,020,813
Wholesale trade	\$0	\$0	\$6,812,364	\$6,812,364
Retail trade	\$0	\$0	\$12,728,697	\$12,728,697
Transportation and warehousing	\$0	\$0	\$3,162,151	\$3,162,151
Information	\$0	\$0	\$6,451,626	\$6,451,626
Finance and insurance	\$0	\$0	\$18,413,016	\$18,413,016
Real estate and rental and leasing	\$0	\$0	\$32,856,867	\$32,856,867
Professional, scientific, and technical services	\$0	\$0	\$6,654,223	\$6,654,223
Management of companies and enterprises	\$0	\$0	\$1,098,482	\$1,098,482
Administrative and support and waste management and remediation services	\$0	\$0	\$4,170,897	\$4,170,897
Educational services	\$0	\$0	\$3,677,931	\$3,677,931
Health care and social assistance	\$0	\$0	\$28,325,488	\$28,325,488
Arts, entertainment, and recreation	\$0	\$0	\$1,904,487	\$1,904,487
Accommodation and food services	\$0	\$0	\$7,761,731	\$7,761,731
Other services (except public administration)	\$0	\$0	\$7,730,495	\$7,730,495
Public administration	\$0	\$0	\$3,310,281	\$3,310,281
Total	\$0	\$0	\$155,809,336	\$155,809,336

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 234: Creating and Protecting Wetlands and Waterway Borders to Capture Carbon—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$0	\$30,386	\$30,386
Mining	\$0	\$0	\$7,130	\$7,130
Utilities	\$0	\$0	\$528,589	\$528,589
Construction	\$0	\$0	\$505,141	\$505,141
Manufacturing	\$0	\$0	\$722,217	\$722,217
Wholesale trade	\$0	\$0	\$2,553,571	\$2,553,571
Retail trade	\$0	\$0	\$6,410,526	\$6,410,526
Transportation and warehousing	\$0	\$0	\$1,089,761	\$1,089,761
Information	\$0	\$0	\$1,373,669	\$1,373,669
Finance and insurance	\$0	\$0	\$5,144,422	\$5,144,422
Real estate and rental and leasing	\$0	\$0	\$1,238,812	\$1,238,812
Professional, scientific, and technical services	\$0	\$0	\$2,922,119	\$2,922,119
Management of companies and enterprises	\$0	\$0	\$593,749	\$593,749
Administrative and support and waste management and remediation services	\$0	\$0	\$1,833,157	\$1,833,157
Educational services	\$0	\$0	\$2,050,653	\$2,050,653
Health care and social assistance	\$0	\$0	\$13,622,112	\$13,622,112
Arts, entertainment, and recreation	\$0	\$0	\$698,452	\$698,452
Accommodation and food services	\$0	\$0	\$2,707,979	\$2,707,979
Other services (except public administration)	\$0	\$0	\$3,307,937	\$3,307,937
Public administration	\$0	\$0	\$1,178,774	\$1,178,774
Total	\$0	\$0	\$48,519,158	\$48,519,158

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 235: Geological Opportunities to Store Carbon—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.4	0.0	0.0	0.4
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.1	0.0	0.1
Manufacturing	0.0	0.0	0.0	0.1
Wholesale trade	0.0	0.1	0.1	0.2
Retail trade	0.0	0.0	0.7	0.7
Transportation and warehousing	0.0	0.1	0.1	0.2
Information	0.0	0.1	0.1	0.1
Finance and insurance	0.0	0.2	0.3	0.4
Real estate and rental and leasing	0.0	0.2	0.2	0.5
Professional, scientific, and technical services	4.7	1.0	0.1	5.9
Management of companies and enterprises	0.0	0.0	0.0	0.1
Administrative and support and waste management and remediation services	0.0	0.7	0.2	0.9
Educational services	0.0	0.0	0.2	0.2
Health care and social assistance	0.0	0.0	0.8	0.8
Arts, entertainment, and recreation	0.0	0.1	0.1	0.2
Accommodation and food services	0.0	0.2	0.4	0.5
Other services (except public administration)	0.0	0.1	0.3	0.5
Public administration	0.4	0.0	0.0	0.5
Average	5.5	3.0	3.7	12.1

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 236: Geological Opportunities to Store Carbon—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$537	\$719	\$1,256
Mining	\$225,000	\$16,990	\$354	\$242,344
Utilities	\$0	\$10,459	\$11,143	\$21,602
Construction	\$0	\$12,701	\$4,510	\$17,211
Manufacturing	\$0	\$23,354	\$14,673	\$38,027
Wholesale trade	\$0	\$15,011	\$21,729	\$36,740
Retail trade	\$0	\$978	\$41,375	\$42,352
Transportation and warehousing	\$0	\$13,200	\$9,704	\$22,904
Information	\$0	\$25,414	\$19,474	\$44,887
Finance and insurance	\$0	\$39,789	\$58,967	\$98,756
Real estate and rental and leasing	\$0	\$48,522	\$101,584	\$150,105
Professional, scientific, and technical services	\$675,000	\$139,862	\$20,372	\$835,235
Management of companies and enterprises	\$0	\$9,007	\$3,328	\$12,335
Administrative and support and waste management and remediation services	\$0	\$50,349	\$12,722	\$63,071
Educational services	\$0	\$149	\$11,091	\$11,239
Health care and social assistance	\$0	\$5	\$84,328	\$84,333
Arts, entertainment, and recreation	\$0	\$2,364	\$5,943	\$8,306
Accommodation and food services	\$0	\$10,472	\$24,265	\$34,736
Other services (except public administration)	\$0	\$11,882	\$23,926	\$35,808
Public administration	\$100,000	\$8,680	\$9,843	\$118,523
Average	\$1,000,000	\$439,722	\$480,049	\$1,919,771

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 237: Geological Opportunities to Store Carbon—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$123	\$91	\$214
Mining	\$27,048	\$2,080	\$22	\$29,150
Utilities	\$0	\$1,285	\$1,498	\$2,783
Construction	\$0	\$4,965	\$1,579	\$6,544
Manufacturing	\$0	\$3,312	\$2,136	\$5,448
Wholesale trade	\$0	\$5,627	\$8,145	\$13,772
Retail trade	\$0	\$509	\$20,837	\$21,346
Transportation and warehousing	\$0	\$4,576	\$3,337	\$7,912
Information	\$0	\$5,804	\$4,171	\$9,974
Finance and insurance	\$0	\$11,364	\$16,391	\$27,755
Real estate and rental and leasing	\$0	\$3,924	\$3,524	\$7,448
Professional, scientific, and technical services	\$340,233	\$66,020	\$8,951	\$415,205
Management of companies and enterprises	\$0	\$4,868	\$1,799	\$6,667
Administrative and support and waste management and remediation services	\$0	\$23,006	\$5,591	\$28,597
Educational services	\$0	\$76	\$6,240	\$6,316
Health care and social assistance	\$0	\$2	\$40,593	\$40,595
Arts, entertainment, and recreation	\$0	\$834	\$2,165	\$2,999
Accommodation and food services	\$0	\$3,638	\$8,468	\$12,106
Other services (except public administration)	\$0	\$4,804	\$10,311	\$15,115
Public administration	\$25,247	\$3,514	\$3,536	\$32,296
Average	\$392,528	\$150,331	\$149,384	\$692,243

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 238: Geological Opportunities to Store Carbon—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.1	0.6	0.7
Mining	0.0	0.0	0.1	0.2
Utilities	0.0	0.6	0.8	1.4
Construction	0.0	1.6	2.4	4.0
Manufacturing	0.0	3.3	2.3	5.6
Wholesale trade	0.0	2.1	7.3	9.4
Retail trade	0.0	0.3	46.3	46.7
Transportation and warehousing	0.0	3.7	5.9	9.6
Information	0.0	18.1	4.2	22.4
Finance and insurance	0.0	10.2	17.2	27.4
Real estate and rental and leasing	0.0	15.9	16.0	31.9
Professional, scientific, and technical services	0.0	53.6	10.2	63.9
Management of companies and enterprises	307.4	0.7	1.1	309.1
Administrative and support and waste management and remediation services	0.0	17.0	12.1	29.1
Educational services	0.0	0.1	10.1	10.2
Health care and social assistance	0.0	0.0	54.3	54.3
Arts, entertainment, and recreation	0.0	10.8	7.9	18.7
Accommodation and food services	0.0	7.5	25.8	33.3
Other services (except public administration)	0.0	10.0	22.7	32.6
Public administration	0.0	1.4	3.3	4.8
Total	307.4	157.2	250.6	715.2

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 239: Geological Opportunities to Store Carbon—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$4,233	\$49,736	\$53,969
Mining	\$0	\$12,234	\$24,495	\$36,729
Utilities	\$0	\$555,983	\$775,094	\$1,331,077
Construction	\$0	\$202,993	\$308,258	\$511,251
Manufacturing	\$0	\$696,005	\$1,018,042	\$1,714,047
Wholesale trade	\$0	\$438,148	\$1,516,595	\$1,954,742
Retail trade	\$0	\$20,261	\$2,822,045	\$2,842,306
Transportation and warehousing	\$0	\$431,951	\$663,813	\$1,095,764
Information	\$0	\$5,657,919	\$1,346,113	\$7,004,032
Finance and insurance	\$0	\$2,237,073	\$4,036,428	\$6,273,502
Real estate and rental and leasing	\$0	\$3,642,494	\$6,959,953	\$10,602,446
Professional, scientific, and technical services	\$0	\$7,282,657	\$1,402,695	\$8,685,352
Management of companies and enterprises	\$66,392,892	\$144,957	\$229,666	\$66,767,514
Administrative and support and waste management and remediation services	\$0	\$1,341,531	\$873,623	\$2,215,153
Educational services	\$0	\$7,149	\$744,901	\$752,050
Health care and social assistance	\$0	\$357	\$5,809,775	\$5,810,132
Arts, entertainment, and recreation	\$0	\$447,285	\$405,150	\$852,435
Accommodation and food services	\$0	\$487,235	\$1,669,211	\$2,156,446
Other services (except public administration)	\$0	\$876,335	\$1,631,850	\$2,508,185
Public administration	\$0	\$216,660	\$678,413	\$895,072
Total	\$66,392,892	\$24,703,459	\$32,965,854	\$124,062,205

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 240: Geological Opportunities to Store Carbon—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$700	\$6,276	\$6,976
Mining	\$0	\$608	\$1,497	\$2,105
Utilities	\$0	\$76,571	\$104,216	\$180,787
Construction	\$0	\$80,008	\$108,007	\$188,015
Manufacturing	\$0	\$212,246	\$147,840	\$360,086
Wholesale trade	\$0	\$164,237	\$568,486	\$732,723
Retail trade	\$0	\$10,560	\$1,421,222	\$1,431,782
Transportation and warehousing	\$0	\$147,241	\$228,505	\$375,746
Information	\$0	\$1,280,109	\$288,084	\$1,568,193
Finance and insurance	\$0	\$680,492	\$1,124,498	\$1,804,990
Real estate and rental and leasing	\$0	\$311,010	\$244,933	\$555,943
Professional, scientific, and technical services	\$0	\$3,381,754	\$616,224	\$3,997,979
Management of companies and enterprises	\$35,886,523	\$78,352	\$124,139	\$36,089,014
Administrative and support and waste management and remediation services	\$0	\$607,192	\$384,009	\$991,200
Educational services	\$0	\$3,462	\$418,055	\$421,516
Health care and social assistance	\$0	\$131	\$2,796,088	\$2,796,218
Arts, entertainment, and recreation	\$0	\$133,836	\$147,684	\$281,520
Accommodation and food services	\$0	\$169,174	\$582,518	\$751,692
Other services (except public administration)	\$0	\$434,248	\$702,565	\$1,136,812
Public administration	\$0	\$112,178	\$243,350	\$355,528
Total	\$35,886,523	\$7,884,107	\$10,258,194	\$54,028,825

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 241: Planting Forests in Maryland—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	5.3	0.4	0.0	5.6
Mining	0.0	0.0	0.0	0.0
Utilities	0.4	0.0	0.0	0.4
Construction	1.5	0.1	0.0	1.7
Manufacturing	0.4	0.1	0.0	0.5
Wholesale trade	0.5	0.1	0.1	0.7
Retail trade	0.0	0.1	0.7	0.7
Transportation and warehousing	0.0	0.2	0.1	0.3
Information	0.0	0.1	0.1	0.1
Finance and insurance	0.0	0.1	0.2	0.4
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	0.8	0.5	0.1	1.5
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.4	0.2	0.5
Educational services	0.0	0.0	0.2	0.2
Health care and social assistance	0.0	0.0	0.8	0.8
Arts, entertainment, and recreation	0.0	0.0	0.1	0.2
Accommodation and food services	0.0	0.1	0.4	0.4
Other services (except public administration)	1.0	0.1	0.3	1.4
Public administration	0.4	0.0	0.0	0.5
Average	10.2	2.6	3.6	16.4

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 242: Planting Forests in Maryland—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$200,000	\$30,133	\$709	\$230,842
Mining	\$0	\$2,359	\$349	\$2,708
Utilities	\$100,000	\$11,759	\$10,969	\$122,729
Construction	\$200,000	\$17,303	\$4,463	\$221,766
Manufacturing	\$100,000	\$27,379	\$14,456	\$141,835
Wholesale trade	\$100,000	\$24,823	\$21,369	\$146,192
Retail trade	\$0	\$4,517	\$40,971	\$45,488
Transportation and warehousing	\$0	\$19,989	\$9,601	\$29,590
Information	\$0	\$23,040	\$19,206	\$42,246
Finance and insurance	\$0	\$30,411	\$58,328	\$88,740
Real estate and rental and leasing	\$0	\$37,308	\$100,457	\$137,765
Professional, scientific, and technical services	\$100,000	\$75,743	\$20,117	\$195,860
Management of companies and enterprises	\$0	\$6,091	\$3,284	\$9,375
Administrative and support and waste management and remediation services	\$0	\$26,876	\$12,573	\$39,449
Educational services	\$0	\$2,357	\$11,032	\$13,389
Health care and social assistance	\$0	\$44	\$83,255	\$83,299
Arts, entertainment, and recreation	\$0	\$1,673	\$5,885	\$7,559
Accommodation and food services	\$0	\$5,160	\$23,966	\$29,126
Other services (except public administration)	\$100,000	\$9,686	\$23,693	\$133,379
Public administration	\$100,000	\$8,752	\$9,716	\$118,469
Average	\$1,000,000	\$365,405	\$474,399	\$1,839,804

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 243: Planting Forests in Maryland—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$103,437	\$5,473	\$90	\$109,000
Mining	\$0	\$412	\$22	\$433
Utilities	\$26,297	\$1,473	\$1,475	\$29,245
Construction	\$75,320	\$6,802	\$1,562	\$83,684
Manufacturing	\$16,611	\$4,078	\$2,105	\$22,795
Wholesale trade	\$37,484	\$9,305	\$8,010	\$54,799
Retail trade	\$0	\$2,354	\$20,633	\$22,987
Transportation and warehousing	\$0	\$6,966	\$3,300	\$10,266
Information	\$0	\$5,168	\$4,114	\$9,283
Finance and insurance	\$0	\$9,110	\$16,203	\$25,312
Real estate and rental and leasing	\$0	\$3,462	\$3,470	\$6,932
Professional, scientific, and technical services	\$55,434	\$35,954	\$8,839	\$100,227
Management of companies and enterprises	\$0	\$3,293	\$1,775	\$5,068
Administrative and support and waste management and remediation services	\$0	\$12,066	\$5,525	\$17,591
Educational services	\$0	\$1,123	\$6,211	\$7,334
Health care and social assistance	\$0	\$16	\$40,079	\$40,095
Arts, entertainment, and recreation	\$0	\$606	\$2,143	\$2,750
Accommodation and food services	\$0	\$1,785	\$8,364	\$10,149
Other services (except public administration)	\$51,598	\$3,888	\$10,214	\$65,700
Public administration	\$25,247	\$3,754	\$3,492	\$32,492
Average	\$391,427	\$117,087	\$147,627	\$656,141

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 244: Planting Forests in Maryland—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.1	0.1
Construction	0.0	0.0	0.1	0.1
Manufacturing	0.0	0.0	0.1	0.1
Wholesale trade	0.0	0.0	0.4	0.4
Retail trade	0.0	0.0	2.6	2.6
Transportation and warehousing	0.0	0.0	0.4	0.4
Information	0.0	0.0	0.3	0.3
Finance and insurance	0.0	0.0	1.0	1.0
Real estate and rental and leasing	0.0	0.0	1.0	1.0
Professional, scientific, and technical services	0.0	0.0	0.6	0.6
Management of companies and enterprises	0.0	0.0	0.1	0.1
Administrative and support and waste management and remediation services	0.0	0.0	0.7	0.7
Educational services	0.0	0.0	0.6	0.6
Health care and social assistance	0.0	0.0	3.3	3.3
Arts, entertainment, and recreation	0.0	0.0	0.5	0.5
Accommodation and food services	0.0	0.0	1.5	1.5
Other services (except public administration)	0.0	0.0	1.3	1.3
Public administration	0.0	0.0	0.2	0.2
Total	0.0	0.0	14.9	14.9

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 245: Planting Forests in Maryland—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$0	\$3,069	\$3,069
Mining	\$0	\$0	\$1,528	\$1,528
Utilities	\$0	\$0	\$49,698	\$49,698
Construction	\$0	\$0	\$18,160	\$18,160
Manufacturing	\$0	\$0	\$63,490	\$63,490
Wholesale trade	\$0	\$0	\$86,145	\$86,145
Retail trade	\$0	\$0	\$160,959	\$160,959
Transportation and warehousing	\$0	\$0	\$39,987	\$39,987
Information	\$0	\$0	\$81,583	\$81,583
Finance and insurance	\$0	\$0	\$232,839	\$232,839
Real estate and rental and leasing	\$0	\$0	\$415,487	\$415,487
Professional, scientific, and technical services	\$0	\$0	\$84,145	\$84,145
Management of companies and enterprises	\$0	\$0	\$13,891	\$13,891
Administrative and support and waste management and remediation services	\$0	\$0	\$52,743	\$52,743
Educational services	\$0	\$0	\$46,509	\$46,509
Health care and social assistance	\$0	\$0	\$358,186	\$358,186
Arts, entertainment, and recreation	\$0	\$0	\$24,083	\$24,083
Accommodation and food services	\$0	\$0	\$98,150	\$98,150
Other services (except public administration)	\$0	\$0	\$97,755	\$97,755
Public administration	\$0	\$0	\$41,860	\$41,860
Total	\$0	\$0	\$1,970,266	\$1,970,266

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 246: Planting Forests in Maryland—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$0	\$384	\$384
Mining	\$0	\$0	\$90	\$90
Utilities	\$0	\$0	\$6,684	\$6,684
Construction	\$0	\$0	\$6,388	\$6,388
Manufacturing	\$0	\$0	\$9,133	\$9,133
Wholesale trade	\$0	\$0	\$32,291	\$32,291
Retail trade	\$0	\$0	\$81,063	\$81,063
Transportation and warehousing	\$0	\$0	\$13,780	\$13,780
Information	\$0	\$0	\$17,371	\$17,371
Finance and insurance	\$0	\$0	\$65,053	\$65,053
Real estate and rental and leasing	\$0	\$0	\$15,665	\$15,665
Professional, scientific, and technical services	\$0	\$0	\$36,951	\$36,951
Management of companies and enterprises	\$0	\$0	\$7,508	\$7,508
Administrative and support and waste management and remediation services	\$0	\$0	\$23,181	\$23,181
Educational services	\$0	\$0	\$25,931	\$25,931
Health care and social assistance	\$0	\$0	\$172,257	\$172,257
Arts, entertainment, and recreation	\$0	\$0	\$8,832	\$8,832
Accommodation and food services	\$0	\$0	\$34,243	\$34,243
Other services (except public administration)	\$0	\$0	\$41,830	\$41,830
Public administration	\$0	\$0	\$14,906	\$14,906
Total	\$0	\$0	\$613,542	\$613,542

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 247: Expanded Use of Forests and Feedstocks for Energy Production—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	5.9	0.9	0.0	6.8
Mining	0.0	0.0	0.0	0.0
Utilities	0.1	0.0	0.0	0.2
Construction	1.9	0.1	0.0	2.1
Manufacturing	0.0	0.1	0.0	0.1
Wholesale trade	0.0	0.1	0.1	0.2
Retail trade	0.0	0.1	0.6	0.7
Transportation and warehousing	0.0	0.1	0.1	0.2
Information	0.0	0.0	0.1	0.1
Finance and insurance	0.0	0.1	0.2	0.3
Real estate and rental and leasing	0.0	0.1	0.2	0.4
Professional, scientific, and technical services	1.9	0.6	0.1	2.6
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.3	0.2	0.5
Educational services	0.0	0.0	0.1	0.2
Health care and social assistance	0.0	0.0	0.7	0.7
Arts, entertainment, and recreation	0.0	0.0	0.1	0.1
Accommodation and food services	0.0	0.1	0.4	0.5
Other services (except public administration)	0.0	0.1	0.3	0.4
Public administration	0.4	0.0	0.0	0.4
Average	10.3	2.9	3.4	16.5

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 248: Expanded Use of Forests and Feedstocks for Energy Production—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$257,143	\$23,603	\$670	\$281,416
Mining	\$0	\$3,250	\$330	\$3,580
Utilities	\$128,571	\$7,071	\$10,372	\$146,014
Construction	\$257,143	\$11,814	\$4,216	\$273,173
Manufacturing	\$0	\$27,738	\$13,666	\$41,404
Wholesale trade	\$0	\$18,567	\$20,208	\$38,775
Retail trade	\$0	\$5,125	\$38,695	\$43,820
Transportation and warehousing	\$0	\$14,476	\$9,069	\$23,545
Information	\$0	\$16,386	\$18,153	\$34,539
Finance and insurance	\$0	\$27,050	\$55,100	\$82,150
Real estate and rental and leasing	\$0	\$28,306	\$94,901	\$123,207
Professional, scientific, and technical services	\$257,143	\$78,948	\$19,009	\$355,100
Management of companies and enterprises	\$0	\$3,946	\$3,104	\$7,050
Administrative and support and waste management and remediation services	\$0	\$25,791	\$11,879	\$37,670
Educational services	\$0	\$970	\$10,411	\$11,380
Health care and social assistance	\$0	\$3	\$78,675	\$78,678
Arts, entertainment, and recreation	\$0	\$1,720	\$5,558	\$7,278
Accommodation and food services	\$0	\$7,141	\$22,646	\$29,787
Other services (except public administration)	\$0	\$9,579	\$22,377	\$31,956
Public administration	\$100,000	\$6,841	\$9,182	\$116,023
Average	\$1,000,000	\$318,325	\$448,221	\$1,766,546

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 249: Expanded Use of Forests and Feedstocks for Energy Production—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$96,429	\$14,157	\$85	\$110,670
Mining	\$0	\$430	\$20	\$450
Utilities	\$18,786	\$876	\$1,394	\$21,055
Construction	\$96,840	\$4,618	\$1,475	\$102,933
Manufacturing	\$0	\$3,809	\$1,990	\$5,799
Wholesale trade	\$0	\$6,960	\$7,575	\$14,534
Retail trade	\$0	\$2,671	\$19,487	\$22,158
Transportation and warehousing	\$0	\$4,666	\$3,117	\$7,783
Information	\$0	\$3,567	\$3,889	\$7,456
Finance and insurance	\$0	\$7,566	\$15,308	\$22,874
Real estate and rental and leasing	\$0	\$2,762	\$3,280	\$6,043
Professional, scientific, and technical services	\$135,015	\$36,967	\$8,353	\$180,335
Management of companies and enterprises	\$0	\$2,133	\$1,678	\$3,811
Administrative and support and waste management and remediation services	\$0	\$11,886	\$5,220	\$17,106
Educational services	\$0	\$527	\$5,861	\$6,388
Health care and social assistance	\$0	\$1	\$37,874	\$37,875
Arts, entertainment, and recreation	\$0	\$573	\$2,024	\$2,598
Accommodation and food services	\$0	\$2,483	\$7,903	\$10,386
Other services (except public administration)	\$0	\$3,808	\$9,646	\$13,454
Public administration	\$25,247	\$2,595	\$3,300	\$31,141
Average	\$372,316	\$113,053	\$139,480	\$624,849

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 250: Expanded Use of Forests and Feedstocks for Energy Production—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	1.1	0.0	0.0	1.1
Construction	0.0	0.2	0.0	0.2
Manufacturing	0.0	0.0	0.0	0.0
Wholesale trade	0.0	0.0	0.0	0.1
Retail trade	0.0	0.0	0.3	0.3
Transportation and warehousing	0.0	0.1	0.0	0.2
Information	0.0	0.1	0.0	0.1
Finance and insurance	0.0	0.1	0.1	0.2
Real estate and rental and leasing	0.0	0.1	0.1	0.2
Professional, scientific, and technical services	0.0	0.3	0.1	0.3
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.1	0.1	0.2
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.4	0.4
Arts, entertainment, and recreation	0.0	0.0	0.1	0.1
Accommodation and food services	0.0	0.2	0.2	0.4
Other services (except public administration)	0.0	0.0	0.2	0.2
Public administration	0.0	0.0	0.0	0.0
Total	1.1	1.3	1.7	4.1

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 251: Expanded Use of Forests and Feedstocks for Energy Production—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$83	\$327	\$409
Mining	\$0	\$7,434	\$161	\$7,595
Utilities	\$1,019,700	\$1,385	\$5,036	\$1,026,122
Construction	\$0	\$26,526	\$2,069	\$28,594
Manufacturing	\$0	\$5,496	\$6,646	\$12,142
Wholesale trade	\$0	\$7,187	\$9,793	\$16,980
Retail trade	\$0	\$944	\$19,010	\$19,954
Transportation and warehousing	\$0	\$32,348	\$4,448	\$36,796
Information	\$0	\$16,560	\$8,848	\$25,408
Finance and insurance	\$0	\$18,154	\$27,013	\$45,167
Real estate and rental and leasing	\$0	\$14,285	\$46,501	\$60,786
Professional, scientific, and technical services	\$0	\$41,241	\$9,288	\$50,528
Management of companies and enterprises	\$0	\$1,245	\$1,514	\$2,760
Administrative and support and waste management and remediation services	\$0	\$9,481	\$5,813	\$15,295
Educational services	\$0	\$144	\$5,160	\$5,303
Health care and social assistance	\$0	\$1	\$38,424	\$38,426
Arts, entertainment, and recreation	\$0	\$1,221	\$2,731	\$3,952
Accommodation and food services	\$0	\$13,599	\$11,070	\$24,669
Other services (except public administration)	\$0	\$2,189	\$10,994	\$13,183
Public administration	\$0	\$2,740	\$4,483	\$7,224
Total	\$1,019,700	\$202,262	\$219,329	\$1,441,292

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 252: Expanded Use of Forests and Feedstocks for Energy Production—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$10	\$41	\$52
Mining	\$0	\$79	\$10	\$89
Utilities	\$148,988	\$191	\$677	\$149,856
Construction	\$0	\$10,571	\$724	\$11,295
Manufacturing	\$0	\$949	\$969	\$1,919
Wholesale trade	\$0	\$2,694	\$3,671	\$6,365
Retail trade	\$0	\$492	\$9,574	\$10,066
Transportation and warehousing	\$0	\$9,275	\$1,528	\$10,803
Information	\$0	\$3,930	\$1,896	\$5,826
Finance and insurance	\$0	\$5,204	\$7,495	\$12,699
Real estate and rental and leasing	\$0	\$1,257	\$1,594	\$2,850
Professional, scientific, and technical services	\$0	\$15,778	\$4,081	\$19,859
Management of companies and enterprises	\$0	\$673	\$818	\$1,492
Administrative and support and waste management and remediation services	\$0	\$4,183	\$2,554	\$6,737
Educational services	\$0	\$77	\$2,909	\$2,986
Health care and social assistance	\$0	\$1	\$18,500	\$18,500
Arts, entertainment, and recreation	\$0	\$451	\$994	\$1,446
Accommodation and food services	\$0	\$4,750	\$3,863	\$8,613
Other services (except public administration)	\$0	\$1,072	\$4,742	\$5,813
Public administration	\$0	\$1,413	\$1,613	\$3,026
Total	\$148,988	\$63,049	\$68,253	\$280,291

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 253: Conservation of Agricultural Land for GHG Benefits—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	6.5	0.0	0.0	6.5
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	2.3	0.1	0.0	2.4
Manufacturing	0.0	0.1	0.0	0.1
Wholesale trade	0.0	0.1	0.1	0.2
Retail trade	0.0	0.1	0.7	0.8
Transportation and warehousing	0.0	0.1	0.1	0.2
Information	0.0	0.1	0.1	0.2
Finance and insurance	0.0	0.2	0.3	0.4
Real estate and rental and leasing	0.0	0.2	0.3	0.5
Professional, scientific, and technical services	2.3	0.7	0.2	3.1
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.5	0.2	0.7
Educational services	0.0	0.0	0.2	0.2
Health care and social assistance	0.0	0.0	0.9	0.9
Arts, entertainment, and recreation	0.0	0.0	0.1	0.2
Accommodation and food services	0.0	0.1	0.4	0.5
Other services (except public administration)	1.5	0.1	0.4	2.0
Public administration	0.4	0.0	0.1	0.5
Average	12.8	2.4	4.0	19.3

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 254: Conservation of Agricultural Land for GHG Benefits—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$150,000	\$940	\$791	\$151,731
Mining	\$0	\$2,560	\$389	\$2,949
Utilities	\$0	\$8,000	\$12,258	\$20,258
Construction	\$300,000	\$8,807	\$4,960	\$313,767
Manufacturing	\$0	\$29,605	\$16,140	\$45,745
Wholesale trade	\$0	\$17,235	\$23,904	\$41,139
Retail trade	\$0	\$5,920	\$45,504	\$51,424
Transportation and warehousing	\$0	\$15,077	\$10,673	\$25,750
Information	\$0	\$26,105	\$21,420	\$47,525
Finance and insurance	\$0	\$35,046	\$64,853	\$99,899
Real estate and rental and leasing	\$0	\$40,125	\$111,726	\$151,851
Professional, scientific, and technical services	\$300,000	\$92,178	\$22,408	\$414,586
Management of companies and enterprises	\$0	\$4,526	\$3,660	\$8,187
Administrative and support and waste management and remediation services	\$0	\$34,723	\$13,993	\$48,716
Educational services	\$0	\$3,267	\$12,195	\$15,463
Health care and social assistance	\$0	\$66	\$92,753	\$92,819
Arts, entertainment, and recreation	\$0	\$2,109	\$6,536	\$8,645
Accommodation and food services	\$0	\$8,052	\$26,688	\$34,740
Other services (except public administration)	\$150,000	\$10,461	\$26,314	\$186,775
Public administration	\$100,000	\$8,074	\$10,826	\$118,900
Average	\$1,000,000	\$352,876	\$527,991	\$1,880,867

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 255: Conservation of Agricultural Land for GHG Benefits—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$105,222	\$219	\$100	\$105,541
Mining	\$0	\$469	\$24	\$493
Utilities	\$0	\$1,003	\$1,648	\$2,651
Construction	\$112,980	\$3,414	\$1,736	\$118,130
Manufacturing	\$0	\$4,329	\$2,349	\$6,678
Wholesale trade	\$0	\$6,461	\$8,960	\$15,421
Retail trade	\$0	\$3,085	\$22,916	\$26,002
Transportation and warehousing	\$0	\$5,244	\$3,670	\$8,914
Information	\$0	\$5,908	\$4,588	\$10,496
Finance and insurance	\$0	\$10,731	\$18,028	\$28,759
Real estate and rental and leasing	\$0	\$3,785	\$3,876	\$7,661
Professional, scientific, and technical services	\$157,518	\$43,755	\$9,846	\$211,118
Management of companies and enterprises	\$0	\$2,447	\$1,979	\$4,425
Administrative and support and waste management and remediation services	\$0	\$16,118	\$6,150	\$22,267
Educational services	\$0	\$1,541	\$6,861	\$8,402
Health care and social assistance	\$0	\$24	\$44,649	\$44,673
Arts, entertainment, and recreation	\$0	\$778	\$2,381	\$3,159
Accommodation and food services	\$0	\$2,792	\$9,314	\$12,106
Other services (except public administration)	\$77,397	\$4,270	\$11,340	\$93,007
Public administration	\$25,247	\$3,416	\$3,889	\$32,551
Average	\$478,363	\$119,788	\$164,303	\$762,454

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 256: Conservation of Agricultural Land for GHG Benefits—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	8.3	8.3
Mining	0.0	0.0	1.4	1.4
Utilities	0.0	0.0	11.7	11.7
Construction	0.0	0.0	31.8	31.8
Manufacturing	0.0	0.0	31.9	31.9
Wholesale trade	0.0	0.0	93.5	93.5
Retail trade	0.0	0.0	596.5	596.5
Transportation and warehousing	0.0	0.0	80.2	80.2
Information	0.0	0.0	57.2	57.2
Finance and insurance	0.0	0.0	223.4	223.4
Real estate and rental and leasing	0.0	0.0	233.9	233.9
Professional, scientific, and technical services	0.0	0.0	138.1	138.1
Management of companies and enterprises	0.0	0.0	14.5	14.5
Administrative and support and waste management and remediation services	0.0	0.0	164.4	164.4
Educational services	0.0	0.0	136.8	136.8
Health care and social assistance	0.0	0.0	750.7	750.7
Arts, entertainment, and recreation	0.0	0.0	106.1	106.1
Accommodation and food services	0.0	0.0	342.6	342.6
Other services (except public administration)	0.0	0.0	304.8	304.8
Public administration	0.0	0.0	46.0	46.0
Total	0.0	0.0	3,373.8	3,373.8

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 257: Conservation of Agricultural Land for GHG Benefits—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$0	\$692,953	\$692,953
Mining	\$0	\$0	\$344,936	\$344,936
Utilities	\$0	\$0	\$11,220,651	\$11,220,651
Construction	\$0	\$0	\$4,100,104	\$4,100,104
Manufacturing	\$0	\$0	\$14,334,515	\$14,334,515
Wholesale trade	\$0	\$0	\$19,449,427	\$19,449,427
Retail trade	\$0	\$0	\$36,340,667	\$36,340,667
Transportation and warehousing	\$0	\$0	\$9,028,001	\$9,028,001
Information	\$0	\$0	\$18,419,511	\$18,419,511
Finance and insurance	\$0	\$0	\$52,569,504	\$52,569,504
Real estate and rental and leasing	\$0	\$0	\$93,806,967	\$93,806,967
Professional, scientific, and technical services	\$0	\$0	\$18,997,931	\$18,997,931
Management of companies and enterprises	\$0	\$0	\$3,136,186	\$3,136,186
Administrative and support and waste management and remediation services	\$0	\$0	\$11,907,989	\$11,907,989
Educational services	\$0	\$0	\$10,500,561	\$10,500,561
Health care and social assistance	\$0	\$0	\$80,869,795	\$80,869,795
Arts, entertainment, and recreation	\$0	\$0	\$5,437,345	\$5,437,345
Accommodation and food services	\$0	\$0	\$22,159,887	\$22,159,887
Other services (except public administration)	\$0	\$0	\$22,070,708	\$22,070,708
Public administration	\$0	\$0	\$9,450,912	\$9,450,912
Total	\$0	\$0	\$444,838,551	\$444,838,551

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 258: Conservation of Agricultural Land for GHG Benefits—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$0	\$86,752	\$86,752
Mining	\$0	\$0	\$20,357	\$20,357
Utilities	\$0	\$0	\$1,509,132	\$1,509,132
Construction	\$0	\$0	\$1,442,187	\$1,442,187
Manufacturing	\$0	\$0	\$2,061,943	\$2,061,943
Wholesale trade	\$0	\$0	\$7,290,494	\$7,290,494
Retail trade	\$0	\$0	\$18,302,171	\$18,302,171
Transportation and warehousing	\$0	\$0	\$3,111,288	\$3,111,288
Information	\$0	\$0	\$3,921,850	\$3,921,850
Finance and insurance	\$0	\$0	\$14,687,421	\$14,687,421
Real estate and rental and leasing	\$0	\$0	\$3,536,832	\$3,536,832
Professional, scientific, and technical services	\$0	\$0	\$8,342,705	\$8,342,705
Management of companies and enterprises	\$0	\$0	\$1,695,163	\$1,695,163
Administrative and support and waste management and remediation services	\$0	\$0	\$5,233,697	\$5,233,697
Educational services	\$0	\$0	\$5,854,653	\$5,854,653
Health care and social assistance	\$0	\$0	\$38,891,384	\$38,891,384
Arts, entertainment, and recreation	\$0	\$0	\$1,994,094	\$1,994,094
Accommodation and food services	\$0	\$0	\$7,731,331	\$7,731,331
Other services (except public administration)	\$0	\$0	\$9,444,223	\$9,444,223
Public administration	\$0	\$0	\$3,365,421	\$3,365,421
Total	\$0	\$0	\$138,523,097	\$138,523,097

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 259: Buy Local for GHG Benefits—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.1	0.0	0.1
Manufacturing	0.0	0.1	0.0	0.1
Wholesale trade	0.7	0.1	0.1	0.9
Retail trade	2.3	0.0	0.7	3.0
Transportation and warehousing	0.0	0.2	0.1	0.3
Information	0.0	0.1	0.1	0.2
Finance and insurance	0.0	0.2	0.2	0.4
Real estate and rental and leasing	0.0	0.3	0.2	0.5
Professional, scientific, and technical services	2.5	0.4	0.1	3.0
Management of companies and enterprises	0.0	0.0	0.0	0.1
Administrative and support and waste management and remediation services	0.0	0.4	0.2	0.6
Educational services	0.0	0.0	0.1	0.2
Health care and social assistance	0.0	0.0	0.8	0.8
Arts, entertainment, and recreation	0.0	0.1	0.1	0.2
Accommodation and food services	2.3	0.1	0.4	2.8
Other services (except public administration)	1.9	0.1	0.3	2.3
Public administration	0.4	0.1	0.0	0.5
Average	10.1	2.3	3.5	15.9

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 260: Buy Local for GHG Benefits—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$376	\$692	\$1,068
Mining	\$0	\$998	\$341	\$1,339
Utilities	\$0	\$12,097	\$10,749	\$22,846
Construction	\$0	\$9,384	\$4,328	\$13,711
Manufacturing	\$0	\$15,968	\$14,143	\$30,111
Wholesale trade	\$150,000	\$17,781	\$20,982	\$188,763
Retail trade	\$150,000	\$1,352	\$39,676	\$191,028
Transportation and warehousing	\$0	\$18,462	\$9,314	\$27,776
Information	\$0	\$35,172	\$18,749	\$53,921
Finance and insurance	\$0	\$41,972	\$56,607	\$98,579
Real estate and rental and leasing	\$0	\$52,075	\$97,544	\$149,619
Professional, scientific, and technical services	\$300,000	\$58,324	\$19,591	\$377,915
Management of companies and enterprises	\$0	\$8,916	\$3,203	\$12,119
Administrative and support and waste management and remediation services	\$0	\$30,865	\$12,225	\$43,090
Educational services	\$0	\$1,267	\$10,587	\$11,853
Health care and social assistance	\$0	\$38	\$81,109	\$81,147
Arts, entertainment, and recreation	\$0	\$4,183	\$5,698	\$9,881
Accommodation and food services	\$150,000	\$6,585	\$23,328	\$179,913
Other services (except public administration)	\$150,000	\$8,363	\$22,943	\$181,306
Public administration	\$100,000	\$11,678	\$9,468	\$121,146
Average	\$1,000,000	\$335,855	\$461,276	\$1,797,131

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 261: Buy Local for GHG Benefits—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$38	\$88	\$126
Mining	\$0	\$131	\$21	\$152
Utilities	\$0	\$1,617	\$1,445	\$3,062
Construction	\$0	\$3,638	\$1,515	\$5,154
Manufacturing	\$0	\$3,268	\$2,057	\$5,325
Wholesale trade	\$56,227	\$6,665	\$7,865	\$70,757
Retail trade	\$77,233	\$703	\$19,981	\$97,918
Transportation and warehousing	\$0	\$7,088	\$3,204	\$10,291
Information	\$0	\$7,973	\$4,015	\$11,988
Finance and insurance	\$0	\$11,763	\$15,745	\$27,509
Real estate and rental and leasing	\$0	\$4,231	\$3,398	\$7,630
Professional, scientific, and technical services	\$136,616	\$26,736	\$8,608	\$171,960
Management of companies and enterprises	\$0	\$4,819	\$1,731	\$6,550
Administrative and support and waste management and remediation services	\$0	\$14,090	\$5,373	\$19,463
Educational services	\$0	\$592	\$5,952	\$6,544
Health care and social assistance	\$0	\$14	\$39,041	\$39,055
Arts, entertainment, and recreation	\$0	\$1,220	\$2,076	\$3,296
Accommodation and food services	\$52,497	\$2,277	\$8,141	\$62,915
Other services (except public administration)	\$95,287	\$3,220	\$9,885	\$108,392
Public administration	\$25,247	\$5,692	\$3,400	\$34,338
Average	\$443,105	\$105,779	\$143,541	\$692,425

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 262: Buy Local for GHG Benefits—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.3	2.1	2.4
Mining	0.0	0.3	0.4	0.6
Utilities	0.0	2.4	2.8	5.2
Construction	0.0	5.5	8.3	13.9
Manufacturing	0.0	11.6	7.9	19.5
Wholesale trade	1,307.9	52.8	25.0	1,385.8
Retail trade	0.0	5.6	161.6	167.2
Transportation and warehousing	0.0	109.2	20.3	129.5
Information	0.0	33.9	14.6	48.4
Finance and insurance	0.0	31.7	59.7	91.4
Real estate and rental and leasing	0.0	57.7	55.0	112.8
Professional, scientific, and technical services	0.0	103.3	35.4	138.7
Management of companies and enterprises	0.0	25.5	3.7	29.2
Administrative and support and waste management and remediation services	0.0	123.9	42.0	165.9
Educational services	0.0	1.8	35.9	37.7
Health care and social assistance	0.0	0.0	188.4	188.4
Arts, entertainment, and recreation	0.0	12.6	27.5	40.2
Accommodation and food services	0.0	19.8	89.5	109.3
Other services (except public administration)	0.0	23.8	79.3	103.0
Public administration	0.0	26.4	11.5	37.9
Total	1,307.9	648.0	871.0	2,827.0

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 263: Buy Local for GHG Benefits—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$20,486	\$171,717	\$192,202
Mining	\$0	\$73,197	\$84,546	\$157,743
Utilities	\$0	\$2,354,078	\$2,664,929	\$5,019,007
Construction	\$0	\$696,479	\$1,073,881	\$1,770,360
Manufacturing	\$0	\$2,839,519	\$3,506,922	\$6,346,441
Wholesale trade	\$272,029,940	\$10,986,969	\$5,201,130	\$288,218,039
Retail trade	\$0	\$339,284	\$9,846,755	\$10,186,039
Transportation and warehousing	\$0	\$11,205,376	\$2,311,132	\$13,516,508
Information	\$0	\$10,572,589	\$4,649,934	\$15,222,523
Finance and insurance	\$0	\$8,828,117	\$14,045,950	\$22,874,067
Real estate and rental and leasing	\$0	\$11,267,431	\$24,202,784	\$35,470,215
Professional, scientific, and technical services	\$0	\$14,244,058	\$4,859,768	\$19,103,826
Management of companies and enterprises	\$0	\$5,515,043	\$794,322	\$6,309,365
Administrative and support and waste management and remediation services	\$0	\$8,638,735	\$3,032,869	\$11,671,604
Educational services	\$0	\$151,477	\$2,629,471	\$2,780,949
Health care and social assistance	\$0	\$1,057	\$20,119,267	\$20,120,324
Arts, entertainment, and recreation	\$0	\$616,212	\$1,414,114	\$2,030,326
Accommodation and food services	\$0	\$1,300,185	\$5,786,951	\$7,087,135
Other services (except public administration)	\$0	\$2,212,029	\$5,694,089	\$7,906,118
Public administration	\$0	\$3,310,556	\$2,348,589	\$5,659,145
Total	\$272,029,940	\$95,172,878	\$114,439,118	\$481,641,936

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 264: Buy Local for GHG Benefits—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$2,886	\$21,716	\$24,603
Mining	\$0	\$2,658	\$5,194	\$7,852
Utilities	\$0	\$322,655	\$358,268	\$680,922
Construction	\$0	\$273,651	\$376,013	\$649,664
Manufacturing	\$0	\$703,409	\$510,128	\$1,213,537
Wholesale trade	\$101,968,686	\$4,118,395	\$1,949,610	\$108,036,691
Retail trade	\$0	\$176,825	\$4,958,958	\$5,135,783
Transportation and warehousing	\$0	\$4,533,780	\$794,879	\$5,328,659
Information	\$0	\$2,387,388	\$995,703	\$3,383,091
Finance and insurance	\$0	\$2,282,059	\$3,906,523	\$6,188,581
Real estate and rental and leasing	\$0	\$983,700	\$842,585	\$1,826,285
Professional, scientific, and technical services	\$0	\$6,396,298	\$2,135,226	\$8,531,524
Management of companies and enterprises	\$0	\$2,980,978	\$429,345	\$3,410,323
Administrative and support and waste management and remediation services	\$0	\$4,044,355	\$1,332,917	\$5,377,273
Educational services	\$0	\$77,657	\$1,478,511	\$1,556,168
Health care and social assistance	\$0	\$388	\$9,684,363	\$9,684,751
Arts, entertainment, and recreation	\$0	\$219,073	\$515,219	\$734,292
Accommodation and food services	\$0	\$449,951	\$2,019,541	\$2,469,492
Other services (except public administration)	\$0	\$887,892	\$2,453,370	\$3,341,262
Public administration	\$0	\$2,200,997	\$843,374	\$3,044,371
Total	\$101,968,686	\$33,044,992	\$35,611,445	\$170,625,123

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 265: Nutrient Trading for GHG Benefits—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	5.5	0.0	0.0	5.5
Mining	0.0	0.0	0.0	0.0
Utilities	0.5	0.0	0.0	0.5
Construction	1.9	0.1	0.0	2.1
Manufacturing	0.0	0.0	0.0	0.0
Wholesale trade	0.0	0.0	0.0	0.0
Retail trade	0.0	0.1	0.0	0.1
Transportation and warehousing	0.0	0.1	0.0	0.1
Information	0.0	-0.2	0.0	-0.2
Finance and insurance	0.0	0.0	0.0	0.0
Real estate and rental and leasing	0.0	-0.1	0.0	-0.1
Professional, scientific, and technical services	1.9	-0.2	0.0	1.8
Management of companies and enterprises	-4.6	0.0	0.0	-4.6
Administrative and support and waste management and remediation services	0.7	0.2	0.0	0.9
Educational services	0.0	0.0	0.0	0.0
Health care and social assistance	0.0	0.0	0.0	0.0
Arts, entertainment, and recreation	0.0	-0.1	0.0	-0.1
Accommodation and food services	0.0	0.0	0.0	0.0
Other services (except public administration)	0.0	0.0	0.0	0.0
Public administration	0.4	0.0	0.0	0.4
Average	6.3	0.0	-0.1	6.2

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 266: Nutrient Trading for GHG Benefits—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$128,571	\$826	\$723	\$130,121
Mining	\$0	\$2,622	\$356	\$2,978
Utilities	\$128,571	\$8,702	\$11,205	\$148,478
Construction	\$257,143	\$19,000	\$4,544	\$280,687
Manufacturing	\$0	\$26,880	\$14,758	\$41,638
Wholesale trade	\$0	\$16,853	\$21,841	\$38,694
Retail trade	\$0	\$5,418	\$41,692	\$47,110
Transportation and warehousing	\$0	\$13,890	\$9,775	\$23,666
Information	\$0	\$19,967	\$19,595	\$39,561
Finance and insurance	\$0	\$32,402	\$59,396	\$91,798
Real estate and rental and leasing	\$0	\$33,972	\$102,313	\$136,286
Professional, scientific, and technical services	\$257,143	\$92,350	\$20,508	\$370,001
Management of companies and enterprises	\$0	\$5,885	\$3,349	\$9,234
Administrative and support and waste management and remediation services	\$128,571	\$42,484	\$12,811	\$183,866
Educational services	\$0	\$554	\$11,194	\$11,748
Health care and social assistance	\$0	\$3	\$84,883	\$84,886
Arts, entertainment, and recreation	\$0	\$1,809	\$5,988	\$7,797
Accommodation and food services	\$0	\$7,244	\$24,428	\$31,672
Other services (except public administration)	\$0	\$11,327	\$24,110	\$35,437
Public administration	\$100,000	\$8,793	\$9,907	\$118,700
Average	\$1,000,000	\$350,981	\$483,378	\$1,834,359

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 267: Nutrient Trading for GHG Benefits—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$90,190	\$190	\$92	\$90,472
Mining	\$0	\$489	\$22	\$511
Utilities	\$33,810	\$1,074	\$1,506	\$36,390
Construction	\$96,840	\$7,481	\$1,590	\$105,911
Manufacturing	\$0	\$3,917	\$2,149	\$6,065
Wholesale trade	\$0	\$6,317	\$8,187	\$14,504
Retail trade	\$0	\$2,824	\$20,997	\$23,820
Transportation and warehousing	\$0	\$4,840	\$3,361	\$8,201
Information	\$0	\$4,257	\$4,197	\$8,454
Finance and insurance	\$0	\$8,879	\$16,507	\$25,385
Real estate and rental and leasing	\$0	\$3,296	\$3,544	\$6,840
Professional, scientific, and technical services	\$135,015	\$43,633	\$9,011	\$187,659
Management of companies and enterprises	\$0	\$3,181	\$1,810	\$4,991
Administrative and support and waste management and remediation services	\$35,765	\$17,628	\$5,630	\$59,024
Educational services	\$0	\$300	\$6,300	\$6,599
Health care and social assistance	\$0	\$1	\$40,861	\$40,863
Arts, entertainment, and recreation	\$0	\$650	\$2,181	\$2,831
Accommodation and food services	\$0	\$2,515	\$8,525	\$11,040
Other services (except public administration)	\$0	\$4,445	\$10,392	\$14,837
Public administration	\$25,247	\$3,526	\$3,560	\$32,332
Average	\$416,868	\$119,442	\$150,420	\$686,730

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 268: Nutrient Trading for GHG Benefits—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.1	0.4	0.5
Mining	0.0	0.0	0.1	0.1
Utilities	0.0	0.4	0.5	0.9
Construction	0.0	1.1	1.6	2.7
Manufacturing	0.0	2.3	1.6	3.8
Wholesale trade	0.0	1.4	4.9	6.4
Retail trade	0.0	0.2	31.4	31.6
Transportation and warehousing	0.0	2.5	4.0	6.5
Information	0.0	12.3	2.9	15.2
Finance and insurance	0.0	6.9	11.6	18.6
Real estate and rental and leasing	0.0	10.8	10.9	21.6
Professional, scientific, and technical services	0.0	36.3	6.9	43.3
Management of companies and enterprises	208.3	0.5	0.7	209.5
Administrative and support and waste management and remediation services	0.0	11.5	8.2	19.7
Educational services	0.0	0.1	6.9	6.9
Health care and social assistance	0.0	0.0	36.8	36.8
Arts, entertainment, and recreation	0.0	7.3	5.4	12.7
Accommodation and food services	0.0	5.1	17.5	22.6
Other services (except public administration)	0.0	6.8	15.4	22.1
Public administration	0.0	1.0	2.3	3.2
Total	208.3	106.5	169.9	484.7

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 269: Nutrient Trading for GHG Benefits—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$2,869	\$33,710	\$36,579
Mining	\$0	\$8,292	\$16,602	\$24,895
Utilities	\$0	\$376,836	\$525,346	\$902,182
Construction	\$0	\$137,585	\$208,932	\$346,517
Manufacturing	\$0	\$471,741	\$690,012	\$1,161,753
Wholesale trade	\$0	\$296,969	\$1,027,923	\$1,324,892
Retail trade	\$0	\$13,733	\$1,912,735	\$1,926,468
Transportation and warehousing	\$0	\$292,769	\$449,921	\$742,691
Information	\$0	\$3,834,844	\$912,373	\$4,747,217
Finance and insurance	\$0	\$1,516,251	\$2,735,824	\$4,252,075
Real estate and rental and leasing	\$0	\$2,468,822	\$4,717,340	\$7,186,162
Professional, scientific, and technical services	\$0	\$4,936,064	\$950,724	\$5,886,787
Management of companies and enterprises	\$45,000,000	\$98,249	\$155,664	\$45,253,913
Administrative and support and waste management and remediation services	\$0	\$909,267	\$592,127	\$1,501,394
Educational services	\$0	\$4,846	\$504,882	\$509,727
Health care and social assistance	\$0	\$242	\$3,937,769	\$3,938,011
Arts, entertainment, and recreation	\$0	\$303,162	\$274,604	\$577,766
Accommodation and food services	\$0	\$330,240	\$1,131,363	\$1,461,603
Other services (except public administration)	\$0	\$593,965	\$1,106,041	\$1,700,006
Public administration	\$0	\$146,848	\$459,817	\$606,665
Total	\$45,000,000	\$16,743,595	\$22,343,709	\$84,087,304

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 270: Nutrient Trading for GHG Benefits—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$475	\$4,254	\$4,728
Mining	\$0	\$412	\$1,014	\$1,427
Utilities	\$0	\$51,899	\$70,636	\$122,535
Construction	\$0	\$54,228	\$73,205	\$127,434
Manufacturing	\$0	\$143,857	\$100,204	\$244,060
Wholesale trade	\$0	\$111,317	\$385,310	\$496,627
Retail trade	\$0	\$7,157	\$963,281	\$970,438
Transportation and warehousing	\$0	\$99,797	\$154,877	\$254,674
Information	\$0	\$867,637	\$195,259	\$1,062,895
Finance and insurance	\$0	\$461,226	\$762,166	\$1,223,392
Real estate and rental and leasing	\$0	\$210,797	\$166,011	\$376,809
Professional, scientific, and technical services	\$0	\$2,292,097	\$417,667	\$2,709,764
Management of companies and enterprises	\$24,323,290	\$53,105	\$84,139	\$24,460,535
Administrative and support and waste management and remediation services	\$0	\$411,544	\$260,275	\$671,819
Educational services	\$0	\$2,346	\$283,350	\$285,697
Health care and social assistance	\$0	\$89	\$1,895,142	\$1,895,230
Arts, entertainment, and recreation	\$0	\$90,712	\$100,098	\$190,810
Accommodation and food services	\$0	\$114,663	\$394,821	\$509,484
Other services (except public administration)	\$0	\$294,326	\$476,187	\$770,513
Public administration	\$0	\$76,032	\$164,939	\$240,971
Total	\$24,323,290	\$5,343,717	\$6,952,834	\$36,619,841

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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A.4 Recycling**Figure 271: Recycling and Source Reduction—Investment Phase, Employment Impacts**

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	1.2	0.0	0.0	1.2
Construction	0.0	0.3	0.0	0.3
Manufacturing	0.0	0.0	0.0	0.1
Wholesale trade	0.0	0.1	0.1	0.1
Retail trade	0.0	0.0	0.6	0.6
Transportation and warehousing	0.0	0.1	0.1	0.2
Information	0.0	0.1	0.1	0.1
Finance and insurance	0.0	0.2	0.2	0.4
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	2.4	0.7	0.1	3.2
Management of companies and enterprises	0.0	0.0	0.0	0.1
Administrative and support and waste management and remediation services	1.5	0.7	0.2	2.4
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.7	0.7
Arts, entertainment, and recreation	0.0	0.1	0.1	0.2
Accommodation and food services	0.0	0.1	0.3	0.5
Other services (except public administration)	0.0	0.1	0.3	0.4
Public administration	0.4	0.1	0.0	0.5
Average	5.5	2.7	3.3	11.5

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 272: Recycling and Source Reduction—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$98	\$655	\$753
Mining	\$0	\$1,619	\$322	\$1,942
Utilities	\$300,000	\$9,298	\$10,149	\$319,447
Construction	\$0	\$32,781	\$4,112	\$36,893
Manufacturing	\$0	\$10,378	\$13,366	\$23,744
Wholesale trade	\$0	\$10,494	\$19,786	\$30,280
Retail trade	\$0	\$1,424	\$37,729	\$39,153
Transportation and warehousing	\$0	\$14,736	\$8,847	\$23,583
Information	\$0	\$24,307	\$17,743	\$42,050
Finance and insurance	\$0	\$41,191	\$53,759	\$94,950
Real estate and rental and leasing	\$0	\$39,950	\$92,607	\$132,557
Professional, scientific, and technical services	\$300,000	\$95,514	\$18,566	\$414,080
Management of companies and enterprises	\$0	\$7,826	\$3,032	\$10,858
Administrative and support and waste management and remediation services	\$300,000	\$66,266	\$11,597	\$377,862
Educational services	\$0	\$75	\$10,123	\$10,198
Health care and social assistance	\$0	\$4	\$76,850	\$76,854
Arts, entertainment, and recreation	\$0	\$2,452	\$5,419	\$7,871
Accommodation and food services	\$0	\$8,326	\$22,115	\$30,441
Other services (except public administration)	\$0	\$13,649	\$21,818	\$35,467
Public administration	\$100,000	\$11,541	\$8,970	\$120,511
Average	\$1,000,000	\$391,928	\$437,565	\$1,829,493

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 273: Recycling and Source Reduction—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$13	\$83	\$96
Mining	\$0	\$289	\$20	\$309
Utilities	\$78,891	\$1,147	\$1,364	\$81,402
Construction	\$0	\$12,972	\$1,439	\$14,411
Manufacturing	\$0	\$2,021	\$1,946	\$3,967
Wholesale trade	\$0	\$3,933	\$7,417	\$11,350
Retail trade	\$0	\$742	\$19,001	\$19,743
Transportation and warehousing	\$0	\$5,482	\$3,042	\$8,524
Information	\$0	\$5,204	\$3,800	\$9,004
Finance and insurance	\$0	\$11,222	\$14,941	\$26,164
Real estate and rental and leasing	\$0	\$3,500	\$3,210	\$6,709
Professional, scientific, and technical services	\$166,302	\$45,271	\$8,158	\$219,730
Management of companies and enterprises	\$0	\$4,230	\$1,639	\$5,869
Administrative and support and waste management and remediation services	\$83,452	\$25,952	\$5,096	\$114,501
Educational services	\$0	\$37	\$5,696	\$5,733
Health care and social assistance	\$0	\$1	\$36,994	\$36,995
Arts, entertainment, and recreation	\$0	\$867	\$1,974	\$2,841
Accommodation and food services	\$0	\$2,889	\$7,718	\$10,606
Other services (except public administration)	\$0	\$4,994	\$9,403	\$14,398
Public administration	\$25,247	\$4,802	\$3,222	\$33,271
Average	\$353,891	\$135,570	\$136,164	\$625,625

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 274: Recycling and Source Reduction—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.1	0.4	0.5
Mining	0.0	1.0	0.1	1.1
Utilities	0.0	1.0	0.6	1.6
Construction	0.0	15.4	1.7	17.1
Manufacturing	0.0	3.8	1.6	5.4
Wholesale trade	0.0	4.3	5.1	9.4
Retail trade	0.0	1.2	32.8	33.9
Transportation and warehousing	0.0	6.2	4.1	10.4
Information	0.0	9.0	3.0	12.0
Finance and insurance	0.0	12.2	12.1	24.4
Real estate and rental and leasing	0.0	18.3	11.3	29.6
Professional, scientific, and technical services	0.0	47.4	7.2	54.6
Management of companies and enterprises	125.8	0.7	0.8	127.3
Administrative and support and waste management and remediation services	0.0	25.2	8.5	33.7
Educational services	0.0	0.1	7.2	7.3
Health care and social assistance	0.0	0.0	38.4	38.4
Arts, entertainment, and recreation	0.0	5.6	5.6	11.2
Accommodation and food services	0.0	5.5	18.2	23.7
Other services (except public administration)	0.0	6.5	16.0	22.5
Public administration	97.3	4.7	2.3	104.3
Total	223.1	168.1	177.1	568.3

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 275: Recycling and Source Reduction—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$7,027	\$35,078	\$42,105
Mining	\$0	\$219,142	\$17,274	\$236,416
Utilities	\$0	\$1,019,228	\$546,028	\$1,565,256
Construction	\$0	\$1,943,583	\$217,950	\$2,161,533
Manufacturing	\$0	\$1,184,464	\$717,555	\$1,902,018
Wholesale trade	\$0	\$890,385	\$1,067,645	\$1,958,030
Retail trade	\$0	\$71,238	\$1,996,164	\$2,067,402
Transportation and warehousing	\$0	\$770,945	\$469,260	\$1,240,206
Information	\$0	\$2,825,970	\$949,519	\$3,775,489
Finance and insurance	\$0	\$2,726,646	\$2,853,006	\$5,579,652
Real estate and rental and leasing	\$0	\$3,621,792	\$4,918,468	\$8,540,260
Professional, scientific, and technical services	\$0	\$6,543,170	\$990,242	\$7,533,412
Management of companies and enterprises	\$27,169,291	\$155,161	\$162,057	\$27,486,509
Administrative and support and waste management and remediation services	\$0	\$2,132,496	\$617,085	\$2,749,581
Educational services	\$0	\$8,877	\$528,615	\$537,492
Health care and social assistance	\$0	\$342	\$4,100,928	\$4,101,270
Arts, entertainment, and recreation	\$0	\$229,409	\$286,607	\$516,016
Accommodation and food services	\$0	\$362,073	\$1,178,606	\$1,540,679
Other services (except public administration)	\$0	\$624,951	\$1,154,294	\$1,779,245
Public administration	\$27,169,291	\$1,152,351	\$478,826	\$28,800,469
Total	\$54,338,583	\$26,489,250	\$23,285,209	\$104,113,041

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 276: Recycling and Source Reduction—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$971	\$4,429	\$5,400
Mining	\$0	\$32,903	\$1,057	\$33,960
Utilities	\$0	\$123,512	\$73,414	\$196,927
Construction	\$0	\$751,153	\$76,350	\$827,504
Manufacturing	\$0	\$250,521	\$104,252	\$354,772
Wholesale trade	\$0	\$333,755	\$400,200	\$733,955
Retail trade	\$0	\$37,127	\$1,005,296	\$1,042,423
Transportation and warehousing	\$0	\$269,871	\$161,495	\$431,367
Information	\$0	\$636,429	\$203,240	\$839,668
Finance and insurance	\$0	\$809,654	\$794,445	\$1,604,099
Real estate and rental and leasing	\$0	\$294,959	\$172,573	\$467,532
Professional, scientific, and technical services	\$0	\$3,099,470	\$435,042	\$3,534,512
Management of companies and enterprises	\$14,685,479	\$83,867	\$87,594	\$14,856,941
Administrative and support and waste management and remediation services	\$0	\$885,421	\$271,234	\$1,156,654
Educational services	\$0	\$4,318	\$296,828	\$301,146
Health care and social assistance	\$0	\$126	\$1,973,751	\$1,973,876
Arts, entertainment, and recreation	\$0	\$70,828	\$104,459	\$175,287
Accommodation and food services	\$0	\$125,081	\$411,309	\$536,390
Other services (except public administration)	\$0	\$268,904	\$497,067	\$765,972
Public administration	\$6,859,300	\$337,978	\$171,810	\$7,369,088
Total	\$21,544,779	\$8,416,848	\$7,245,845	\$37,207,473

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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A.5 Multi-Sector**Figure 277: Outreach and Public Education—Investment Phase, Employment Impacts**

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.1	0.0	0.1
Manufacturing	0.0	0.0	0.0	0.1
Wholesale trade	0.0	0.0	0.1	0.1
Retail trade	0.0	0.0	0.6	0.6
Transportation and warehousing	0.0	0.2	0.1	0.2
Information	2.4	0.3	0.1	2.8
Finance and insurance	0.0	0.1	0.2	0.3
Real estate and rental and leasing	0.0	0.2	0.2	0.5
Professional, scientific, and technical services	3.7	0.6	0.1	4.4
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.5	0.2	0.6
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.7	0.7
Arts, entertainment, and recreation	0.0	0.1	0.1	0.2
Accommodation and food services	0.0	0.1	0.3	0.5
Other services (except public administration)	0.0	0.1	0.3	0.4
Public administration	0.4	0.1	0.0	0.5
Average	6.5	2.4	3.4	12.3

Source: RESI

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Figure 278: Outreach and Public Education—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$62	\$662	\$724
Mining	\$0	\$893	\$326	\$1,219
Utilities	\$0	\$6,533	\$10,261	\$16,794
Construction	\$0	\$8,461	\$4,152	\$12,613
Manufacturing	\$0	\$13,541	\$13,511	\$27,053
Wholesale trade	\$0	\$9,051	\$20,011	\$29,062
Retail trade	\$0	\$615	\$38,086	\$38,701
Transportation and warehousing	\$0	\$16,447	\$8,933	\$25,380
Information	\$450,000	\$77,882	\$17,930	\$545,812
Finance and insurance	\$0	\$26,013	\$54,283	\$80,296
Real estate and rental and leasing	\$0	\$49,113	\$93,517	\$142,630
Professional, scientific, and technical services	\$450,000	\$75,766	\$18,756	\$544,522
Management of companies and enterprises	\$0	\$7,536	\$3,064	\$10,600
Administrative and support and waste management and remediation services	\$0	\$35,061	\$11,713	\$46,773
Educational services	\$0	\$69	\$10,206	\$10,275
Health care and social assistance	\$0	\$4	\$77,640	\$77,644
Arts, entertainment, and recreation	\$0	\$3,970	\$5,470	\$9,440
Accommodation and food services	\$0	\$7,204	\$22,339	\$29,544
Other services (except public administration)	\$0	\$8,050	\$22,024	\$30,074
Public administration	\$100,000	\$9,770	\$9,062	\$118,832
Average	\$1,000,000	\$356,040	\$441,948	\$1,797,988

Source: RESI

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Figure 279: Outreach and Public Education—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$9	\$84	\$93
Mining	\$0	\$127	\$20	\$147
Utilities	\$0	\$842	\$1,379	\$2,222
Construction	\$0	\$3,274	\$1,453	\$4,728
Manufacturing	\$0	\$3,533	\$1,966	\$5,500
Wholesale trade	\$0	\$3,393	\$7,501	\$10,894
Retail trade	\$0	\$321	\$19,181	\$19,501
Transportation and warehousing	\$0	\$6,238	\$3,072	\$9,310
Information	\$153,816	\$21,372	\$3,840	\$179,028
Finance and insurance	\$0	\$7,180	\$15,090	\$22,270
Real estate and rental and leasing	\$0	\$3,867	\$3,245	\$7,112
Professional, scientific, and technical services	\$204,924	\$34,894	\$8,241	\$248,059
Management of companies and enterprises	\$0	\$4,073	\$1,656	\$5,729
Administrative and support and waste management and remediation services	\$0	\$16,924	\$5,147	\$22,072
Educational services	\$0	\$34	\$5,742	\$5,776
Health care and social assistance	\$0	\$1	\$37,374	\$37,375
Arts, entertainment, and recreation	\$0	\$1,263	\$1,993	\$3,256
Accommodation and food services	\$0	\$2,493	\$7,796	\$10,289
Other services (except public administration)	\$0	\$2,895	\$9,492	\$12,387
Public administration	\$25,247	\$4,726	\$3,255	\$33,228
Average	\$383,986	\$117,461	\$137,527	\$638,975

Source: RESI

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Figure 280: Outreach and Public Education—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.0	0.0	0.0
Manufacturing	0.0	0.0	0.0	0.0
Wholesale trade	0.0	0.0	0.0	0.0
Retail trade	0.0	0.0	0.3	0.3
Transportation and warehousing	0.0	0.0	0.0	0.0
Information	0.0	0.0	0.0	0.0
Finance and insurance	0.0	0.0	0.1	0.1
Real estate and rental and leasing	0.0	0.0	0.1	0.1
Professional, scientific, and technical services	0.0	0.0	0.1	0.1
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.0	0.1	0.1
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.3	0.3
Arts, entertainment, and recreation	0.0	0.0	0.0	0.0
Accommodation and food services	0.0	0.0	0.2	0.2
Other services (except public administration)	0.0	0.0	0.1	0.1
Public administration	0.0	0.0	0.0	0.0
Total	0.0	0.0	1.5	1.5

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 281: Outreach and Public Education—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$0	\$305	\$305
Mining	\$0	\$0	\$152	\$152
Utilities	\$0	\$0	\$4,946	\$4,946
Construction	\$0	\$0	\$1,807	\$1,807
Manufacturing	\$0	\$0	\$6,318	\$6,318
Wholesale trade	\$0	\$0	\$8,572	\$8,572
Retail trade	\$0	\$0	\$16,017	\$16,017
Transportation and warehousing	\$0	\$0	\$3,979	\$3,979
Information	\$0	\$0	\$8,118	\$8,118
Finance and insurance	\$0	\$0	\$23,170	\$23,170
Real estate and rental and leasing	\$0	\$0	\$41,346	\$41,346
Professional, scientific, and technical services	\$0	\$0	\$8,373	\$8,373
Management of companies and enterprises	\$0	\$0	\$1,382	\$1,382
Administrative and support and waste management and remediation services	\$0	\$0	\$5,248	\$5,248
Educational services	\$0	\$0	\$4,628	\$4,628
Health care and social assistance	\$0	\$0	\$35,644	\$35,644
Arts, entertainment, and recreation	\$0	\$0	\$2,397	\$2,397
Accommodation and food services	\$0	\$0	\$9,767	\$9,767
Other services (except public administration)	\$0	\$0	\$9,728	\$9,728
Public administration	\$0	\$0	\$4,166	\$4,166
Total	\$0	\$0	\$196,064	\$196,064

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 282: Outreach and Public Education—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing and hunting	\$0	\$0	\$38	\$38
Mining	\$0	\$0	\$9	\$9
Utilities	\$0	\$0	\$665	\$665
Construction	\$0	\$0	\$636	\$636
Manufacturing	\$0	\$0	\$909	\$909
Wholesale trade	\$0	\$0	\$3,213	\$3,213
Retail trade	\$0	\$0	\$8,067	\$8,067
Transportation and warehousing	\$0	\$0	\$1,371	\$1,371
Information	\$0	\$0	\$1,729	\$1,729
Finance and insurance	\$0	\$0	\$6,474	\$6,474
Real estate and rental and leasing	\$0	\$0	\$1,559	\$1,559
Professional, scientific, and technical services	\$0	\$0	\$3,677	\$3,677
Management of companies and enterprises	\$0	\$0	\$747	\$747
Administrative and support and waste management and remediation services	\$0	\$0	\$2,307	\$2,307
Educational services	\$0	\$0	\$2,580	\$2,580
Health care and social assistance	\$0	\$0	\$17,141	\$17,141
Arts, entertainment, and recreation	\$0	\$0	\$879	\$879
Accommodation and food services	\$0	\$0	\$3,408	\$3,408
Other services (except public administration)	\$0	\$0	\$4,163	\$4,163
Public administration	\$0	\$0	\$1,483	\$1,483
Total	\$0	\$0	\$61,054	\$61,054

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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A.6 Buildings**Figure 283: Green Building Initiatives—Investment Phase, Employment Impacts**

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	4.5	0.1	0.0	4.6
Manufacturing	0.0	0.1	0.0	0.1
Wholesale trade	0.0	0.1	0.1	0.2
Retail trade	0.0	0.2	0.7	0.9
Transportation and warehousing	0.0	0.1	0.1	0.2
Information	0.0	0.1	0.1	0.1
Finance and insurance	0.0	0.1	0.2	0.4
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	2.4	0.7	0.1	3.3
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.4	0.2	0.6
Educational services	0.0	0.0	0.2	0.2
Health care and social assistance	0.0	0.0	0.8	0.8
Arts, entertainment, and recreation	0.0	0.0	0.1	0.2
Accommodation and food services	0.0	0.1	0.4	0.5
Other services (except public administration)	0.0	0.1	0.3	0.5
Public administration	0.4	0.0	0.0	0.4
Average	7.3	2.3	3.6	13.3

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 284: Green Building Initiatives—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$427	\$714	\$1,141
Mining	\$0	\$4,054	\$352	\$4,406
Utilities	\$0	\$7,694	\$11,069	\$18,763
Construction	\$600,000	\$8,276	\$4,483	\$612,759
Manufacturing	\$0	\$29,698	\$14,577	\$44,275
Wholesale trade	\$0	\$19,873	\$21,581	\$41,455
Retail trade	\$0	\$10,935	\$41,132	\$52,066
Transportation and warehousing	\$0	\$14,291	\$9,646	\$23,936
Information	\$0	\$19,516	\$19,349	\$38,865
Finance and insurance	\$0	\$27,190	\$58,612	\$85,802
Real estate and rental and leasing	\$0	\$35,244	\$100,968	\$136,212
Professional, scientific, and technical services	\$300,000	\$97,316	\$20,245	\$417,561
Management of companies and enterprises	\$0	\$4,553	\$3,307	\$7,860
Administrative and support and waste management and remediation services	\$0	\$30,358	\$12,644	\$43,003
Educational services	\$0	\$95	\$11,032	\$11,127
Health care and social assistance	\$0	\$3	\$83,799	\$83,802
Arts, entertainment, and recreation	\$0	\$1,732	\$5,908	\$7,640
Accommodation and food services	\$0	\$5,741	\$24,114	\$29,855
Other services (except public administration)	\$0	\$14,415	\$23,786	\$38,201
Public administration	\$100,000	\$6,985	\$9,781	\$116,766
Average	\$1,000,000	\$338,397	\$477,097	\$1,815,494

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 285: Green Building Initiatives—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$53	\$90	\$143
Mining	\$0	\$796	\$22	\$818
Utilities	\$0	\$981	\$1,488	\$2,469
Construction	\$225,960	\$3,206	\$1,569	\$230,735
Manufacturing	\$0	\$5,295	\$2,122	\$7,416
Wholesale trade	\$0	\$7,449	\$8,090	\$15,539
Retail trade	\$0	\$5,699	\$20,714	\$26,413
Transportation and warehousing	\$0	\$4,735	\$3,316	\$8,051
Information	\$0	\$4,132	\$4,144	\$8,276
Finance and insurance	\$0	\$7,604	\$16,291	\$23,895
Real estate and rental and leasing	\$0	\$3,819	\$3,500	\$7,319
Professional, scientific, and technical services	\$166,302	\$46,929	\$8,895	\$222,126
Management of companies and enterprises	\$0	\$2,461	\$1,787	\$4,248
Administrative and support and waste management and remediation services	\$0	\$14,186	\$5,557	\$19,743
Educational services	\$0	\$48	\$6,208	\$6,256
Health care and social assistance	\$0	\$1	\$40,339	\$40,340
Arts, entertainment, and recreation	\$0	\$595	\$2,152	\$2,747
Accommodation and food services	\$0	\$1,991	\$8,415	\$10,407
Other services (except public administration)	\$0	\$5,567	\$10,251	\$15,819
Public administration	\$25,247	\$2,650	\$3,514	\$31,410
Average	\$417,508	\$118,197	\$148,465	\$684,170

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 286: Green Building Initiatives—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.0	0.1	0.1
Manufacturing	0.0	0.1	0.1	0.1
Wholesale trade	0.0	0.0	0.2	0.2
Retail trade	0.0	0.0	1.0	1.0
Transportation and warehousing	0.0	0.1	0.1	0.2
Information	0.0	0.4	0.1	0.5
Finance and insurance	0.0	0.2	0.4	0.6
Real estate and rental and leasing	0.0	0.3	0.4	0.7
Professional, scientific, and technical services	0.0	1.2	0.2	1.4
Management of companies and enterprises	6.8	0.0	0.0	6.8
Administrative and support and waste management and remediation services	0.0	0.4	0.3	0.6
Educational services	0.0	0.0	0.2	0.2
Health care and social assistance	0.0	0.0	1.2	1.2
Arts, entertainment, and recreation	0.0	0.2	0.2	0.4
Accommodation and food services	0.0	0.2	0.6	0.7
Other services (except public administration)	0.0	0.2	0.5	0.7
Public administration	0.0	0.0	0.1	0.1
Total	6.8	3.5	5.5	15.7

Source: RESI

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Figure 287: Green Building Initiatives—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$93	\$1,094	\$1,187
Mining	\$0	\$269	\$539	\$808
Utilities	\$0	\$12,231	\$17,051	\$29,281
Construction	\$0	\$4,465	\$6,781	\$11,247
Manufacturing	\$0	\$15,311	\$22,395	\$37,706
Wholesale trade	\$0	\$9,638	\$33,362	\$43,001
Retail trade	\$0	\$446	\$62,080	\$62,526
Transportation and warehousing	\$0	\$9,502	\$14,603	\$24,105
Information	\$0	\$124,464	\$29,612	\$154,077
Finance and insurance	\$0	\$49,212	\$88,794	\$138,006
Real estate and rental and leasing	\$0	\$80,129	\$153,107	\$233,235
Professional, scientific, and technical services	\$0	\$160,206	\$30,857	\$191,063
Management of companies and enterprises	\$1,460,529	\$3,189	\$5,052	\$1,468,770
Administrative and support and waste management and remediation services	\$0	\$29,511	\$19,218	\$48,730
Educational services	\$0	\$157	\$16,387	\$16,544
Health care and social assistance	\$0	\$8	\$127,805	\$127,813
Arts, entertainment, and recreation	\$0	\$9,839	\$8,913	\$18,752
Accommodation and food services	\$0	\$10,718	\$36,720	\$47,438
Other services (except public administration)	\$0	\$19,278	\$35,898	\$55,176
Public administration	\$0	\$4,766	\$14,924	\$19,690
Total	\$1,460,529	\$543,433	\$725,192	\$2,729,153

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 288: Green Building Initiatives—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$15	\$138	\$153
Mining	\$0	\$13	\$33	\$46
Utilities	\$0	\$1,684	\$2,293	\$3,977
Construction	\$0	\$1,760	\$2,376	\$4,136
Manufacturing	\$0	\$4,669	\$3,252	\$7,921
Wholesale trade	\$0	\$3,613	\$12,506	\$16,119
Retail trade	\$0	\$232	\$31,264	\$31,497
Transportation and warehousing	\$0	\$3,239	\$5,027	\$8,266
Information	\$0	\$28,160	\$6,337	\$34,498
Finance and insurance	\$0	\$14,970	\$24,737	\$39,707
Real estate and rental and leasing	\$0	\$6,842	\$5,388	\$12,230
Professional, scientific, and technical services	\$0	\$74,393	\$13,556	\$87,949
Management of companies and enterprises	\$789,441	\$1,724	\$2,731	\$793,896
Administrative and support and waste management and remediation services	\$0	\$13,357	\$8,448	\$21,805
Educational services	\$0	\$76	\$9,196	\$9,273
Health care and social assistance	\$0	\$3	\$61,509	\$61,512
Arts, entertainment, and recreation	\$0	\$2,944	\$3,249	\$6,193
Accommodation and food services	\$0	\$3,722	\$12,814	\$16,536
Other services (except public administration)	\$0	\$9,553	\$15,455	\$25,008
Public administration	\$0	\$2,468	\$5,353	\$7,821
Total	\$789,441	\$173,437	\$225,662	\$1,188,540

Source: RESI

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Figure 289: Building Codes—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.2	0.0	0.0	0.2
Construction	2.8	0.1	0.0	2.9
Manufacturing	0.0	0.1	0.0	0.1
Wholesale trade	0.0	0.1	0.1	0.2
Retail trade	0.0	0.1	0.6	0.7
Transportation and warehousing	0.0	0.1	0.1	0.2
Information	0.0	0.1	0.1	0.1
Finance and insurance	0.0	0.1	0.2	0.3
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	2.7	0.6	0.1	3.5
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.4	0.2	0.6
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.7	0.7
Arts, entertainment, and recreation	0.0	0.0	0.1	0.1
Accommodation and food services	0.0	0.1	0.3	0.5
Other services (except public administration)	0.0	0.1	0.3	0.4
Public administration	0.4	0.0	0.0	0.4
Average	6.1	2.2	3.3	11.6

Source: RESI

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Figure 290: Building Codes—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$290	\$658	\$947
Mining	\$0	\$3,527	\$324	\$3,851
Utilities	\$180,000	\$6,741	\$10,188	\$196,930
Construction	\$360,000	\$12,945	\$4,130	\$377,075
Manufacturing	\$0	\$19,875	\$13,419	\$33,294
Wholesale trade	\$0	\$16,153	\$19,861	\$36,014
Retail trade	\$0	\$5,646	\$37,900	\$43,547
Transportation and warehousing	\$0	\$16,145	\$8,887	\$25,032
Information	\$0	\$20,670	\$17,816	\$38,486
Finance and insurance	\$0	\$29,426	\$53,997	\$83,423
Real estate and rental and leasing	\$0	\$32,549	\$93,014	\$125,562
Professional, scientific, and technical services	\$360,000	\$89,333	\$18,645	\$467,978
Management of companies and enterprises	\$0	\$4,361	\$3,045	\$7,406
Administrative and support and waste management and remediation services	\$0	\$30,277	\$11,647	\$41,924
Educational services	\$0	\$139	\$10,174	\$10,313
Health care and social assistance	\$0	\$4	\$77,174	\$77,177
Arts, entertainment, and recreation	\$0	\$1,901	\$5,444	\$7,345
Accommodation and food services	\$0	\$9,467	\$22,209	\$31,676
Other services (except public administration)	\$0	\$9,789	\$21,917	\$31,706
Public administration	\$100,000	\$6,989	\$9,007	\$115,997
Average	\$1,000,000	\$316,229	\$439,456	\$1,755,685

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 291: Building Codes—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$36	\$83	\$119
Mining	\$0	\$417	\$20	\$437
Utilities	\$26,300	\$857	\$1,370	\$28,527
Construction	\$139,082	\$5,067	\$1,446	\$145,595
Manufacturing	\$0	\$3,745	\$1,954	\$5,698
Wholesale trade	\$0	\$6,055	\$7,445	\$13,500
Retail trade	\$0	\$2,943	\$19,087	\$22,030
Transportation and warehousing	\$0	\$5,186	\$3,055	\$8,241
Information	\$0	\$4,478	\$3,816	\$8,294
Finance and insurance	\$0	\$8,235	\$15,006	\$23,241
Real estate and rental and leasing	\$0	\$3,106	\$3,222	\$6,328
Professional, scientific, and technical services	\$189,021	\$41,749	\$8,193	\$238,963
Management of companies and enterprises	\$0	\$2,357	\$1,646	\$4,003
Administrative and support and waste management and remediation services	\$0	\$14,224	\$5,118	\$19,342
Educational services	\$0	\$73	\$5,725	\$5,798
Health care and social assistance	\$0	\$1	\$37,150	\$37,151
Arts, entertainment, and recreation	\$0	\$678	\$1,983	\$2,661
Accommodation and food services	\$0	\$3,293	\$7,751	\$11,043
Other services (except public administration)	\$0	\$3,906	\$9,446	\$13,353
Public administration	\$25,247	\$2,771	\$3,236	\$31,253
Average	\$379,649	\$109,176	\$136,752	\$625,578

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 292: Green Building Initiatives—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.1	0.1
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.1	0.1
Construction	0.0	0.0	0.2	0.2
Manufacturing	0.0	0.0	0.2	0.2
Wholesale trade	0.0	0.0	0.6	0.6
Retail trade	0.0	0.0	4.1	4.1
Transportation and warehousing	0.0	0.0	0.6	0.6
Information	0.0	0.0	0.4	0.4
Finance and insurance	0.0	0.0	1.5	1.5
Real estate and rental and leasing	0.0	0.0	1.6	1.6
Professional, scientific, and technical services	0.0	0.0	0.9	1.0
Management of companies and enterprises	0.0	0.0	0.1	0.1
Administrative and support and waste management and remediation services	0.0	0.0	1.1	1.1
Educational services	0.0	0.0	0.9	0.9
Health care and social assistance	0.0	0.0	5.1	5.1
Arts, entertainment, and recreation	0.0	0.0	0.7	0.7
Accommodation and food services	0.0	0.0	2.3	2.4
Other services (except public administration)	0.0	0.0	2.1	2.1
Public administration	0.0	0.0	0.3	0.3
Total	0.0	0.0	23.1	23.2

Source: RESI

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Figure 293: Green Building Initiatives—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$1	\$4,751	\$4,752
Mining	\$0	\$2	\$2,365	\$2,367
Utilities	\$0	\$75	\$76,931	\$77,006
Construction	\$0	\$28	\$28,114	\$28,142
Manufacturing	\$0	\$94	\$98,284	\$98,378
Wholesale trade	\$0	\$59	\$133,372	\$133,432
Retail trade	\$0	\$3	\$249,200	\$249,203
Transportation and warehousing	\$0	\$59	\$61,903	\$61,962
Information	\$0	\$767	\$126,297	\$127,064
Finance and insurance	\$0	\$303	\$360,481	\$360,784
Real estate and rental and leasing	\$0	\$494	\$643,222	\$643,716
Professional, scientific, and technical services	\$0	\$987	\$130,265	\$131,253
Management of companies and enterprises	\$9,000	\$20	\$21,504	\$30,524
Administrative and support and waste management and remediation services	\$0	\$182	\$81,650	\$81,832
Educational services	\$0	\$1	\$71,996	\$71,997
Health care and social assistance	\$0	\$0	\$554,488	\$554,488
Arts, entertainment, and recreation	\$0	\$61	\$37,283	\$37,344
Accommodation and food services	\$0	\$66	\$151,951	\$152,017
Other services (except public administration)	\$0	\$119	\$151,335	\$151,454
Public administration	\$0	\$29	\$64,801	\$64,830
Total	\$9,000	\$3,349	\$3,050,196	\$3,062,545

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 294: Green Building Initiatives—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$0	\$595	\$595
Mining	\$0	\$0	\$140	\$140
Utilities	\$0	\$10	\$10,347	\$10,357
Construction	\$0	\$11	\$9,889	\$9,900
Manufacturing	\$0	\$29	\$14,138	\$14,167
Wholesale trade	\$0	\$22	\$49,994	\$50,016
Retail trade	\$0	\$1	\$125,504	\$125,506
Transportation and warehousing	\$0	\$20	\$21,333	\$21,353
Information	\$0	\$174	\$26,891	\$27,065
Finance and insurance	\$0	\$92	\$100,714	\$100,807
Real estate and rental and leasing	\$0	\$42	\$24,249	\$24,291
Professional, scientific, and technical services	\$0	\$458	\$57,204	\$57,663
Management of companies and enterprises	\$4,865	\$11	\$11,623	\$16,499
Administrative and support and waste management and remediation services	\$0	\$82	\$35,886	\$35,969
Educational services	\$0	\$0	\$40,142	\$40,143
Health care and social assistance	\$0	\$0	\$266,661	\$266,661
Arts, entertainment, and recreation	\$0	\$18	\$13,673	\$13,691
Accommodation and food services	\$0	\$23	\$53,014	\$53,037
Other services (except public administration)	\$0	\$59	\$64,758	\$64,817
Public administration	\$0	\$15	\$23,075	\$23,091
Total	\$4,865	\$1,069	\$949,833	\$955,766

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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A.7 Land Use**Figure 295: Reducing GHG Emissions from the Transportation Sector through Land Use and Location Efficiency—Investment Phase, Employment Impacts**

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.7	0.1	0.0	0.8
Manufacturing	0.0	0.0	0.0	0.0
Wholesale trade	0.0	0.0	0.1	0.1
Retail trade	0.0	0.0	0.5	0.5
Transportation and warehousing	0.0	0.1	0.1	0.1
Information	1.0	0.1	0.0	1.1
Finance and insurance	0.0	0.1	0.2	0.3
Real estate and rental and leasing	0.0	0.1	0.2	0.2
Professional, scientific, and technical services	4.5	0.6	0.1	5.2
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.5	0.1	0.7
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	-1.9	0.0	0.6	-1.3
Arts, entertainment, and recreation	0.0	0.1	0.1	0.1
Accommodation and food services	0.0	0.1	0.3	0.4
Other services (except public administration)	0.0	0.1	0.3	0.3
Public administration	0.4	0.0	0.0	0.4
Average	4.7	1.9	2.8	9.3

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 296: Reducing GHG Emissions from the Transportation Sector through Land Use and Location Efficiency—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$119	\$828	\$947
Mining	\$0	\$1,303	\$408	\$1,710
Utilities	\$0	\$6,874	\$12,829	\$19,703
Construction	\$100,000	\$8,436	\$5,194	\$113,631
Manufacturing	\$0	\$12,417	\$16,894	\$29,311
Wholesale trade	\$0	\$10,262	\$25,015	\$35,277
Retail trade	\$0	\$1,701	\$47,652	\$49,353
Transportation and warehousing	\$0	\$11,067	\$11,176	\$22,243
Information	\$0	\$24,512	\$22,422	\$46,934
Finance and insurance	\$0	\$36,292	\$67,909	\$104,201
Real estate and rental and leasing	\$0	\$42,674	\$116,986	\$159,660
Professional, scientific, and technical services	\$800,000	\$102,083	\$23,459	\$925,542
Management of companies and enterprises	\$0	\$6,380	\$3,832	\$10,212
Administrative and support and waste management and remediation services	\$0	\$49,502	\$14,651	\$64,152
Educational services	\$0	\$101	\$12,777	\$12,878
Health care and social assistance	\$0	\$5	\$97,104	\$97,109
Arts, entertainment, and recreation	\$0	\$2,991	\$6,844	\$9,835
Accommodation and food services	\$0	\$10,152	\$27,941	\$38,093
Other services (except public administration)	\$0	\$15,223	\$27,556	\$42,779
Public administration	\$100,000	\$8,214	\$11,334	\$119,548
Average	\$1,000,000	\$350,307	\$552,813	\$1,903,120

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 297: Reducing GHG Emissions from the Transportation Sector through Land Use and Location Efficiency—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$15	\$105	\$120
Mining	\$0	\$212	\$25	\$237
Utilities	\$0	\$881	\$1,725	\$2,605
Construction	\$35,449	\$3,265	\$1,818	\$40,532
Manufacturing	\$0	\$2,460	\$2,459	\$4,919
Wholesale trade	\$0	\$3,847	\$9,377	\$13,223
Retail trade	\$0	\$887	\$23,998	\$24,885
Transportation and warehousing	\$0	\$4,027	\$3,843	\$7,870
Information	\$0	\$5,356	\$4,802	\$10,158
Finance and insurance	\$0	\$10,154	\$18,876	\$29,030
Real estate and rental and leasing	\$0	\$3,733	\$4,057	\$7,790
Professional, scientific, and technical services	\$437,615	\$49,159	\$10,308	\$497,082
Management of companies and enterprises	\$0	\$3,449	\$2,071	\$5,520
Administrative and support and waste management and remediation services	\$0	\$23,953	\$6,439	\$30,392
Educational services	\$0	\$51	\$7,189	\$7,240
Health care and social assistance	\$0	\$2	\$46,743	\$46,745
Arts, entertainment, and recreation	\$0	\$1,007	\$2,493	\$3,500
Accommodation and food services	\$0	\$3,526	\$9,751	\$13,277
Other services (except public administration)	\$0	\$5,331	\$11,876	\$17,207
Public administration	\$25,247	\$3,427	\$4,072	\$32,745
Average	\$498,310	\$124,739	\$172,027	\$795,076

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 298: Reducing GHG Emissions from the Transportation Sector through Land Use and Location Efficiency—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	6.5	0.0	0.0	6.5
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	2.3	0.2	0.1	2.5
Manufacturing	0.0	0.1	0.1	0.1
Wholesale trade	0.0	0.1	0.2	0.3
Retail trade	0.0	0.1	1.6	1.7
Transportation and warehousing	0.0	0.3	0.2	0.5
Information	2.9	0.2	0.1	3.2
Finance and insurance	0.0	0.3	0.6	0.9
Real estate and rental and leasing	0.0	0.2	0.5	0.7
Professional, scientific, and technical services	11.4	1.6	0.3	13.3
Management of companies and enterprises	0.0	0.0	0.0	0.1
Administrative and support and waste management and remediation services	0.0	1.5	0.4	1.9
Educational services	0.0	0.0	0.4	0.4
Health care and social assistance	-5.7	0.0	1.8	-3.9
Arts, entertainment, and recreation	0.0	0.2	0.3	0.4
Accommodation and food services	0.0	0.3	0.9	1.2
Other services (except public administration)	1.5	0.3	0.8	2.5
Public administration	1.1	0.1	0.1	1.3
Total	19.8	5.5	8.4	33.7

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 299: Reducing GHG Emissions from the Transportation Sector through Land Use and Location Efficiency—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$1,425	\$30,241	\$31,667
Mining	\$0	\$4,120	\$14,965	\$19,085
Utilities	\$0	\$187,246	\$479,492	\$666,738
Construction	\$0	\$68,364	\$183,641	\$252,005
Manufacturing	\$0	\$234,403	\$621,936	\$856,339
Wholesale trade	\$0	\$147,561	\$889,422	\$1,036,983
Retail trade	\$0	\$6,824	\$1,657,929	\$1,664,753
Transportation and warehousing	\$0	\$145,474	\$399,326	\$544,800
Information	\$0	\$1,905,491	\$811,955	\$2,717,447
Finance and insurance	\$0	\$753,408	\$2,382,870	\$3,136,278
Real estate and rental and leasing	\$0	\$1,226,730	\$4,170,311	\$5,397,041
Professional, scientific, and technical services	\$0	\$2,452,675	\$842,272	\$3,294,948
Management of companies and enterprises	\$22,360,000	\$48,819	\$138,406	\$22,547,225
Administrative and support and waste management and remediation services	\$0	\$451,805	\$526,057	\$977,861
Educational services	\$0	\$2,408	\$455,304	\$457,712
Health care and social assistance	\$0	\$120	\$3,531,078	\$3,531,198
Arts, entertainment, and recreation	\$0	\$150,638	\$242,307	\$392,945
Accommodation and food services	\$0	\$164,093	\$993,590	\$1,157,683
Other services (except public administration)	\$0	\$295,135	\$979,271	\$1,274,406
Public administration	\$0	\$72,967	\$412,477	\$485,444
Total	\$22,360,000	\$8,319,706	\$19,762,850	\$50,442,556

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 300: Reducing GHG Emissions from the Transportation Sector through Land Use and Location Efficiency—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$236	\$3,803	\$4,038
Mining	\$0	\$205	\$900	\$1,105
Utilities	\$0	\$25,788	\$64,479	\$90,267
Construction	\$0	\$26,945	\$64,453	\$91,398
Manufacturing	\$0	\$71,481	\$89,934	\$161,415
Wholesale trade	\$0	\$55,312	\$333,394	\$388,706
Retail trade	\$0	\$3,556	\$834,966	\$838,523
Transportation and warehousing	\$0	\$49,588	\$137,530	\$187,118
Information	\$0	\$431,119	\$173,376	\$604,495
Finance and insurance	\$0	\$229,178	\$664,659	\$893,838
Real estate and rental and leasing	\$0	\$104,743	\$151,347	\$256,090
Professional, scientific, and technical services	\$0	\$1,138,918	\$369,957	\$1,508,875
Management of companies and enterprises	\$12,085,973	\$26,388	\$74,811	\$12,187,171
Administrative and support and waste management and remediation services	\$0	\$204,492	\$231,222	\$435,714
Educational services	\$0	\$1,166	\$254,777	\$255,943
Health care and social assistance	\$0	\$44	\$1,698,847	\$1,698,891
Arts, entertainment, and recreation	\$0	\$45,074	\$88,560	\$133,634
Accommodation and food services	\$0	\$56,975	\$346,703	\$403,677
Other services (except public administration)	\$0	\$146,247	\$420,480	\$566,728
Public administration	\$0	\$37,779	\$147,477	\$185,257
Total	\$12,085,973	\$2,655,234	\$6,151,676	\$20,892,882

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 301: Transportation GHG Targets for Local Governments and Metropolitan Planning Organizations—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	2.1	0.1	0.0	2.3
Manufacturing	0.0	0.1	0.0	0.1
Wholesale trade	0.0	0.1	0.1	0.2
Retail trade	0.0	0.1	0.7	0.8
Transportation and warehousing	0.0	0.1	0.1	0.2
Information	0.0	0.1	0.1	0.1
Finance and insurance	0.0	0.1	0.3	0.4
Real estate and rental and leasing	0.0	0.2	0.2	0.5
Professional, scientific, and technical services	4.5	0.8	0.2	5.5
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.6	0.2	0.8
Educational services	0.0	0.0	0.2	0.2
Health care and social assistance	0.0	0.0	0.8	0.8
Arts, entertainment, and recreation	0.0	0.1	0.1	0.2
Accommodation and food services	0.0	0.2	0.4	0.6
Other services (except public administration)	0.0	0.1	0.4	0.5
Public administration	0.4	0.0	0.1	0.5
Average	7.0	2.6	3.9	13.5

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 302: Transportation GHG Targets for Local Governments and Metropolitan Planning Organizations—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$228	\$767	\$995
Mining	\$0	\$2,094	\$378	\$2,472
Utilities	\$0	\$7,372	\$11,886	\$19,259
Construction	\$300,000	\$8,829	\$4,814	\$313,644
Manufacturing	\$0	\$20,979	\$15,654	\$36,633
Wholesale trade	\$0	\$14,761	\$23,175	\$37,936
Retail trade	\$0	\$3,920	\$44,172	\$48,092
Transportation and warehousing	\$0	\$12,226	\$10,359	\$22,585
Information	\$0	\$23,727	\$20,778	\$44,505
Finance and insurance	\$0	\$34,889	\$62,943	\$97,832
Real estate and rental and leasing	\$0	\$39,784	\$108,430	\$148,214
Professional, scientific, and technical services	\$600,000	\$112,103	\$21,741	\$733,843
Management of companies and enterprises	\$0	\$6,092	\$3,551	\$9,643
Administrative and support and waste management and remediation services	\$0	\$41,709	\$13,579	\$55,288
Educational services	\$0	\$156	\$11,848	\$12,004
Health care and social assistance	\$0	\$5	\$89,990	\$89,995
Arts, entertainment, and recreation	\$0	\$2,414	\$6,344	\$8,759
Accommodation and food services	\$0	\$10,371	\$25,895	\$36,266
Other services (except public administration)	\$0	\$13,220	\$25,544	\$38,763
Public administration	\$100,000	\$7,809	\$10,504	\$118,312
Average	\$1,000,000	\$362,686	\$512,354	\$1,875,040

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 303: Transportation GHG Targets for Local Governments and Metropolitan Planning Organizations—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$29	\$97	\$126
Mining	\$0	\$378	\$23	\$402
Utilities	\$0	\$943	\$1,598	\$2,541
Construction	\$106,346	\$3,424	\$1,685	\$111,456
Manufacturing	\$0	\$3,942	\$2,279	\$6,220
Wholesale trade	\$0	\$5,533	\$8,687	\$14,220
Retail trade	\$0	\$2,043	\$22,246	\$24,289
Transportation and warehousing	\$0	\$4,282	\$3,562	\$7,843
Information	\$0	\$5,116	\$4,450	\$9,566
Finance and insurance	\$0	\$9,643	\$17,495	\$27,138
Real estate and rental and leasing	\$0	\$3,795	\$3,759	\$7,554
Professional, scientific, and technical services	\$315,036	\$53,088	\$9,553	\$377,677
Management of companies and enterprises	\$0	\$3,293	\$1,919	\$5,212
Administrative and support and waste management and remediation services	\$0	\$20,004	\$5,967	\$25,971
Educational services	\$0	\$81	\$6,667	\$6,748
Health care and social assistance	\$0	\$2	\$43,319	\$43,321
Arts, entertainment, and recreation	\$0	\$848	\$2,311	\$3,159
Accommodation and food services	\$0	\$3,604	\$9,037	\$12,641
Other services (except public administration)	\$0	\$5,142	\$11,009	\$16,152
Public administration	\$25,247	\$3,231	\$3,773	\$32,251
Average	\$446,629	\$128,422	\$159,437	\$734,487

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 304: Transportation GHG Targets for Local Governments and Metropolitan Planning Organizations—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.1	0.1
Mining	0.0	0.4	0.0	0.4
Utilities	0.0	0.3	0.1	0.4
Construction	0.0	5.7	0.3	6.0
Manufacturing	0.0	0.9	0.3	1.2
Wholesale trade	0.0	1.3	0.8	2.2
Retail trade	0.0	0.4	5.3	5.7
Transportation and warehousing	0.0	1.8	0.7	2.5
Information	0.0	0.6	0.5	1.1
Finance and insurance	0.0	3.1	2.0	5.1
Real estate and rental and leasing	0.0	4.6	1.8	6.4
Professional, scientific, and technical services	0.0	9.8	1.2	11.0
Management of companies and enterprises	0.0	0.2	0.1	0.3
Administrative and support and waste management and remediation services	0.0	7.0	1.4	8.4
Educational services	0.0	0.0	1.2	1.2
Health care and social assistance	0.0	0.0	6.2	6.2
Arts, entertainment, and recreation	0.0	0.5	0.9	1.4
Accommodation and food services	0.0	0.9	3.0	3.9
Other services (except public administration)	0.0	0.9	2.6	3.5
Public administration	37.6	1.6	0.4	39.6
Total	37.6	40.1	28.8	106.6

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 305: Transportation GHG Targets for Local Governments and Metropolitan Planning Organizations—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$2,048	\$5,694	\$7,742
Mining	\$0	\$82,810	\$2,804	\$85,614
Utilities	\$0	\$306,169	\$88,499	\$394,668
Construction	\$0	\$719,497	\$35,502	\$754,999
Manufacturing	\$0	\$347,910	\$116,384	\$464,294
Wholesale trade	\$0	\$274,991	\$172,873	\$447,864
Retail trade	\$0	\$24,343	\$325,357	\$349,700
Transportation and warehousing	\$0	\$229,782	\$76,421	\$306,203
Information	\$0	\$197,473	\$154,170	\$351,644
Finance and insurance	\$0	\$700,422	\$464,535	\$1,164,957
Real estate and rental and leasing	\$0	\$824,180	\$800,631	\$1,624,812
Professional, scientific, and technical services	\$0	\$1,377,866	\$160,965	\$1,538,830
Management of companies and enterprises	\$0	\$37,064	\$26,325	\$63,389
Administrative and support and waste management and remediation services	\$0	\$612,376	\$100,385	\$712,761
Educational services	\$0	\$2,301	\$86,543	\$88,844
Health care and social assistance	\$0	\$76	\$666,492	\$666,568
Arts, entertainment, and recreation	\$0	\$17,933	\$46,720	\$64,653
Accommodation and food services	\$0	\$62,914	\$191,632	\$254,546
Other services (except public administration)	\$0	\$102,998	\$188,142	\$291,140
Public administration	\$10,506,886	\$411,349	\$77,810	\$10,996,046
Total	\$10,506,886	\$6,334,500	\$3,787,886	\$20,629,272

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 306: Transportation GHG Targets for Local Governments and Metropolitan Planning Organizations—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$265	\$720	\$984
Mining	\$0	\$12,628	\$172	\$12,800
Utilities	\$0	\$35,647	\$11,898	\$47,545
Construction	\$0	\$277,824	\$12,434	\$290,258
Manufacturing	\$0	\$63,293	\$16,920	\$80,213
Wholesale trade	\$0	\$103,078	\$64,800	\$167,879
Retail trade	\$0	\$12,687	\$163,854	\$176,541
Transportation and warehousing	\$0	\$81,063	\$26,292	\$107,355
Information	\$0	\$43,538	\$33,007	\$76,544
Finance and insurance	\$0	\$205,419	\$129,272	\$334,690
Real estate and rental and leasing	\$0	\$64,848	\$27,976	\$92,824
Professional, scientific, and technical services	\$0	\$663,451	\$70,720	\$734,171
Management of companies and enterprises	\$0	\$20,034	\$14,229	\$34,263
Administrative and support and waste management and remediation services	\$0	\$246,319	\$44,121	\$290,440
Educational services	\$0	\$1,122	\$48,631	\$49,752
Health care and social assistance	\$0	\$28	\$320,798	\$320,825
Arts, entertainment, and recreation	\$0	\$6,211	\$17,025	\$23,235
Accommodation and food services	\$0	\$21,599	\$66,876	\$88,475
Other services (except public administration)	\$0	\$35,269	\$81,042	\$116,312
Public administration	\$2,652,623	\$112,950	\$27,931	\$2,793,504
Total	\$2,652,623	\$2,007,272	\$1,178,716	\$5,838,610

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 307: Funding Mechanisms for Smart Growth—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	4.2	0.1	0.0	4.3
Manufacturing	0.0	0.1	0.0	0.1
Wholesale trade	0.0	0.1	0.1	0.2
Retail trade	0.0	0.4	0.6	1.0
Transportation and warehousing	0.0	0.1	0.1	0.2
Information	0.0	0.1	0.1	0.1
Finance and insurance	0.0	0.1	0.2	0.4
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	2.3	0.6	0.1	3.0
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.4	0.2	0.6
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.7	0.7
Arts, entertainment, and recreation	0.0	0.0	0.1	0.1
Accommodation and food services	0.0	0.1	0.4	0.5
Other services (except public administration)	0.0	0.1	0.3	0.4
Public administration	0.4	0.0	0.0	0.4
Average	6.8	2.5	3.5	12.8

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 308: Funding Mechanisms for Smart Growth—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$547	\$680	\$1,227
Mining	\$0	\$4,000	\$335	\$4,335
Utilities	\$0	\$7,475	\$10,535	\$18,009
Construction	\$600,000	\$8,448	\$4,271	\$612,719
Manufacturing	\$0	\$32,956	\$13,876	\$46,832
Wholesale trade	\$0	\$21,668	\$20,536	\$42,204
Retail trade	\$0	\$22,787	\$39,195	\$61,982
Transportation and warehousing	\$0	\$14,842	\$9,190	\$24,032
Information	\$0	\$19,606	\$18,422	\$38,028
Finance and insurance	\$0	\$27,636	\$55,840	\$83,476
Real estate and rental and leasing	\$0	\$32,725	\$96,188	\$128,912
Professional, scientific, and technical services	\$300,000	\$89,846	\$19,281	\$409,126
Management of companies and enterprises	\$0	\$4,640	\$3,149	\$7,789
Administrative and support and waste management and remediation services	\$0	\$30,088	\$12,044	\$42,132
Educational services	\$0	\$140	\$10,523	\$10,663
Health care and social assistance	\$0	\$3	\$79,804	\$79,807
Arts, entertainment, and recreation	\$0	\$1,640	\$5,630	\$7,270
Accommodation and food services	\$0	\$6,665	\$22,966	\$29,631
Other services (except public administration)	\$0	\$11,592	\$22,666	\$34,257
Public administration	\$100,000	\$6,977	\$9,314	\$116,291
Average	\$1,000,000	\$344,281	\$454,442	\$1,798,724

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 309: Funding Mechanisms for Smart Growth—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$74	\$86	\$160
Mining	\$0	\$815	\$21	\$836
Utilities	\$0	\$952	\$1,416	\$2,368
Construction	\$201,081	\$3,275	\$1,495	\$205,851
Manufacturing	\$0	\$6,112	\$2,020	\$8,132
Wholesale trade	\$0	\$8,122	\$7,698	\$15,820
Retail trade	\$0	\$11,876	\$19,739	\$31,615
Transportation and warehousing	\$0	\$4,884	\$3,160	\$8,043
Information	\$0	\$4,160	\$3,946	\$8,106
Finance and insurance	\$0	\$7,743	\$15,518	\$23,261
Real estate and rental and leasing	\$0	\$3,331	\$3,332	\$6,663
Professional, scientific, and technical services	\$157,518	\$42,638	\$8,472	\$208,627
Management of companies and enterprises	\$0	\$2,508	\$1,702	\$4,210
Administrative and support and waste management and remediation services	\$0	\$14,022	\$5,293	\$19,315
Educational services	\$0	\$72	\$5,922	\$5,994
Health care and social assistance	\$0	\$1	\$38,416	\$38,417
Arts, entertainment, and recreation	\$0	\$582	\$2,051	\$2,632
Accommodation and food services	\$0	\$2,314	\$8,015	\$10,329
Other services (except public administration)	\$0	\$4,729	\$9,769	\$14,499
Public administration	\$25,247	\$2,707	\$3,346	\$31,300
Average	\$383,846	\$120,917	\$141,416	\$646,178

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 310: Funding Mechanisms for Smart Growth—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.2	0.5	0.7
Mining	0.0	2.9	0.1	3.0
Utilities	0.0	2.2	0.7	2.9
Construction	0.0	43.1	2.1	45.2
Manufacturing	0.0	7.0	2.0	9.0
Wholesale trade	0.0	10.0	6.3	16.3
Retail trade	0.0	3.0	40.4	43.4
Transportation and warehousing	0.0	13.8	5.1	18.8
Information	0.0	4.6	3.7	8.2
Finance and insurance	0.0	23.6	14.9	38.5
Real estate and rental and leasing	0.0	34.6	13.8	48.4
Professional, scientific, and technical services	0.0	74.3	8.9	83.2
Management of companies and enterprises	0.0	1.3	0.9	2.2
Administrative and support and waste management and remediation services	0.0	53.3	10.5	63.8
Educational services	0.0	0.2	8.9	9.2
Health care and social assistance	0.0	0.0	47.2	47.2
Arts, entertainment, and recreation	0.0	3.6	6.9	10.5
Accommodation and food services	0.0	7.1	22.4	29.5
Other services (except public administration)	0.0	7.0	19.8	26.8
Public administration	284.6	11.9	2.9	299.4
Total	284.6	303.7	218.0	806.2

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 311: Funding Mechanisms for Smart Growth—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$15,489	\$43,071	\$58,559
Mining	\$0	\$626,357	\$21,208	\$647,565
Utilities	\$0	\$2,315,788	\$669,382	\$2,985,170
Construction	\$0	\$5,442,101	\$268,531	\$5,710,632
Manufacturing	\$0	\$2,631,506	\$880,300	\$3,511,806
Wholesale trade	\$0	\$2,079,962	\$1,307,570	\$3,387,532
Retail trade	\$0	\$184,123	\$2,460,925	\$2,645,047
Transportation and warehousing	\$0	\$1,738,014	\$578,033	\$2,316,047
Information	\$0	\$1,493,641	\$1,166,109	\$2,659,750
Finance and insurance	\$0	\$5,297,826	\$3,513,629	\$8,811,454
Real estate and rental and leasing	\$0	\$6,233,902	\$6,055,784	\$12,289,686
Professional, scientific, and technical services	\$0	\$10,421,846	\$1,217,498	\$11,639,344
Management of companies and enterprises	\$0	\$280,343	\$199,116	\$479,459
Administrative and support and waste management and remediation services	\$0	\$4,631,862	\$759,289	\$5,391,151
Educational services	\$0	\$17,407	\$654,588	\$671,995
Health care and social assistance	\$0	\$574	\$5,041,188	\$5,041,762
Arts, entertainment, and recreation	\$0	\$135,639	\$353,380	\$489,019
Accommodation and food services	\$0	\$475,866	\$1,449,455	\$1,925,321
Other services (except public administration)	\$0	\$779,049	\$1,423,064	\$2,202,113
Public administration	\$79,471,569	\$3,111,346	\$588,539	\$83,171,455
Total	\$79,471,569	\$47,912,641	\$28,650,659	\$156,034,869

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 312: Funding Mechanisms for Smart Growth—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$2,001	\$5,443	\$7,444
Mining	\$0	\$95,516	\$1,301	\$96,816
Utilities	\$0	\$269,625	\$89,995	\$359,620
Construction	\$0	\$2,101,393	\$94,046	\$2,195,439
Manufacturing	\$0	\$478,731	\$127,978	\$606,709
Wholesale trade	\$0	\$779,661	\$490,134	\$1,269,795
Retail trade	\$0	\$95,960	\$1,239,355	\$1,335,315
Transportation and warehousing	\$0	\$613,142	\$198,864	\$812,006
Information	\$0	\$329,309	\$249,654	\$578,963
Finance and insurance	\$0	\$1,553,739	\$977,779	\$2,531,518
Real estate and rental and leasing	\$0	\$490,493	\$211,603	\$702,096
Professional, scientific, and technical services	\$0	\$5,018,185	\$534,907	\$5,553,092
Management of companies and enterprises	\$0	\$151,530	\$107,626	\$259,156
Administrative and support and waste management and remediation services	\$0	\$1,863,100	\$333,718	\$2,196,818
Educational services	\$0	\$8,485	\$367,830	\$376,316
Health care and social assistance	\$0	\$211	\$2,426,435	\$2,426,646
Arts, entertainment, and recreation	\$0	\$46,975	\$128,772	\$175,747
Accommodation and food services	\$0	\$163,369	\$505,832	\$669,201
Other services (except public administration)	\$0	\$266,769	\$612,986	\$879,755
Public administration	\$20,063,804	\$854,328	\$211,264	\$21,129,397
Total	\$20,063,804	\$15,182,521	\$8,915,523	\$44,161,848

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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**Figure 313: GHG Benefits from Priority Funding Areas and Other Growth Boundaries—
Investment Phase, Employment Impacts**

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	3.6	0.1	0.0	3.7
Manufacturing	0.0	0.1	0.0	0.1
Wholesale trade	0.0	0.1	0.1	0.2
Retail trade	0.0	0.3	0.7	1.0
Transportation and warehousing	0.0	0.1	0.1	0.2
Information	0.0	0.1	0.1	0.1
Finance and insurance	0.0	0.2	0.2	0.4
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	1.9	0.6	0.1	2.7
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.5	0.2	0.6
Educational services	0.0	0.0	0.1	0.2
Health care and social assistance	0.0	0.0	0.8	0.8
Arts, entertainment, and recreation	0.0	0.0	0.1	0.2
Accommodation and food services	0.0	0.1	0.4	0.5
Other services (except public administration)	1.3	0.1	0.3	1.7
Public administration	0.4	0.0	0.0	0.4
Average	7.2	2.7	3.5	13.4

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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**Figure 314: GHG Benefits from Priority Funding Areas and Other Growth Boundaries—
Investment Phase, Output Impacts**

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$480	\$696	\$1,176
Mining	\$0	\$3,565	\$342	\$3,907
Utilities	\$0	\$7,601	\$10,781	\$18,382
Construction	\$514,286	\$8,661	\$4,362	\$527,309
Manufacturing	\$0	\$30,030	\$14,196	\$44,226
Wholesale trade	\$0	\$19,846	\$21,024	\$40,870
Retail trade	\$0	\$19,714	\$40,020	\$59,734
Transportation and warehousing	\$0	\$16,572	\$9,387	\$25,958
Information	\$0	\$26,073	\$18,839	\$44,912
Finance and insurance	\$0	\$33,694	\$57,039	\$90,733
Real estate and rental and leasing	\$0	\$39,289	\$98,263	\$137,553
Professional, scientific, and technical services	\$257,143	\$90,737	\$19,708	\$367,588
Management of companies and enterprises	\$0	\$4,394	\$3,219	\$7,614
Administrative and support and waste management and remediation services	\$0	\$33,840	\$12,307	\$46,147
Educational services	\$0	\$2,388	\$10,725	\$13,113
Health care and social assistance	\$0	\$57	\$81,578	\$81,635
Arts, entertainment, and recreation	\$0	\$1,987	\$5,748	\$7,735
Accommodation and food services	\$0	\$7,504	\$23,473	\$30,976
Other services (except public administration)	\$128,571	\$11,108	\$23,143	\$162,822
Public administration	\$100,000	\$7,852	\$9,522	\$117,374
Average	\$1,000,000	\$365,392	\$464,373	\$1,829,765

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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**Figure 315: GHG Benefits from Priority Funding Areas and Other Growth Boundaries—
Investment Phase, Wage Impacts**

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$65	\$88	\$153
Mining	\$0	\$717	\$21	\$738
Utilities	\$0	\$973	\$1,449	\$2,422
Construction	\$172,355	\$3,357	\$1,527	\$177,239
Manufacturing	\$0	\$5,653	\$2,066	\$7,719
Wholesale trade	\$0	\$7,439	\$7,881	\$15,320
Retail trade	\$0	\$10,275	\$20,155	\$30,429
Transportation and warehousing	\$0	\$5,633	\$3,228	\$8,860
Information	\$0	\$5,821	\$4,035	\$9,856
Finance and insurance	\$0	\$10,279	\$15,856	\$26,135
Real estate and rental and leasing	\$0	\$3,774	\$3,409	\$7,183
Professional, scientific, and technical services	\$135,015	\$43,078	\$8,659	\$186,753
Management of companies and enterprises	\$0	\$2,375	\$1,740	\$4,115
Administrative and support and waste management and remediation services	\$0	\$15,624	\$5,409	\$21,033
Educational services	\$0	\$1,094	\$6,034	\$7,128
Health care and social assistance	\$0	\$21	\$39,269	\$39,290
Arts, entertainment, and recreation	\$0	\$732	\$2,094	\$2,826
Accommodation and food services	\$0	\$2,601	\$8,192	\$10,793
Other services (except public administration)	\$66,340	\$4,634	\$9,974	\$80,948
Public administration	\$25,247	\$3,276	\$3,420	\$31,943
Average	\$398,958	\$127,421	\$144,506	\$670,884

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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**Figure 316: GHG Benefits from Priority Funding Areas and Other Growth Boundaries—
Operation Phase, Employment Impacts**

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.1	0.1
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.2	0.2
Construction	0.0	0.0	0.4	0.4
Manufacturing	0.0	0.0	0.4	0.4
Wholesale trade	0.0	0.0	1.3	1.3
Retail trade	0.0	0.0	8.2	8.2
Transportation and warehousing	0.0	0.0	1.1	1.1
Information	0.0	0.0	0.8	0.8
Finance and insurance	0.0	0.0	3.1	3.1
Real estate and rental and leasing	0.0	0.0	3.2	3.2
Professional, scientific, and technical services	0.0	0.0	1.9	1.9
Management of companies and enterprises	0.0	0.0	0.2	0.2
Administrative and support and waste management and remediation services	0.0	0.0	2.3	2.3
Educational services	0.0	0.0	1.9	1.9
Health care and social assistance	0.0	0.0	10.3	10.3
Arts, entertainment, and recreation	0.0	0.0	1.5	1.5
Accommodation and food services	0.0	0.0	4.7	4.7
Other services (except public administration)	0.0	0.0	4.2	4.2
Public administration	0.0	0.0	0.6	0.6
Total	0.0	0.0	46.4	46.4

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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**Figure 317: GHG Benefits from Priority Funding Areas and Other Growth Boundaries—
Operation Phase, Output Impacts**

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$0	\$9,524	\$9,524
Mining	\$0	\$0	\$4,741	\$4,741
Utilities	\$0	\$0	\$154,214	\$154,214
Construction	\$0	\$0	\$56,351	\$56,351
Manufacturing	\$0	\$0	\$197,011	\$197,011
Wholesale trade	\$0	\$0	\$267,309	\$267,309
Retail trade	\$0	\$0	\$499,459	\$499,459
Transportation and warehousing	\$0	\$0	\$124,079	\$124,079
Information	\$0	\$0	\$253,154	\$253,154
Finance and insurance	\$0	\$0	\$722,505	\$722,505
Real estate and rental and leasing	\$0	\$0	\$1,289,264	\$1,289,264
Professional, scientific, and technical services	\$0	\$0	\$261,104	\$261,104
Management of companies and enterprises	\$0	\$0	\$43,103	\$43,103
Administrative and support and waste management and remediation services	\$0	\$0	\$163,661	\$163,661
Educational services	\$0	\$0	\$144,318	\$144,318
Health care and social assistance	\$0	\$0	\$1,111,458	\$1,111,458
Arts, entertainment, and recreation	\$0	\$0	\$74,730	\$74,730
Accommodation and food services	\$0	\$0	\$304,561	\$304,561
Other services (except public administration)	\$0	\$0	\$303,335	\$303,335
Public administration	\$0	\$0	\$129,891	\$129,891
Total	\$0	\$0	\$6,113,771	\$6,113,771

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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**Figure 318: GHG Benefits from Priority Funding Areas and Other Growth Boundaries—
Operation Phase, Wage Impacts**

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$0	\$1,192	\$1,192
Mining	\$0	\$0	\$280	\$280
Utilities	\$0	\$0	\$20,741	\$20,741
Construction	\$0	\$0	\$19,821	\$19,821
Manufacturing	\$0	\$0	\$28,339	\$28,339
Wholesale trade	\$0	\$0	\$100,199	\$100,199
Retail trade	\$0	\$0	\$251,541	\$251,541
Transportation and warehousing	\$0	\$0	\$42,761	\$42,761
Information	\$0	\$0	\$53,901	\$53,901
Finance and insurance	\$0	\$0	\$201,861	\$201,861
Real estate and rental and leasing	\$0	\$0	\$48,610	\$48,610
Professional, scientific, and technical services	\$0	\$0	\$114,660	\$114,660
Management of companies and enterprises	\$0	\$0	\$23,298	\$23,298
Administrative and support and waste management and remediation services	\$0	\$0	\$71,931	\$71,931
Educational services	\$0	\$0	\$80,465	\$80,465
Health care and social assistance	\$0	\$0	\$534,515	\$534,515
Arts, entertainment, and recreation	\$0	\$0	\$27,406	\$27,406
Accommodation and food services	\$0	\$0	\$106,258	\$106,258
Other services (except public administration)	\$0	\$0	\$129,799	\$129,799
Public administration	\$0	\$0	\$46,254	\$46,254
Total	\$0	\$0	\$1,903,833	\$1,903,833

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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A.8 Innovative Initiatives**Figure 319: Leadership-by-Example-Local Government—Investment Phase, Employment Impacts**

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.6	0.0	0.0	0.6
Construction	2.0	0.2	0.0	2.2
Manufacturing	0.0	0.0	0.0	0.1
Wholesale trade	0.0	0.1	0.1	0.2
Retail trade	0.0	0.1	0.6	0.7
Transportation and warehousing	0.0	0.1	0.1	0.2
Information	0.0	0.1	0.1	0.1
Finance and insurance	0.0	0.1	0.2	0.4
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	1.9	0.6	0.1	2.7
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.7	0.5	0.2	1.3
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.7	0.7
Arts, entertainment, and recreation	0.0	0.0	0.1	0.1
Accommodation and food services	0.0	0.1	0.3	0.5
Other services (except public administration)	0.0	0.1	0.3	0.4
Public administration	0.4	0.0	0.0	0.4
Average	5.6	2.4	3.2	11.1

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 320: Leadership-by-Example-Local Government—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$239	\$628	\$867
Mining	\$0	\$3,084	\$309	\$3,393
Utilities	\$257,143	\$7,854	\$9,727	\$274,723
Construction	\$257,143	\$22,118	\$3,943	\$283,205
Manufacturing	\$0	\$17,482	\$12,812	\$30,293
Wholesale trade	\$0	\$14,890	\$18,962	\$33,852
Retail trade	\$0	\$4,559	\$36,185	\$40,744
Transportation and warehousing	\$0	\$16,350	\$8,485	\$24,834
Information	\$0	\$21,624	\$17,009	\$38,633
Finance and insurance	\$0	\$33,387	\$51,553	\$84,940
Real estate and rental and leasing	\$0	\$34,068	\$88,803	\$122,871
Professional, scientific, and technical services	\$257,143	\$90,877	\$17,801	\$365,820
Management of companies and enterprises	\$0	\$5,537	\$2,907	\$8,444
Administrative and support and waste management and remediation services	\$128,571	\$42,398	\$11,119	\$182,089
Educational services	\$0	\$121	\$9,714	\$9,835
Health care and social assistance	\$0	\$4	\$73,680	\$73,683
Arts, entertainment, and recreation	\$0	\$1,940	\$5,197	\$7,138
Accommodation and food services	\$0	\$8,896	\$21,204	\$30,099
Other services (except public administration)	\$0	\$10,524	\$20,925	\$31,449
Public administration	\$100,000	\$8,736	\$8,600	\$117,335
Average	\$1,000,000	\$344,687	\$419,562	\$1,764,249

Source: RESI

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Figure 321: Leadership-by-Example-Local Government—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$30	\$79	\$110
Mining	\$0	\$404	\$19	\$423
Utilities	\$52,596	\$983	\$1,308	\$54,886
Construction	\$99,344	\$8,724	\$1,380	\$109,448
Manufacturing	\$0	\$3,295	\$1,865	\$5,161
Wholesale trade	\$0	\$5,582	\$7,108	\$12,689
Retail trade	\$0	\$2,376	\$18,223	\$20,599
Transportation and warehousing	\$0	\$5,496	\$2,917	\$8,413
Information	\$0	\$4,647	\$3,643	\$8,290
Finance and insurance	\$0	\$9,204	\$14,327	\$23,531
Real estate and rental and leasing	\$0	\$3,190	\$3,076	\$6,266
Professional, scientific, and technical services	\$135,015	\$42,481	\$7,822	\$185,318
Management of companies and enterprises	\$0	\$2,993	\$1,571	\$4,564
Administrative and support and waste management and remediation services	\$35,765	\$17,578	\$4,887	\$58,230
Educational services	\$0	\$63	\$5,466	\$5,529
Health care and social assistance	\$0	\$1	\$35,468	\$35,469
Arts, entertainment, and recreation	\$0	\$700	\$1,893	\$2,594
Accommodation and food services	\$0	\$3,092	\$7,400	\$10,491
Other services (except public administration)	\$0	\$4,156	\$9,019	\$13,175
Public administration	\$25,247	\$3,534	\$3,090	\$31,870
Average	\$347,967	\$118,528	\$130,561	\$597,056

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 322: Leadership-by-Example-Local Government—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.2	0.6	0.8
Mining	0.0	3.4	0.1	3.5
Utilities	0.0	2.6	0.8	3.4
Construction	0.0	49.8	2.4	52.2
Manufacturing	0.0	8.1	2.3	10.4
Wholesale trade	0.0	11.6	7.3	18.8
Retail trade	0.0	3.5	46.7	50.2
Transportation and warehousing	0.0	15.9	5.9	21.8
Information	0.0	5.3	4.2	9.5
Finance and insurance	0.0	27.2	17.3	44.5
Real estate and rental and leasing	0.0	39.9	16.0	55.9
Professional, scientific, and technical services	0.0	85.9	10.3	96.1
Management of companies and enterprises	0.0	1.5	1.1	2.6
Administrative and support and waste management and remediation services	0.0	61.6	12.2	73.7
Educational services	0.0	0.3	10.3	10.6
Health care and social assistance	0.0	0.0	54.5	54.5
Arts, entertainment, and recreation	0.0	4.1	8.0	12.1
Accommodation and food services	0.0	8.2	25.9	34.1
Other services (except public administration)	0.0	8.1	22.9	31.0
Public administration	328.9	13.8	3.3	346.0
Total	328.9	350.9	251.9	931.7

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 323: Leadership-by-Example-Local Government—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$17,899	\$49,772	\$67,671
Mining	\$0	\$723,810	\$24,508	\$748,318
Utilities	\$0	\$2,676,096	\$773,530	\$3,449,626
Construction	\$0	\$6,288,824	\$310,312	\$6,599,136
Manufacturing	\$0	\$3,040,936	\$1,017,263	\$4,058,199
Wholesale trade	\$0	\$2,403,579	\$1,511,012	\$3,914,590
Retail trade	\$0	\$212,770	\$2,843,814	\$3,056,584
Transportation and warehousing	\$0	\$2,008,427	\$667,968	\$2,676,395
Information	\$0	\$1,726,033	\$1,347,541	\$3,073,574
Finance and insurance	\$0	\$6,122,102	\$4,060,305	\$10,182,407
Real estate and rental and leasing	\$0	\$7,203,820	\$6,997,989	\$14,201,808
Professional, scientific, and technical services	\$0	\$12,043,355	\$1,406,925	\$13,450,280
Management of companies and enterprises	\$0	\$323,961	\$230,096	\$554,057
Administrative and support and waste management and remediation services	\$0	\$5,352,522	\$877,425	\$6,229,947
Educational services	\$0	\$20,115	\$756,434	\$776,549
Health care and social assistance	\$0	\$663	\$5,825,533	\$5,826,197
Arts, entertainment, and recreation	\$0	\$156,742	\$408,362	\$565,104
Accommodation and food services	\$0	\$549,905	\$1,674,972	\$2,224,877
Other services (except public administration)	\$0	\$900,259	\$1,644,475	\$2,544,734
Public administration	\$91,836,353	\$3,595,433	\$680,109	\$96,111,895
Total	\$91,836,353	\$55,367,249	\$33,108,344	\$180,311,946

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 324: Leadership-by-Example-Local Government—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$2,312	\$6,290	\$8,602
Mining	\$0	\$110,377	\$1,503	\$111,880
Utilities	\$0	\$311,576	\$103,997	\$415,572
Construction	\$0	\$2,428,343	\$108,678	\$2,537,022
Manufacturing	\$0	\$553,215	\$147,890	\$701,105
Wholesale trade	\$0	\$900,966	\$566,393	\$1,467,359
Retail trade	\$0	\$110,890	\$1,432,184	\$1,543,073
Transportation and warehousing	\$0	\$708,539	\$229,805	\$938,344
Information	\$0	\$380,545	\$288,497	\$669,042
Finance and insurance	\$0	\$1,795,481	\$1,129,910	\$2,925,391
Real estate and rental and leasing	\$0	\$566,808	\$244,526	\$811,334
Professional, scientific, and technical services	\$0	\$5,798,952	\$618,132	\$6,417,084
Management of companies and enterprises	\$0	\$175,106	\$124,371	\$299,477
Administrative and support and waste management and remediation services	\$0	\$2,152,975	\$385,640	\$2,538,615
Educational services	\$0	\$9,805	\$425,060	\$434,866
Health care and social assistance	\$0	\$243	\$2,803,959	\$2,804,202
Arts, entertainment, and recreation	\$0	\$54,284	\$148,807	\$203,091
Accommodation and food services	\$0	\$188,787	\$584,533	\$773,320
Other services (except public administration)	\$0	\$308,275	\$708,359	\$1,016,634
Public administration	\$23,185,482	\$987,251	\$244,135	\$24,416,867
Total	\$23,185,482	\$17,544,732	\$10,302,667	\$51,032,880

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 325: Leadership-by-Example-Federal Government—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.6	0.0	0.0	0.7
Construction	2.0	0.1	0.0	2.2
Manufacturing	0.0	0.1	0.0	0.1
Wholesale trade	0.0	0.1	0.1	0.2
Retail trade	0.0	0.1	0.6	0.7
Transportation and warehousing	0.0	0.1	0.1	0.2
Information	0.0	0.2	0.1	0.2
Finance and insurance	0.0	0.1	0.2	0.4
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	1.9	0.6	0.1	2.7
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.7	0.5	0.2	1.3
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.7	0.7
Arts, entertainment, and recreation	0.0	0.1	0.1	0.2
Accommodation and food services	0.0	0.2	0.3	0.5
Other services (except public administration)	0.0	0.1	0.3	0.4
Public administration	1.3	0.1	0.0	1.4
Average	6.5	2.6	3.3	12.4

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 326: Leadership-by-Example-Federal Government—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$379	\$658	\$1,038
Mining	\$0	\$2,717	\$324	\$3,041
Utilities	\$257,143	\$16,030	\$10,197	\$283,370
Construction	\$257,143	\$16,059	\$4,132	\$277,334
Manufacturing	\$0	\$19,318	\$13,430	\$32,748
Wholesale trade	\$0	\$19,605	\$19,881	\$39,486
Retail trade	\$0	\$4,617	\$37,912	\$42,528
Transportation and warehousing	\$0	\$18,974	\$8,890	\$27,864
Information	\$0	\$61,667	\$17,828	\$79,495
Finance and insurance	\$0	\$32,270	\$54,019	\$86,288
Real estate and rental and leasing	\$0	\$31,362	\$93,054	\$124,416
Professional, scientific, and technical services	\$257,143	\$88,781	\$18,656	\$364,580
Management of companies and enterprises	\$0	\$5,941	\$3,047	\$8,989
Administrative and support and waste management and remediation services	\$128,571	\$43,698	\$11,653	\$183,922
Educational services	\$0	\$131	\$10,172	\$10,303
Health care and social assistance	\$0	\$4	\$77,220	\$77,224
Arts, entertainment, and recreation	\$0	\$2,719	\$5,445	\$8,164
Accommodation and food services	\$0	\$12,578	\$22,221	\$34,799
Other services (except public administration)	\$0	\$12,965	\$21,924	\$34,888
Public administration	\$100,000	\$9,375	\$9,013	\$118,388
Average	\$1,000,000	\$399,190	\$439,676	\$1,838,866

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 327: Leadership-by-Example-Federal Government—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$42	\$83	\$125
Mining	\$0	\$291	\$20	\$311
Utilities	\$52,596	\$2,006	\$1,371	\$55,973
Construction	\$99,344	\$6,390	\$1,446	\$107,180
Manufacturing	\$0	\$3,663	\$1,955	\$5,617
Wholesale trade	\$0	\$7,349	\$7,452	\$14,801
Retail trade	\$0	\$2,406	\$19,093	\$21,499
Transportation and warehousing	\$0	\$6,373	\$3,057	\$9,430
Information	\$0	\$12,157	\$3,819	\$15,976
Finance and insurance	\$0	\$8,823	\$15,014	\$23,836
Real estate and rental and leasing	\$0	\$3,066	\$3,225	\$6,290
Professional, scientific, and technical services	\$135,015	\$41,334	\$8,197	\$184,547
Management of companies and enterprises	\$0	\$3,211	\$1,647	\$4,858
Administrative and support and waste management and remediation services	\$35,765	\$18,422	\$5,121	\$59,308
Educational services	\$0	\$68	\$5,724	\$5,792
Health care and social assistance	\$0	\$1	\$37,172	\$37,173
Arts, entertainment, and recreation	\$0	\$1,028	\$1,984	\$3,012
Accommodation and food services	\$0	\$4,376	\$7,755	\$12,131
Other services (except public administration)	\$0	\$5,088	\$9,449	\$14,537
Public administration	\$38,648	\$4,124	\$3,238	\$46,010
Average	\$361,368	\$130,218	\$136,820	\$628,407

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 328: Leadership-by-Example-Federal Government—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	1.0	0.6	1.6
Mining	0.0	0.9	0.1	1.0
Utilities	0.0	5.9	0.8	6.6
Construction	0.0	3.5	2.2	5.7
Manufacturing	0.0	9.9	2.1	12.0
Wholesale trade	0.0	19.4	6.8	26.2
Retail trade	0.0	2.6	43.6	46.2
Transportation and warehousing	0.0	23.5	5.5	29.0
Information	0.0	59.6	3.9	63.5
Finance and insurance	0.0	12.9	16.1	29.0
Real estate and rental and leasing	0.0	14.5	15.0	29.4
Professional, scientific, and technical services	0.0	42.8	9.6	52.4
Management of companies and enterprises	0.0	1.9	1.0	2.9
Administrative and support and waste management and remediation services	0.0	57.9	11.4	69.3
Educational services	0.0	0.2	9.6	9.8
Health care and social assistance	0.0	0.0	51.0	51.0
Arts, entertainment, and recreation	0.0	11.3	7.4	18.7
Accommodation and food services	0.0	36.3	24.2	60.5
Other services (except public administration)	0.0	13.5	21.4	34.8
Public administration	713.3	12.2	3.1	728.7
Total	713.3	329.7	235.5	1,278.5

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 329: Leadership-by-Example-Federal Government—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$87,813	\$46,544	\$134,357
Mining	\$0	\$231,951	\$22,919	\$254,870
Utilities	\$0	\$6,111,887	\$723,489	\$6,835,375
Construction	\$0	\$434,866	\$290,077	\$724,944
Manufacturing	\$0	\$2,837,086	\$951,379	\$3,788,465
Wholesale trade	\$0	\$4,040,706	\$1,413,412	\$5,454,118
Retail trade	\$0	\$159,451	\$2,658,203	\$2,817,654
Transportation and warehousing	\$0	\$2,651,721	\$624,428	\$3,276,149
Information	\$0	\$23,104,401	\$1,260,118	\$24,364,519
Finance and insurance	\$0	\$3,058,046	\$3,795,725	\$6,853,771
Real estate and rental and leasing	\$0	\$2,832,105	\$6,542,166	\$9,374,271
Professional, scientific, and technical services	\$0	\$6,072,750	\$1,315,487	\$7,388,238
Management of companies and enterprises	\$0	\$417,286	\$215,157	\$632,444
Administrative and support and waste management and remediation services	\$0	\$3,928,640	\$820,330	\$4,748,970
Educational services	\$0	\$17,150	\$706,721	\$723,870
Health care and social assistance	\$0	\$559	\$5,447,028	\$5,447,587
Arts, entertainment, and recreation	\$0	\$523,322	\$381,704	\$905,026
Accommodation and food services	\$0	\$2,359,350	\$1,566,070	\$3,925,420
Other services (except public administration)	\$0	\$1,885,400	\$1,537,140	\$3,422,540
Public administration	\$55,112,330	\$2,509,873	\$635,928	\$58,258,131
Total	\$55,112,330	\$63,264,364	\$30,954,024	\$149,330,718

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 330: Leadership-by-Example-Federal Government—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$7,948	\$5,881	\$13,830
Mining	\$0	\$4,097	\$1,405	\$5,502
Utilities	\$0	\$751,177	\$97,269	\$848,447
Construction	\$0	\$170,994	\$101,595	\$272,588
Manufacturing	\$0	\$534,284	\$138,302	\$672,586
Wholesale trade	\$0	\$1,514,633	\$529,808	\$2,044,441
Retail trade	\$0	\$83,101	\$1,338,707	\$1,421,809
Transportation and warehousing	\$0	\$908,470	\$214,833	\$1,123,303
Information	\$0	\$4,367,757	\$269,774	\$4,637,531
Finance and insurance	\$0	\$867,140	\$1,056,355	\$1,923,495
Real estate and rental and leasing	\$0	\$271,672	\$228,702	\$500,374
Professional, scientific, and technical services	\$0	\$2,848,302	\$577,956	\$3,426,258
Management of companies and enterprises	\$0	\$225,551	\$116,296	\$341,847
Administrative and support and waste management and remediation services	\$0	\$1,756,889	\$360,549	\$2,117,438
Educational services	\$0	\$9,017	\$397,094	\$406,111
Health care and social assistance	\$0	\$205	\$2,621,758	\$2,621,963
Arts, entertainment, and recreation	\$0	\$213,188	\$139,096	\$352,284
Accommodation and food services	\$0	\$820,904	\$546,528	\$1,367,432
Other services (except public administration)	\$0	\$698,765	\$662,103	\$1,360,868
Public administration	\$21,299,644	\$917,772	\$228,265	\$22,445,681
Total	\$21,299,644	\$16,971,866	\$9,632,277	\$47,903,786

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 331: Leadership-by-Example-Maryland Colleges and Universities—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.4	0.0	0.0	0.4
Construction	1.1	0.1	0.0	1.3
Manufacturing	0.2	0.1	0.0	0.3
Wholesale trade	0.4	0.1	0.1	0.5
Retail trade	0.0	0.1	0.6	0.6
Transportation and warehousing	1.8	0.2	0.1	2.1
Information	0.0	0.1	0.1	0.1
Finance and insurance	0.0	0.1	0.2	0.3
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	1.1	0.5	0.1	1.8
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.4	0.4	0.1	0.9
Educational services	0.7	0.0	0.1	0.8
Health care and social assistance	0.0	0.0	0.7	0.7
Arts, entertainment, and recreation	0.0	0.0	0.1	0.1
Accommodation and food services	0.0	0.1	0.3	0.4
Other services (except public administration)	0.0	0.1	0.3	0.4
Public administration	0.4	0.1	0.0	0.5
Average	6.5	2.2	3.1	11.8

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 332: Leadership-by-Example-Maryland Colleges and Universities—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$216	\$601	\$817
Mining	\$0	\$2,662	\$296	\$2,958
Utilities	\$150,000	\$11,465	\$9,322	\$170,787
Construction	\$150,000	\$16,735	\$3,763	\$170,498
Manufacturing	\$75,000	\$20,381	\$12,270	\$107,651
Wholesale trade	\$75,000	\$20,058	\$18,187	\$113,245
Retail trade	\$0	\$3,671	\$34,511	\$38,182
Transportation and warehousing	\$150,000	\$20,591	\$8,098	\$178,689
Information	\$0	\$23,067	\$16,275	\$39,342
Finance and insurance	\$0	\$31,704	\$49,210	\$80,914
Real estate and rental and leasing	\$0	\$40,147	\$84,787	\$124,934
Professional, scientific, and technical services	\$150,000	\$73,034	\$17,016	\$240,051
Management of companies and enterprises	\$0	\$7,505	\$2,781	\$10,286
Administrative and support and waste management and remediation services	\$75,000	\$35,383	\$10,622	\$121,006
Educational services	\$75,000	\$419	\$9,230	\$84,648
Health care and social assistance	\$0	\$3	\$70,443	\$70,446
Arts, entertainment, and recreation	\$0	\$1,719	\$4,956	\$6,676
Accommodation and food services	\$0	\$8,030	\$20,265	\$28,295
Other services (except public administration)	\$0	\$9,291	\$19,957	\$29,248
Public administration	\$100,000	\$12,443	\$8,223	\$120,666
Average	\$1,000,000	\$338,526	\$400,812	\$1,739,338

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 333: Leadership-by-Example-Maryland Colleges and Universities—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$25	\$76	\$101
Mining	\$0	\$350	\$18	\$369
Utilities	\$30,681	\$1,460	\$1,253	\$33,394
Construction	\$56,490	\$6,573	\$1,317	\$64,380
Manufacturing	\$15,211	\$3,631	\$1,785	\$20,628
Wholesale trade	\$28,113	\$7,519	\$6,817	\$42,449
Retail trade	\$0	\$1,913	\$17,380	\$19,293
Transportation and warehousing	\$56,291	\$7,967	\$2,785	\$67,043
Information	\$0	\$5,116	\$3,485	\$8,602
Finance and insurance	\$0	\$8,750	\$13,684	\$22,434
Real estate and rental and leasing	\$0	\$3,821	\$2,948	\$6,768
Professional, scientific, and technical services	\$78,759	\$34,042	\$7,477	\$120,278
Management of companies and enterprises	\$0	\$4,057	\$1,503	\$5,560
Administrative and support and waste management and remediation services	\$20,863	\$14,824	\$4,668	\$40,356
Educational services	\$41,076	\$198	\$5,191	\$46,465
Health care and social assistance	\$0	\$1	\$33,908	\$33,909
Arts, entertainment, and recreation	\$0	\$604	\$1,806	\$2,410
Accommodation and food services	\$0	\$2,789	\$7,072	\$9,861
Other services (except public administration)	\$0	\$3,732	\$8,599	\$12,332
Public administration	\$25,247	\$4,927	\$2,953	\$33,127
Average	\$352,731	\$112,302	\$124,726	\$589,759

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 334: Leadership-by-Example-Maryland Colleges and Universities—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.1
Mining	0.0	0.1	0.0	0.1
Utilities	0.0	0.2	0.1	0.2
Construction	0.0	1.5	0.2	1.6
Manufacturing	0.0	0.3	0.2	0.5
Wholesale trade	0.0	0.5	0.5	1.0
Retail trade	0.0	0.1	3.1	3.2
Transportation and warehousing	0.0	0.6	0.4	1.0
Information	0.0	0.4	0.3	0.7
Finance and insurance	0.0	0.9	1.2	2.0
Real estate and rental and leasing	0.0	2.7	1.1	3.8
Professional, scientific, and technical services	0.0	3.1	0.7	3.8
Management of companies and enterprises	0.0	0.1	0.1	0.1
Administrative and support and waste management and remediation services	0.0	2.4	0.8	3.2
Educational services	24.1	0.2	0.7	24.9
Health care and social assistance	0.0	0.0	3.6	3.6
Arts, entertainment, and recreation	0.0	0.2	0.5	0.7
Accommodation and food services	0.0	0.5	1.7	2.2
Other services (except public administration)	0.0	0.4	1.5	2.0
Public administration	9.0	0.8	0.2	10.0
Total	33.1	14.9	16.8	64.9

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 335: Leadership-by-Example-Maryland Colleges and Universities—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$2,228	\$3,318	\$5,546
Mining	\$0	\$23,008	\$1,634	\$24,642
Utilities	\$0	\$194,995	\$51,579	\$246,574
Construction	\$0	\$184,417	\$20,685	\$205,103
Manufacturing	\$0	\$121,244	\$67,828	\$189,073
Wholesale trade	\$0	\$100,274	\$100,760	\$201,035
Retail trade	\$0	\$6,773	\$189,562	\$196,335
Transportation and warehousing	\$0	\$77,516	\$44,527	\$122,043
Information	\$0	\$123,271	\$89,845	\$213,116
Finance and insurance	\$0	\$201,854	\$270,667	\$472,521
Real estate and rental and leasing	\$0	\$484,600	\$466,505	\$951,105
Professional, scientific, and technical services	\$0	\$441,340	\$93,798	\$535,138
Management of companies and enterprises	\$0	\$13,742	\$15,341	\$29,082
Administrative and support and waste management and remediation services	\$0	\$200,479	\$58,494	\$258,973
Educational services	\$2,520,539	\$9,890	\$50,409	\$2,580,838
Health care and social assistance	\$0	\$25	\$388,383	\$388,408
Arts, entertainment, and recreation	\$0	\$8,179	\$27,220	\$35,399
Accommodation and food services	\$0	\$32,696	\$111,666	\$144,362
Other services (except public administration)	\$0	\$44,454	\$109,617	\$154,071
Public administration	\$2,520,539	\$187,569	\$45,343	\$2,753,450
Total	\$5,041,077	\$2,458,555	\$2,207,182	\$9,706,815

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 336: Leadership-by-Example-Maryland Colleges and Universities—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$217	\$419	\$636
Mining	\$0	\$3,148	\$100	\$3,248
Utilities	\$0	\$24,094	\$6,935	\$31,029
Construction	\$0	\$71,197	\$7,245	\$78,441
Manufacturing	\$0	\$21,754	\$9,861	\$31,614
Wholesale trade	\$0	\$37,587	\$37,769	\$75,357
Retail trade	\$0	\$3,530	\$95,466	\$98,996
Transportation and warehousing	\$0	\$27,030	\$15,319	\$42,350
Information	\$0	\$30,208	\$19,235	\$49,443
Finance and insurance	\$0	\$58,721	\$75,325	\$134,046
Real estate and rental and leasing	\$0	\$38,316	\$16,305	\$54,621
Professional, scientific, and technical services	\$0	\$210,432	\$41,210	\$251,642
Management of companies and enterprises	\$0	\$7,428	\$8,292	\$15,719
Administrative and support and waste management and remediation services	\$0	\$79,587	\$25,709	\$105,296
Educational services	\$1,380,435	\$4,525	\$28,325	\$1,413,285
Health care and social assistance	\$0	\$9	\$186,937	\$186,946
Arts, entertainment, and recreation	\$0	\$2,980	\$9,919	\$12,899
Accommodation and food services	\$0	\$11,195	\$38,969	\$50,165
Other services (except public administration)	\$0	\$16,640	\$47,217	\$63,856
Public administration	\$636,348	\$57,409	\$16,276	\$710,033
Total	\$2,016,783	\$706,007	\$686,831	\$3,409,622

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 337: State of Maryland Initiative to Lead by Example—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.6	0.0	0.0	0.6
Construction	2.6	0.2	0.0	2.7
Manufacturing	0.0	0.1	0.0	0.1
Wholesale trade	0.0	0.1	0.1	0.2
Retail trade	0.0	0.1	0.6	0.7
Transportation and warehousing	0.0	0.1	0.1	0.2
Information	0.0	0.1	0.1	0.1
Finance and insurance	0.0	0.1	0.2	0.3
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	1.7	0.7	0.1	2.5
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.6	0.5	0.2	1.2
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.7	0.7
Arts, entertainment, and recreation	0.0	0.0	0.1	0.1
Accommodation and food services	0.0	0.1	0.3	0.5
Other services (except public administration)	0.0	0.1	0.3	0.4
Public administration	0.4	0.0	0.0	0.4
Average	5.7	2.4	3.2	11.3

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 338: State of Maryland Initiative to Lead by Example—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$272	\$629	\$901
Mining	\$0	\$3,236	\$310	\$3,545
Utilities	\$225,000	\$7,939	\$9,741	\$242,680
Construction	\$337,500	\$20,405	\$3,949	\$361,855
Manufacturing	\$0	\$20,838	\$12,830	\$33,668
Wholesale trade	\$0	\$16,382	\$18,988	\$35,370
Retail trade	\$0	\$5,271	\$36,241	\$41,512
Transportation and warehousing	\$0	\$16,271	\$8,497	\$24,769
Information	\$0	\$21,168	\$17,034	\$38,202
Finance and insurance	\$0	\$32,129	\$51,631	\$83,760
Real estate and rental and leasing	\$0	\$33,872	\$88,938	\$122,810
Professional, scientific, and technical services	\$225,000	\$93,578	\$17,827	\$336,405
Management of companies and enterprises	\$0	\$5,401	\$2,912	\$8,313
Administrative and support and waste management and remediation services	\$112,500	\$39,737	\$11,136	\$163,373
Educational services	\$0	\$120	\$9,729	\$9,850
Health care and social assistance	\$0	\$3	\$73,789	\$73,792
Arts, entertainment, and recreation	\$0	\$1,822	\$5,205	\$7,027
Accommodation and food services	\$0	\$8,263	\$21,235	\$29,498
Other services (except public administration)	\$0	\$11,048	\$20,957	\$32,005
Public administration	\$100,000	\$8,465	\$8,612	\$117,077
Average	\$1,000,000	\$346,220	\$420,191	\$1,766,412

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 339: State of Maryland Initiative to Lead by Example—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$34	\$80	\$114
Mining	\$0	\$460	\$19	\$479
Utilities	\$46,021	\$996	\$1,309	\$48,327
Construction	\$126,806	\$8,041	\$1,382	\$136,229
Manufacturing	\$0	\$3,886	\$1,868	\$5,754
Wholesale trade	\$0	\$6,141	\$7,118	\$13,258
Retail trade	\$0	\$2,747	\$18,251	\$20,998
Transportation and warehousing	\$0	\$5,445	\$2,921	\$8,367
Information	\$0	\$4,527	\$3,648	\$8,176
Finance and insurance	\$0	\$8,868	\$14,349	\$23,217
Real estate and rental and leasing	\$0	\$3,301	\$3,081	\$6,382
Professional, scientific, and technical services	\$118,138	\$43,931	\$7,833	\$169,903
Management of companies and enterprises	\$0	\$2,919	\$1,574	\$4,493
Administrative and support and waste management and remediation services	\$31,295	\$16,563	\$4,894	\$52,752
Educational services	\$0	\$62	\$5,475	\$5,537
Health care and social assistance	\$0	\$1	\$35,521	\$35,522
Arts, entertainment, and recreation	\$0	\$658	\$1,896	\$2,554
Accommodation and food services	\$0	\$2,871	\$7,411	\$10,282
Other services (except public administration)	\$0	\$4,412	\$9,033	\$13,445
Public administration	\$25,247	\$3,380	\$3,094	\$31,720
Average	\$347,507	\$119,245	\$130,757	\$597,509

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 340: State of Maryland Initiative to Lead by Example—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.0	0.0	0.0
Manufacturing	0.0	0.0	0.0	0.0
Wholesale trade	0.0	0.0	0.0	0.0
Retail trade	0.0	0.0	0.2	0.2
Transportation and warehousing	0.0	0.0	0.0	0.0
Information	0.0	0.1	0.0	0.1
Finance and insurance	0.0	0.0	0.1	0.1
Real estate and rental and leasing	0.0	0.1	0.1	0.2
Professional, scientific, and technical services	0.0	0.3	0.0	0.3
Management of companies and enterprises	1.5	0.0	0.0	1.5
Administrative and support and waste management and remediation services	0.0	0.1	0.1	0.1
Educational services	0.0	0.0	0.0	0.0
Health care and social assistance	0.0	0.0	0.3	0.3
Arts, entertainment, and recreation	0.0	0.1	0.0	0.1
Accommodation and food services	0.0	0.0	0.1	0.2
Other services (except public administration)	0.0	0.0	0.1	0.2
Public administration	0.0	0.0	0.0	0.0
Total	1.5	0.8	1.2	3.4

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 341: State of Maryland Initiative to Lead by Example—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$20	\$239	\$259
Mining	\$0	\$59	\$118	\$176
Utilities	\$0	\$2,669	\$3,721	\$6,390
Construction	\$0	\$975	\$1,480	\$2,454
Manufacturing	\$0	\$3,341	\$4,887	\$8,229
Wholesale trade	\$0	\$2,103	\$7,281	\$9,384
Retail trade	\$0	\$97	\$13,548	\$13,645
Transportation and warehousing	\$0	\$2,074	\$3,187	\$5,261
Information	\$0	\$27,163	\$6,462	\$33,625
Finance and insurance	\$0	\$10,740	\$19,378	\$30,118
Real estate and rental and leasing	\$0	\$17,487	\$33,414	\$50,901
Professional, scientific, and technical services	\$0	\$34,963	\$6,734	\$41,697
Management of companies and enterprises	\$318,741	\$696	\$1,103	\$320,540
Administrative and support and waste management and remediation services	\$0	\$6,440	\$4,194	\$10,635
Educational services	\$0	\$34	\$3,576	\$3,610
Health care and social assistance	\$0	\$2	\$27,892	\$27,893
Arts, entertainment, and recreation	\$0	\$2,147	\$1,945	\$4,092
Accommodation and food services	\$0	\$2,339	\$8,014	\$10,353
Other services (except public administration)	\$0	\$4,207	\$7,834	\$12,041
Public administration	\$0	\$1,040	\$3,257	\$4,297
Total	\$318,741	\$118,597	\$158,263	\$595,602

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 342: State of Maryland Initiative to Lead by Example—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$3	\$30	\$33
Mining	\$0	\$3	\$7	\$10
Utilities	\$0	\$368	\$500	\$868
Construction	\$0	\$384	\$519	\$903
Manufacturing	\$0	\$1,019	\$710	\$1,729
Wholesale trade	\$0	\$788	\$2,729	\$3,518
Retail trade	\$0	\$51	\$6,823	\$6,874
Transportation and warehousing	\$0	\$707	\$1,097	\$1,804
Information	\$0	\$6,146	\$1,383	\$7,529
Finance and insurance	\$0	\$3,267	\$5,399	\$8,665
Real estate and rental and leasing	\$0	\$1,493	\$1,176	\$2,669
Professional, scientific, and technical services	\$0	\$16,235	\$2,958	\$19,194
Management of companies and enterprises	\$172,285	\$376	\$596	\$173,257
Administrative and support and waste management and remediation services	\$0	\$2,915	\$1,844	\$4,759
Educational services	\$0	\$17	\$2,007	\$2,024
Health care and social assistance	\$0	\$1	\$13,424	\$13,424
Arts, entertainment, and recreation	\$0	\$643	\$709	\$1,352
Accommodation and food services	\$0	\$812	\$2,797	\$3,609
Other services (except public administration)	\$0	\$2,085	\$3,373	\$5,458
Public administration	\$0	\$539	\$1,168	\$1,707
Total	\$172,285	\$37,850	\$49,248	\$259,383

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 343: State of Maryland Carbon and Footprint Initiatives—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.1	0.0	0.0	0.1
Construction	1.4	0.1	0.0	1.5
Manufacturing	0.0	0.0	0.0	0.1
Wholesale trade	1.1	0.1	0.1	1.3
Retail trade	0.0	0.1	0.7	0.7
Transportation and warehousing	0.0	0.2	0.1	0.3
Information	0.0	0.1	0.1	0.1
Finance and insurance	0.0	0.1	0.2	0.4
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	3.2	0.6	0.1	3.9
Management of companies and enterprises	0.0	0.0	0.0	0.1
Administrative and support and waste management and remediation services	0.0	0.5	0.2	0.7
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.8	0.8
Arts, entertainment, and recreation	0.0	0.1	0.1	0.2
Accommodation and food services	0.0	0.1	0.4	0.5
Other services (except public administration)	0.0	0.1	0.3	0.4
Public administration	0.4	0.1	0.0	0.5
Average	6.1	2.4	3.6	12.1

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 344: State of Maryland Carbon and Footprint Initiatives—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$187	\$699	\$887
Mining	\$0	\$2,543	\$344	\$2,888
Utilities	\$90,000	\$7,749	\$10,841	\$108,591
Construction	\$180,000	\$10,841	\$4,387	\$195,227
Manufacturing	\$0	\$15,983	\$14,275	\$30,258
Wholesale trade	\$225,000	\$19,548	\$21,142	\$265,690
Retail trade	\$0	\$3,965	\$40,243	\$44,208
Transportation and warehousing	\$0	\$20,844	\$9,439	\$30,284
Information	\$0	\$25,775	\$18,944	\$44,720
Finance and insurance	\$0	\$33,078	\$57,357	\$90,434
Real estate and rental and leasing	\$0	\$39,201	\$98,811	\$138,013
Professional, scientific, and technical services	\$405,000	\$86,149	\$19,818	\$510,967
Management of companies and enterprises	\$0	\$8,522	\$3,237	\$11,759
Administrative and support and waste management and remediation services	\$0	\$37,541	\$12,376	\$49,916
Educational services	\$0	\$221	\$10,785	\$11,006
Health care and social assistance	\$0	\$4	\$82,033	\$82,037
Arts, entertainment, and recreation	\$0	\$2,314	\$5,780	\$8,094
Accommodation and food services	\$0	\$8,442	\$23,604	\$32,046
Other services (except public administration)	\$0	\$11,618	\$23,272	\$34,890
Public administration	\$100,000	\$9,394	\$9,575	\$118,969
Average	\$1,000,000	\$343,920	\$466,962	\$1,810,882

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 345: State of Maryland Carbon and Footprint Initiatives—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$24	\$89	\$112
Mining	\$0	\$338	\$21	\$359
Utilities	\$13,150	\$998	\$1,457	\$15,605
Construction	\$67,788	\$4,225	\$1,536	\$73,549
Manufacturing	\$0	\$3,103	\$2,078	\$5,181
Wholesale trade	\$84,340	\$7,327	\$7,925	\$99,592
Retail trade	\$0	\$2,066	\$20,267	\$22,333
Transportation and warehousing	\$0	\$7,620	\$3,246	\$10,865
Information	\$0	\$5,693	\$4,057	\$9,750
Finance and insurance	\$0	\$9,115	\$15,944	\$25,059
Real estate and rental and leasing	\$0	\$3,572	\$3,428	\$7,000
Professional, scientific, and technical services	\$219,237	\$40,569	\$8,708	\$268,513
Management of companies and enterprises	\$0	\$4,606	\$1,750	\$6,356
Administrative and support and waste management and remediation services	\$0	\$17,736	\$5,439	\$23,174
Educational services	\$0	\$113	\$6,068	\$6,181
Health care and social assistance	\$0	\$2	\$39,488	\$39,490
Arts, entertainment, and recreation	\$0	\$802	\$2,106	\$2,907
Accommodation and food services	\$0	\$2,932	\$8,237	\$11,170
Other services (except public administration)	\$0	\$4,352	\$10,029	\$14,381
Public administration	\$25,247	\$4,384	\$3,440	\$33,070
Average	\$409,761	\$119,577	\$145,311	\$674,649

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 346: State of Maryland Carbon and Footprint Initiatives—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.1	0.0	0.1
Utilities	0.0	0.0	0.0	0.1
Construction	0.0	0.9	0.0	0.9
Manufacturing	0.0	0.1	0.0	0.2
Wholesale trade	0.0	0.2	0.1	0.3
Retail trade	0.0	0.1	0.8	0.9
Transportation and warehousing	0.0	0.3	0.1	0.4
Information	0.0	0.1	0.1	0.2
Finance and insurance	0.0	0.5	0.3	0.8
Real estate and rental and leasing	0.0	0.7	0.3	1.0
Professional, scientific, and technical services	0.0	1.5	0.2	1.7
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	1.1	0.2	1.3
Educational services	0.0	0.0	0.2	0.2
Health care and social assistance	0.0	0.0	1.0	1.0
Arts, entertainment, and recreation	0.0	0.1	0.1	0.2
Accommodation and food services	0.0	0.1	0.5	0.6
Other services (except public administration)	0.0	0.1	0.4	0.6
Public administration	5.8	0.2	0.1	6.2
Total	5.8	6.2	4.5	16.6

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Figure 347: State of Maryland Carbon and Footprint Initiatives—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$318	\$885	\$1,203
Mining	\$0	\$12,870	\$436	\$13,306
Utilities	\$0	\$47,583	\$13,754	\$61,337
Construction	\$0	\$111,821	\$5,518	\$117,339
Manufacturing	\$0	\$54,071	\$18,088	\$72,158
Wholesale trade	\$0	\$42,738	\$26,867	\$69,605
Retail trade	\$0	\$3,783	\$50,566	\$54,349
Transportation and warehousing	\$0	\$35,712	\$11,877	\$47,589
Information	\$0	\$30,690	\$23,960	\$54,651
Finance and insurance	\$0	\$108,857	\$72,196	\$181,052
Real estate and rental and leasing	\$0	\$128,090	\$124,431	\$252,521
Professional, scientific, and technical services	\$0	\$214,142	\$25,016	\$239,158
Management of companies and enterprises	\$0	\$5,760	\$4,091	\$9,852
Administrative and support and waste management and remediation services	\$0	\$95,173	\$15,601	\$110,774
Educational services	\$0	\$358	\$13,450	\$13,808
Health care and social assistance	\$0	\$12	\$103,583	\$103,595
Arts, entertainment, and recreation	\$0	\$2,787	\$7,261	\$10,048
Accommodation and food services	\$0	\$9,778	\$29,783	\$39,560
Other services (except public administration)	\$0	\$16,007	\$29,240	\$45,248
Public administration	\$1,632,934	\$63,930	\$12,093	\$1,708,957
Total	\$1,632,934	\$984,480	\$588,696	\$3,206,111

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 348: State of Maryland Carbon and Footprint Initiatives—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$41	\$112	\$153
Mining	\$0	\$1,963	\$27	\$1,989
Utilities	\$0	\$5,540	\$1,849	\$7,389
Construction	\$0	\$43,178	\$1,932	\$45,111
Manufacturing	\$0	\$9,837	\$2,630	\$12,466
Wholesale trade	\$0	\$16,020	\$10,071	\$26,091
Retail trade	\$0	\$1,972	\$25,466	\$27,437
Transportation and warehousing	\$0	\$12,598	\$4,086	\$16,685
Information	\$0	\$6,766	\$5,130	\$11,896
Finance and insurance	\$0	\$31,925	\$20,091	\$52,016
Real estate and rental and leasing	\$0	\$10,078	\$4,348	\$14,426
Professional, scientific, and technical services	\$0	\$103,111	\$10,991	\$114,102
Management of companies and enterprises	\$0	\$3,114	\$2,211	\$5,325
Administrative and support and waste management and remediation services	\$0	\$38,282	\$6,857	\$45,139
Educational services	\$0	\$174	\$7,558	\$7,732
Health care and social assistance	\$0	\$4	\$49,857	\$49,861
Arts, entertainment, and recreation	\$0	\$965	\$2,646	\$3,611
Accommodation and food services	\$0	\$3,357	\$10,394	\$13,750
Other services (except public administration)	\$0	\$5,481	\$12,595	\$18,077
Public administration	\$412,259	\$17,554	\$4,341	\$434,154
Total	\$412,259	\$311,961	\$183,191	\$907,411

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 349: GHG Early Voluntary Reduction—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.6	0.0	0.0	0.6
Construction	0.0	0.2	0.0	0.2
Manufacturing	0.0	0.0	0.0	0.1
Wholesale trade	0.6	0.1	0.1	0.8
Retail trade	0.0	0.0	0.6	0.6
Transportation and warehousing	0.0	0.2	0.1	0.2
Information	0.0	0.1	0.1	0.1
Finance and insurance	0.0	0.1	0.2	0.3
Real estate and rental and leasing	0.0	0.2	0.2	0.4
Professional, scientific, and technical services	1.0	0.6	0.1	1.7
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	3.5	0.6	0.1	4.3
Educational services	0.0	0.0	0.1	0.1
Health care and social assistance	0.0	0.0	0.6	0.6
Arts, entertainment, and recreation	0.0	0.0	0.1	0.1
Accommodation and food services	0.0	0.1	0.3	0.4
Other services (except public administration)	0.0	0.1	0.3	0.4
Public administration	0.4	0.1	0.0	0.5
Average	6.2	2.5	3.0	11.7

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 350: GHG Early Voluntary Reduction—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$200	\$591	\$791
Mining	\$0	\$2,309	\$291	\$2,601
Utilities	\$257,143	\$8,507	\$9,164	\$274,814
Construction	\$0	\$22,240	\$3,708	\$25,948
Manufacturing	\$0	\$11,855	\$12,067	\$23,921
Wholesale trade	\$128,571	\$13,980	\$17,870	\$160,421
Retail trade	\$0	\$1,326	\$34,020	\$35,346
Transportation and warehousing	\$0	\$18,982	\$7,979	\$26,961
Information	\$0	\$27,720	\$16,014	\$43,734
Finance and insurance	\$0	\$34,956	\$48,486	\$83,442
Real estate and rental and leasing	\$0	\$38,653	\$83,529	\$122,182
Professional, scientific, and technical services	\$128,571	\$81,375	\$16,752	\$226,699
Management of companies and enterprises	\$0	\$8,063	\$2,737	\$10,800
Administrative and support and waste management and remediation services	\$385,714	\$52,387	\$10,461	\$448,563
Educational services	\$0	\$277	\$9,118	\$9,395
Health care and social assistance	\$0	\$4	\$69,343	\$69,347
Arts, entertainment, and recreation	\$0	\$2,068	\$4,886	\$6,954
Accommodation and food services	\$0	\$8,106	\$19,953	\$28,059
Other services (except public administration)	\$0	\$12,274	\$19,673	\$31,947
Public administration	\$100,000	\$10,619	\$8,094	\$118,713
Average	\$1,000,000	\$355,902	\$394,735	\$1,750,637

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 351: GHG Early Voluntary Reduction—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$46	\$75	\$121
Mining	\$0	\$208	\$18	\$226
Utilities	\$52,596	\$1,080	\$1,232	\$54,908
Construction	\$0	\$8,769	\$1,298	\$10,068
Manufacturing	\$0	\$2,188	\$1,756	\$3,944
Wholesale trade	\$48,194	\$5,240	\$6,699	\$60,133
Retail trade	\$0	\$691	\$17,133	\$17,824
Transportation and warehousing	\$0	\$6,831	\$2,744	\$9,574
Information	\$0	\$5,978	\$3,430	\$9,408
Finance and insurance	\$0	\$9,550	\$13,478	\$23,028
Real estate and rental and leasing	\$0	\$3,620	\$2,898	\$6,518
Professional, scientific, and technical services	\$71,272	\$38,108	\$7,361	\$116,741
Management of companies and enterprises	\$0	\$4,358	\$1,479	\$5,838
Administrative and support and waste management and remediation services	\$127,923	\$22,503	\$4,597	\$155,024
Educational services	\$0	\$134	\$5,130	\$5,264
Health care and social assistance	\$0	\$1	\$33,380	\$33,381
Arts, entertainment, and recreation	\$0	\$738	\$1,780	\$2,518
Accommodation and food services	\$0	\$2,815	\$6,963	\$9,778
Other services (except public administration)	\$0	\$4,445	\$8,478	\$12,923
Public administration	\$25,247	\$4,505	\$2,908	\$32,659
Average	\$325,232	\$121,809	\$122,836	\$569,876

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 352: GHG Early Voluntary Reduction—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.1	0.2	0.3
Mining	0.0	1.1	0.0	1.2
Utilities	0.0	0.9	0.3	1.2
Construction	0.0	17.0	0.8	17.9
Manufacturing	0.0	2.8	0.8	3.6
Wholesale trade	0.0	3.9	2.5	6.4
Retail trade	0.0	1.2	16.0	17.1
Transportation and warehousing	0.0	5.4	2.0	7.4
Information	0.0	1.8	1.4	3.3
Finance and insurance	0.0	9.3	5.9	15.2
Real estate and rental and leasing	0.0	13.6	5.5	19.1
Professional, scientific, and technical services	0.0	29.4	3.5	32.9
Management of companies and enterprises	0.0	0.5	0.4	0.9
Administrative and support and waste management and remediation services	0.0	21.0	4.2	25.2
Educational services	0.0	0.1	3.5	3.6
Health care and social assistance	0.0	0.0	18.6	18.6
Arts, entertainment, and recreation	0.0	1.4	2.7	4.1
Accommodation and food services	0.0	2.8	8.9	11.7
Other services (except public administration)	0.0	2.8	7.8	10.6
Public administration	112.4	4.7	1.1	118.3
Total	112.4	119.9	86.1	318.4

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 353: GHG Early Voluntary Reduction—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$6,118	\$17,012	\$23,129
Mining	\$0	\$247,393	\$8,377	\$255,770
Utilities	\$0	\$914,670	\$264,387	\$1,179,057
Construction	\$0	\$2,149,474	\$106,062	\$2,255,537
Manufacturing	\$0	\$1,039,370	\$347,693	\$1,387,063
Wholesale trade	\$0	\$821,526	\$516,453	\$1,337,978
Retail trade	\$0	\$72,723	\$971,995	\$1,044,718
Transportation and warehousing	\$0	\$686,466	\$228,307	\$914,772
Information	\$0	\$589,946	\$460,580	\$1,050,525
Finance and insurance	\$0	\$2,092,490	\$1,387,783	\$3,480,273
Real estate and rental and leasing	\$0	\$2,462,213	\$2,391,862	\$4,854,075
Professional, scientific, and technical services	\$0	\$4,116,331	\$480,877	\$4,597,208
Management of companies and enterprises	\$0	\$110,727	\$78,645	\$189,373
Administrative and support and waste management and remediation services	\$0	\$1,829,453	\$299,897	\$2,129,350
Educational services	\$0	\$6,875	\$258,544	\$265,419
Health care and social assistance	\$0	\$227	\$1,991,125	\$1,991,352
Arts, entertainment, and recreation	\$0	\$53,573	\$139,575	\$193,149
Accommodation and food services	\$0	\$187,954	\$572,493	\$760,447
Other services (except public administration)	\$0	\$307,702	\$562,070	\$869,772
Public administration	\$31,388,997	\$1,228,893	\$232,456	\$32,850,346
Total	\$31,388,997	\$18,924,123	\$11,316,191	\$61,629,311

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 354: GHG Early Voluntary Reduction—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$790	\$2,150	\$2,940
Mining	\$0	\$37,726	\$514	\$38,240
Utilities	\$0	\$106,494	\$35,545	\$142,040
Construction	\$0	\$829,990	\$37,145	\$867,136
Manufacturing	\$0	\$189,085	\$50,548	\$239,633
Wholesale trade	\$0	\$307,944	\$193,589	\$501,533
Retail trade	\$0	\$37,901	\$489,510	\$527,411
Transportation and warehousing	\$0	\$242,174	\$78,546	\$320,719
Information	\$0	\$130,068	\$98,606	\$228,674
Finance and insurance	\$0	\$613,682	\$386,195	\$999,877
Real estate and rental and leasing	\$0	\$193,731	\$83,577	\$277,308
Professional, scientific, and technical services	\$0	\$1,982,040	\$211,273	\$2,193,313
Management of companies and enterprises	\$0	\$59,850	\$42,509	\$102,359
Administrative and support and waste management and remediation services	\$0	\$735,871	\$131,809	\$867,680
Educational services	\$0	\$3,351	\$145,283	\$148,634
Health care and social assistance	\$0	\$83	\$958,373	\$958,456
Arts, entertainment, and recreation	\$0	\$18,554	\$50,861	\$69,415
Accommodation and food services	\$0	\$64,526	\$199,789	\$264,315
Other services (except public administration)	\$0	\$105,366	\$242,112	\$347,478
Public administration	\$7,924,629	\$337,435	\$83,443	\$8,345,508
Total	\$7,924,629	\$5,996,662	\$3,521,376	\$17,442,667

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 355: Job Creation and Economic Development Initiatives—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.1	0.0	0.1
Manufacturing	0.0	0.0	0.0	0.1
Wholesale trade	0.0	0.0	0.1	0.2
Retail trade	0.0	0.0	0.8	0.8
Transportation and warehousing	0.0	0.1	0.1	0.2
Information	0.0	0.1	0.1	0.1
Finance and insurance	0.0	0.2	0.3	0.4
Real estate and rental and leasing	0.0	0.2	0.3	0.5
Professional, scientific, and technical services	7.3	0.7	0.2	8.2
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.7	0.2	1.0
Educational services	0.0	0.0	0.2	0.2
Health care and social assistance	0.0	0.0	0.9	0.9
Arts, entertainment, and recreation	0.0	0.1	0.1	0.2
Accommodation and food services	0.0	0.2	0.4	0.6
Other services (except public administration)	0.0	0.1	0.4	0.5
Public administration	0.4	0.0	0.1	0.5
Average	7.6	2.6	4.4	14.6

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 356: Job Creation and Economic Development Initiatives—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$64	\$858	\$923
Mining	\$0	\$907	\$423	\$1,329
Utilities	\$0	\$6,625	\$13,300	\$19,925
Construction	\$0	\$8,240	\$5,384	\$13,624
Manufacturing	\$0	\$8,136	\$17,514	\$25,650
Wholesale trade	\$0	\$8,013	\$25,935	\$33,948
Retail trade	\$0	\$592	\$49,393	\$49,984
Transportation and warehousing	\$0	\$10,488	\$11,584	\$22,072
Information	\$0	\$24,904	\$23,245	\$48,149
Finance and insurance	\$0	\$36,994	\$70,391	\$107,385
Real estate and rental and leasing	\$0	\$44,119	\$121,264	\$165,383
Professional, scientific, and technical services	\$900,000	\$97,073	\$24,318	\$1,021,391
Management of companies and enterprises	\$0	\$6,525	\$3,972	\$10,497
Administrative and support and waste management and remediation services	\$0	\$53,398	\$15,187	\$68,585
Educational services	\$0	\$73	\$13,241	\$13,315
Health care and social assistance	\$0	\$5	\$100,661	\$100,667
Arts, entertainment, and recreation	\$0	\$3,279	\$7,094	\$10,373
Accommodation and food services	\$0	\$10,042	\$28,964	\$39,007
Other services (except public administration)	\$0	\$16,224	\$28,563	\$44,787
Public administration	\$100,000	\$8,417	\$11,749	\$120,166
Average	\$1,000,000	\$344,117	\$573,042	\$1,917,159

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 357: Job Creation and Economic Development Initiatives—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$8	\$109	\$117
Mining	\$0	\$129	\$26	\$155
Utilities	\$0	\$849	\$1,788	\$2,637
Construction	\$0	\$3,186	\$1,885	\$5,071
Manufacturing	\$0	\$1,719	\$2,549	\$4,268
Wholesale trade	\$0	\$3,004	\$9,722	\$12,725
Retail trade	\$0	\$308	\$24,875	\$25,183
Transportation and warehousing	\$0	\$3,899	\$3,983	\$7,883
Information	\$0	\$5,476	\$4,978	\$10,454
Finance and insurance	\$0	\$10,409	\$19,566	\$29,976
Real estate and rental and leasing	\$0	\$3,701	\$4,206	\$7,907
Professional, scientific, and technical services	\$498,905	\$47,195	\$10,685	\$556,784
Management of companies and enterprises	\$0	\$3,527	\$2,147	\$5,674
Administrative and support and waste management and remediation services	\$0	\$25,928	\$6,674	\$32,602
Educational services	\$0	\$36	\$7,450	\$7,486
Health care and social assistance	\$0	\$2	\$48,456	\$48,458
Arts, entertainment, and recreation	\$0	\$1,086	\$2,584	\$3,670
Accommodation and food services	\$0	\$3,487	\$10,108	\$13,595
Other services (except public administration)	\$0	\$5,425	\$12,310	\$17,735
Public administration	\$25,247	\$3,524	\$4,221	\$32,992
Average	\$524,151	\$122,898	\$178,322	\$825,371

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 358: Job Creation and Economic Development Initiatives—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	2.0	2.0
Mining	0.0	0.0	0.3	0.3
Utilities	0.0	0.0	2.8	2.8
Construction	0.0	0.0	7.6	7.6
Manufacturing	0.0	0.0	7.6	7.6
Wholesale trade	0.0	0.0	22.4	22.4
Retail trade	0.0	0.0	142.7	142.7
Transportation and warehousing	0.0	0.0	19.2	19.2
Information	0.0	0.0	13.7	13.7
Finance and insurance	0.0	0.0	53.5	53.5
Real estate and rental and leasing	0.0	0.0	56.0	56.0
Professional, scientific, and technical services	0.0	0.0	33.0	33.0
Management of companies and enterprises	0.0	0.0	3.5	3.5
Administrative and support and waste management and remediation services	0.0	0.0	39.3	39.3
Educational services	0.0	0.0	32.7	32.7
Health care and social assistance	0.0	0.0	179.6	179.6
Arts, entertainment, and recreation	0.0	0.0	25.4	25.4
Accommodation and food services	0.0	0.0	82.0	82.0
Other services (except public administration)	0.0	0.0	72.9	72.9
Public administration	0.0	0.0	11.0	11.0
Total	0.0	0.0	807.3	807.3

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 359: Job Creation and Economic Development Initiatives—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$0	\$165,815	\$165,815
Mining	\$0	\$0	\$82,539	\$82,539
Utilities	\$0	\$0	\$2,684,968	\$2,684,968
Construction	\$0	\$0	\$981,106	\$981,106
Manufacturing	\$0	\$0	\$3,430,078	\$3,430,078
Wholesale trade	\$0	\$0	\$4,654,015	\$4,654,015
Retail trade	\$0	\$0	\$8,695,887	\$8,695,887
Transportation and warehousing	\$0	\$0	\$2,160,293	\$2,160,293
Information	\$0	\$0	\$4,407,569	\$4,407,569
Finance and insurance	\$0	\$0	\$12,579,254	\$12,579,254
Real estate and rental and leasing	\$0	\$0	\$22,446,885	\$22,446,885
Professional, scientific, and technical services	\$0	\$0	\$4,545,978	\$4,545,978
Management of companies and enterprises	\$0	\$0	\$750,452	\$750,452
Administrative and support and waste management and remediation services	\$0	\$0	\$2,849,439	\$2,849,439
Educational services	\$0	\$0	\$2,512,659	\$2,512,659
Health care and social assistance	\$0	\$0	\$19,351,175	\$19,351,175
Arts, entertainment, and recreation	\$0	\$0	\$1,301,092	\$1,301,092
Accommodation and food services	\$0	\$0	\$5,302,596	\$5,302,596
Other services (except public administration)	\$0	\$0	\$5,281,257	\$5,281,257
Public administration	\$0	\$0	\$2,261,490	\$2,261,490
Total	\$0	\$0	\$106,444,546	\$106,444,546

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 360: Job Creation and Economic Development Initiatives—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$0	\$20,759	\$20,759
Mining	\$0	\$0	\$4,871	\$4,871
Utilities	\$0	\$0	\$361,117	\$361,117
Construction	\$0	\$0	\$345,098	\$345,098
Manufacturing	\$0	\$0	\$493,398	\$493,398
Wholesale trade	\$0	\$0	\$1,744,528	\$1,744,528
Retail trade	\$0	\$0	\$4,379,491	\$4,379,491
Transportation and warehousing	\$0	\$0	\$744,494	\$744,494
Information	\$0	\$0	\$938,452	\$938,452
Finance and insurance	\$0	\$0	\$3,514,524	\$3,514,524
Real estate and rental and leasing	\$0	\$0	\$846,322	\$846,322
Professional, scientific, and technical services	\$0	\$0	\$1,996,310	\$1,996,310
Management of companies and enterprises	\$0	\$0	\$405,632	\$405,632
Administrative and support and waste management and remediation services	\$0	\$0	\$1,252,361	\$1,252,361
Educational services	\$0	\$0	\$1,400,948	\$1,400,948
Health care and social assistance	\$0	\$0	\$9,306,243	\$9,306,243
Arts, entertainment, and recreation	\$0	\$0	\$477,163	\$477,163
Accommodation and food services	\$0	\$0	\$1,850,015	\$1,850,015
Other services (except public administration)	\$0	\$0	\$2,259,890	\$2,259,890
Public administration	\$0	\$0	\$805,305	\$805,305
Total	\$0	\$0	\$33,146,921	\$33,146,921

Source: RESI

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Figure 361: Public Health Initiatives Related to Climate Changes—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.0	0.0	0.0
Manufacturing	0.0	0.0	0.0	0.0
Wholesale trade	0.0	0.0	0.0	0.0
Retail trade	0.0	0.0	0.0	0.0
Transportation and warehousing	0.0	0.0	0.0	0.0
Information	2.9	0.1	0.0	2.9
Finance and insurance	0.0	0.0	0.0	0.0
Real estate and rental and leasing	0.0	-0.3	0.0	-0.3
Professional, scientific, and technical services	1.8	0.3	0.0	2.1
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.3	0.0	0.3
Educational services	0.0	0.0	0.0	0.0
Health care and social assistance	-5.7	0.0	0.0	-5.8
Arts, entertainment, and recreation	0.0	0.0	0.0	0.0
Accommodation and food services	0.0	0.0	0.0	0.0
Other services (except public administration)	0.0	0.0	0.0	0.0
Public administration	0.4	0.0	0.0	0.3
Average	-0.7	0.4	0.1	-0.2

Source: RESI

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Figure 362: Public Health Initiatives Related to Climate Changes—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$73	\$758	\$831
Mining	\$0	\$941	\$373	\$1,314
Utilities	\$0	\$8,922	\$11,744	\$20,666
Construction	\$0	\$9,478	\$4,751	\$14,229
Manufacturing	\$0	\$11,490	\$15,464	\$26,953
Wholesale trade	\$0	\$16,296	\$22,904	\$39,200
Retail trade	\$0	\$1,160	\$43,582	\$44,743
Transportation and warehousing	\$0	\$13,409	\$10,223	\$23,632
Information	\$450,000	\$44,477	\$20,521	\$514,997
Finance and insurance	\$0	\$40,228	\$62,119	\$102,347
Real estate and rental and leasing	\$0	\$60,276	\$107,018	\$167,294
Professional, scientific, and technical services	\$225,000	\$87,072	\$21,465	\$333,537
Management of companies and enterprises	\$0	\$14,360	\$3,507	\$17,867
Administrative and support and waste management and remediation services	\$0	\$63,315	\$13,404	\$76,719
Educational services	\$0	\$143	\$11,677	\$11,820
Health care and social assistance	\$225,000	\$7,870	\$88,853	\$321,723
Arts, entertainment, and recreation	\$0	\$3,036	\$6,260	\$9,296
Accommodation and food services	\$0	\$10,301	\$25,565	\$35,867
Other services (except public administration)	\$0	\$12,064	\$25,203	\$37,266
Public administration	\$100,000	\$9,508	\$10,371	\$119,879
Average	\$1,000,000	\$414,419	\$505,761	\$1,920,180

Source: RESI

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Figure 363: Public Health Initiatives Related to Climate Changes—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$10	\$96	\$106
Mining	\$0	\$129	\$23	\$152
Utilities	\$0	\$1,178	\$1,579	\$2,757
Construction	\$0	\$3,674	\$1,663	\$5,338
Manufacturing	\$0	\$2,524	\$2,251	\$4,774
Wholesale trade	\$0	\$6,109	\$8,585	\$14,694
Retail trade	\$0	\$605	\$21,949	\$22,553
Transportation and warehousing	\$0	\$5,072	\$3,515	\$8,587
Information	\$202,220	\$9,896	\$4,395	\$216,511
Finance and insurance	\$0	\$11,304	\$17,269	\$28,573
Real estate and rental and leasing	\$0	\$4,981	\$3,714	\$8,695
Professional, scientific, and technical services	\$124,726	\$40,690	\$9,431	\$174,847
Management of companies and enterprises	\$0	\$7,762	\$1,895	\$9,657
Administrative and support and waste management and remediation services	\$0	\$30,963	\$5,891	\$36,854
Educational services	\$0	\$74	\$6,569	\$6,643
Health care and social assistance	\$80,949	\$2,888	\$42,771	\$126,609
Arts, entertainment, and recreation	\$0	\$1,078	\$2,280	\$3,358
Accommodation and food services	\$0	\$3,569	\$8,922	\$12,491
Other services (except public administration)	\$0	\$4,850	\$10,861	\$15,712
Public administration	\$25,247	\$4,306	\$3,725	\$33,278
Average	\$433,142	\$141,662	\$157,385	\$732,189

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 364: Public Health Initiatives Related to Climate Changes—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.1	0.1
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.1	0.1
Construction	0.0	0.0	0.4	0.4
Manufacturing	0.0	0.0	0.4	0.4
Wholesale trade	0.0	0.0	1.1	1.1
Retail trade	0.0	0.0	7.1	7.1
Transportation and warehousing	0.0	0.0	1.0	1.0
Information	0.0	0.0	0.7	0.7
Finance and insurance	0.0	0.0	2.7	2.7
Real estate and rental and leasing	0.0	0.0	2.8	2.8
Professional, scientific, and technical services	0.0	0.0	1.7	1.7
Management of companies and enterprises	0.0	0.0	0.2	0.2
Administrative and support and waste management and remediation services	0.0	0.0	2.0	2.0
Educational services	0.0	0.0	1.6	1.6
Health care and social assistance	0.0	0.0	9.0	9.0
Arts, entertainment, and recreation	0.0	0.0	1.3	1.3
Accommodation and food services	0.0	0.0	4.1	4.1
Other services (except public administration)	0.0	0.0	3.6	3.6
Public administration	0.0	0.0	0.6	0.6
Total	0.0	0.0	40.4	40.4

Source: RESI

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Figure 365: Public Health Initiatives Related to Climate Changes—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$0	\$8,290	\$8,290
Mining	\$0	\$0	\$4,127	\$4,127
Utilities	\$0	\$0	\$134,241	\$134,241
Construction	\$0	\$0	\$49,053	\$49,053
Manufacturing	\$0	\$0	\$171,495	\$171,495
Wholesale trade	\$0	\$0	\$232,688	\$232,688
Retail trade	\$0	\$0	\$434,771	\$434,771
Transportation and warehousing	\$0	\$0	\$108,009	\$108,009
Information	\$0	\$0	\$220,367	\$220,367
Finance and insurance	\$0	\$0	\$628,929	\$628,929
Real estate and rental and leasing	\$0	\$0	\$1,122,285	\$1,122,285
Professional, scientific, and technical services	\$0	\$0	\$227,287	\$227,287
Management of companies and enterprises	\$0	\$0	\$37,521	\$37,521
Administrative and support and waste management and remediation services	\$0	\$0	\$142,464	\$142,464
Educational services	\$0	\$0	\$125,626	\$125,626
Health care and social assistance	\$0	\$0	\$967,507	\$967,507
Arts, entertainment, and recreation	\$0	\$0	\$65,051	\$65,051
Accommodation and food services	\$0	\$0	\$265,116	\$265,116
Other services (except public administration)	\$0	\$0	\$264,049	\$264,049
Public administration	\$0	\$0	\$113,069	\$113,069
Total	\$0	\$0	\$5,321,944	\$5,321,944

Source: RESI

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Figure 366: Public Health Initiatives Related to Climate Changes—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$0	\$1,038	\$1,038
Mining	\$0	\$0	\$244	\$244
Utilities	\$0	\$0	\$18,055	\$18,055
Construction	\$0	\$0	\$17,254	\$17,254
Manufacturing	\$0	\$0	\$24,669	\$24,669
Wholesale trade	\$0	\$0	\$87,222	\$87,222
Retail trade	\$0	\$0	\$218,963	\$218,963
Transportation and warehousing	\$0	\$0	\$37,223	\$37,223
Information	\$0	\$0	\$46,920	\$46,920
Finance and insurance	\$0	\$0	\$175,717	\$175,717
Real estate and rental and leasing	\$0	\$0	\$42,314	\$42,314
Professional, scientific, and technical services	\$0	\$0	\$99,810	\$99,810
Management of companies and enterprises	\$0	\$0	\$20,281	\$20,281
Administrative and support and waste management and remediation services	\$0	\$0	\$62,615	\$62,615
Educational services	\$0	\$0	\$70,044	\$70,044
Health care and social assistance	\$0	\$0	\$465,287	\$465,287
Arts, entertainment, and recreation	\$0	\$0	\$23,857	\$23,857
Accommodation and food services	\$0	\$0	\$92,496	\$92,496
Other services (except public administration)	\$0	\$0	\$112,988	\$112,988
Public administration	\$0	\$0	\$40,263	\$40,263
Total	\$0	\$0	\$1,657,258	\$1,657,258

Source: RESI

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Figure 367: Title V Permits for GHG Sources—Investment Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.1	0.0	0.1
Manufacturing	0.0	0.0	0.0	0.0
Wholesale trade	0.0	0.0	0.0	0.0
Retail trade	0.0	0.0	0.0	0.0
Transportation and warehousing	0.0	0.1	0.0	0.1
Information	1.2	-0.1	0.0	1.1
Finance and insurance	0.0	0.0	0.0	0.0
Real estate and rental and leasing	0.0	0.0	0.0	0.0
Professional, scientific, and technical services	4.2	-0.1	0.0	4.1
Management of companies and enterprises	-4.6	0.0	0.0	-4.6
Administrative and support and waste management and remediation services	0.0	0.5	0.0	0.4
Educational services	0.0	0.0	0.0	0.0
Health care and social assistance	0.0	0.0	-0.1	-0.1
Arts, entertainment, and recreation	0.0	-0.1	0.0	-0.1
Accommodation and food services	0.0	0.0	0.0	0.0
Other services (except public administration)	0.0	0.0	0.0	-0.1
Public administration	0.4	0.0	0.0	0.4
Average	1.1	0.3	-0.2	1.2

Source: RESI

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Figure 368: Title V Permits for GHG Sources—Investment Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$352	-\$53	\$299
Mining	\$0	\$990	-\$26	\$964
Utilities	\$0	-\$405	-\$876	-\$1,281
Construction	\$0	\$10,502	-\$278	\$10,224
Manufacturing	\$0	\$2,026	-\$1,117	\$909
Wholesale trade	\$0	\$2,800	-\$1,781	\$1,019
Retail trade	\$0	\$486	-\$2,464	-\$1,978
Transportation and warehousing	\$0	\$6,990	-\$605	\$6,385
Information	\$300,000	-\$36,392	-\$1,412	\$262,196
Finance and insurance	\$0	-\$1,938	-\$3,716	-\$5,654
Real estate and rental and leasing	\$0	-\$746	-\$6,491	-\$7,236
Professional, scientific, and technical services	\$600,000	-\$13,656	-\$1,399	\$584,945
Management of companies and enterprises	-\$1,000,000	\$3,957	-\$236	-\$996,279
Administrative and support and waste management and remediation services	\$0	\$30,047	-\$840	\$29,207
Educational services	\$0	-\$23	-\$498	-\$520
Health care and social assistance	\$0	-\$1	-\$5,840	-\$5,842
Arts, entertainment, and recreation	\$0	-\$3,957	-\$351	-\$4,309
Accommodation and food services	\$0	\$1,612	-\$1,645	-\$34
Other services (except public administration)	\$0	-\$2,054	-\$1,424	-\$3,478
Public administration	\$100,000	\$5,148	-\$686	\$104,462
Average	\$0	\$5,736	-\$31,738	-\$26,002

Source: RESI

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Figure 369: Title V Permits for GHG Sources—Investment Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$116	-\$6	\$109
Mining	\$0	\$161	-\$1	\$160
Utilities	\$0	-\$124	-\$118	-\$242
Construction	\$0	\$4,101	-\$99	\$4,002
Manufacturing	\$0	-\$288	-\$158	-\$446
Wholesale trade	\$0	\$1,049	-\$667	\$382
Retail trade	\$0	\$253	-\$1,241	-\$988
Transportation and warehousing	\$0	\$2,589	-\$212	\$2,377
Information	\$76,145	-\$8,196	-\$299	\$67,650
Finance and insurance	\$0	-\$1,307	-\$1,068	-\$2,375
Real estate and rental and leasing	\$0	-\$624	-\$275	-\$899
Professional, scientific, and technical services	\$304,910	-\$6,349	-\$613	\$297,948
Management of companies and enterprises	-\$540,518	\$2,139	-\$128	-\$538,506
Administrative and support and waste management and remediation services	\$0	\$14,304	-\$370	\$13,933
Educational services	\$0	-\$10	-\$265	-\$275
Health care and social assistance	\$0	-\$1	-\$2,803	-\$2,804
Arts, entertainment, and recreation	\$0	-\$1,002	-\$129	-\$1,132
Accommodation and food services	\$0	\$554	-\$574	-\$20
Other services (except public administration)	\$0	-\$2,311	-\$604	-\$2,914
Public administration	\$25,247	\$1,731	-\$241	\$26,736
Average	-\$134,216	\$6,784	-\$9,872	-\$137,304

Source: RESI

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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Figure 370: Title V Permits for GHG Sources—Operation Phase, Employment Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	0.0	0.0	0.0	0.0
Mining	0.0	0.0	0.0	0.0
Utilities	0.0	0.0	0.0	0.0
Construction	0.0	0.2	0.0	0.2
Manufacturing	0.0	0.0	0.0	0.0
Wholesale trade	0.0	0.0	0.0	0.1
Retail trade	0.0	0.0	0.2	0.2
Transportation and warehousing	0.0	0.1	0.0	0.1
Information	0.0	0.0	0.0	0.0
Finance and insurance	0.0	0.1	0.1	0.1
Real estate and rental and leasing	0.0	0.1	0.1	0.2
Professional, scientific, and technical services	0.0	0.3	0.0	0.3
Management of companies and enterprises	0.0	0.0	0.0	0.0
Administrative and support and waste management and remediation services	0.0	0.2	0.0	0.2
Educational services	0.0	0.0	0.0	0.0
Health care and social assistance	0.0	0.0	0.2	0.2
Arts, entertainment, and recreation	0.0	0.0	0.0	0.0
Accommodation and food services	0.0	0.0	0.1	0.1
Other services (except public administration)	0.0	0.0	0.1	0.1
Public administration	1.1	0.0	0.0	1.2
Total	1.1	1.2	0.8	3.1

Source: RESI

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Figure 371: Title V Permits for GHG Sources—Operation Phase, Output Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$60	\$166	\$226
Mining	\$0	\$2,412	\$82	\$2,494
Utilities	\$0	\$8,918	\$2,578	\$11,496
Construction	\$0	\$20,957	\$1,034	\$21,991
Manufacturing	\$0	\$10,134	\$3,390	\$13,524
Wholesale trade	\$0	\$8,010	\$5,035	\$13,045
Retail trade	\$0	\$709	\$9,477	\$10,186
Transportation and warehousing	\$0	\$6,693	\$2,226	\$8,919
Information	\$0	\$5,752	\$4,491	\$10,243
Finance and insurance	\$0	\$20,402	\$13,531	\$33,933
Real estate and rental and leasing	\$0	\$24,007	\$23,321	\$47,327
Professional, scientific, and technical services	\$0	\$40,134	\$4,689	\$44,823
Management of companies and enterprises	\$0	\$1,080	\$767	\$1,846
Administrative and support and waste management and remediation services	\$0	\$17,837	\$2,924	\$20,761
Educational services	\$0	\$67	\$2,521	\$2,588
Health care and social assistance	\$0	\$2	\$19,413	\$19,416
Arts, entertainment, and recreation	\$0	\$522	\$1,361	\$1,883
Accommodation and food services	\$0	\$1,833	\$5,582	\$7,414
Other services (except public administration)	\$0	\$3,000	\$5,480	\$8,480
Public administration	\$306,042	\$11,982	\$2,266	\$320,290
Total	\$306,042	\$184,510	\$110,333	\$600,884

Source: RESI

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Figure 372: Title V Permits for GHG Sources—Operation Phase, Wage Impacts

Industry Sector	Direct	Indirect	Induced	Total
Agriculture, forestry, fishing, and hunting	\$0	\$8	\$21	\$29
Mining	\$0	\$368	\$5	\$373
Utilities	\$0	\$1,038	\$347	\$1,385
Construction	\$0	\$8,092	\$362	\$8,455
Manufacturing	\$0	\$1,844	\$493	\$2,336
Wholesale trade	\$0	\$3,002	\$1,887	\$4,890
Retail trade	\$0	\$370	\$4,773	\$5,142
Transportation and warehousing	\$0	\$2,361	\$766	\$3,127
Information	\$0	\$1,268	\$961	\$2,230
Finance and insurance	\$0	\$5,983	\$3,765	\$9,749
Real estate and rental and leasing	\$0	\$1,889	\$815	\$2,704
Professional, scientific, and technical services	\$0	\$19,325	\$2,060	\$21,385
Management of companies and enterprises	\$0	\$584	\$414	\$998
Administrative and support and waste management and remediation services	\$0	\$7,175	\$1,285	\$8,460
Educational services	\$0	\$33	\$1,416	\$1,449
Health care and social assistance	\$0	\$1	\$9,344	\$9,345
Arts, entertainment, and recreation	\$0	\$181	\$496	\$677
Accommodation and food services	\$0	\$629	\$1,948	\$2,577
Other services (except public administration)	\$0	\$1,027	\$2,361	\$3,388
Public administration	\$77,265	\$3,290	\$814	\$81,369
Total	\$77,265	\$58,467	\$34,333	\$170,066

Source: RESI

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Appendix B—Methodology**B.1 General Overview**

Each subject area has its own strategies and subprograms in place in order to meet greenhouse gas emissions reduction goals. In some cases, state government agencies associated with these subject areas are developing further strategies and subprograms to bridge the gap between achieved emissions reductions and emissions reduction targets.

Greenhouse gas emission reductions are measured by per strategy/subprogram, but data is supplied by each agency responsible for each strategy. As such, RESI, in coordination with MDE, developed a methodology according to variations in reported data. MDE assisted in the development and finalization of all assumptions used in the economic modeling for the task order. Through this coordinated effort, RESI and MDE determined two phases to be modeled for each strategy and subprogram: an investment phase and an operation phase.

Investment Phase

The investment phase refers to the entire period during which a strategy and its subprograms are being developed, invested in, and enacted. In other words, it is the period during which the implementing entity or entities—whether it be state government agency or agencies, a business entity or entities required to comply, and/or some other individual or group(s)—will channel funds and effort into the appropriate sector(s) of the economy to achieve the requirements outlined for the strategy and subprograms.

In all cases, this phase is modeled per \$1 million invested in each subprogram due to uncertainty regarding the total implementation cost of each strategy and subprogram. In cases where strategies involve more than one subprogram, the total impacts for the overall strategy were scaled down to \$1 million for purposes of comparison and uniformity.¹ The total actual economic impacts can be determined by multiplying the economic impacts represented by the total actual investment cost of a strategy in its entirety once that cost is determined. Due to the basis upon which the investment phase impacts were measured, the total average impacts for each subject area per \$1 million invested was calculated as a subject area total.

In addition, it should be noted that “investment” is not necessarily modeled as a positive inflow of capital for all industry sectors identified in Section B.3. In some cases, “investment” is the outflow of capital for those industries for which strategy compliance is mandated and an inflow of capital for all industry sectors experiencing a positive change due to other industries’ mandated compliance. The modeling approach balanced the cash inflows to and cash outflows from affected sectors. Therefore, the direct output impact in these cases is \$0. To calculate the average for the subject area overall, a standard average was taken (including instances of \$0 of direct output impact) and scaled to \$1 million. This method applies to all instances throughout the report.

¹ For similar reasons, totals for agencies across all strategies are not represented in Section 3.0 or Appendix A. However, agency totals for the investment phase have been included on a per \$1 million basis in the executive

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

The inclusion of these industries and this method allows for a more conservative estimate of the economic and fiscal impacts associated with strategy implementation. Also, most of these industries are expected to experience “end user” cost savings, so the positive impacts for those industries is modeled in the operation phase.

It is also important to note the occurrence of negative impacts associated with strategies modeled in such a way reflects the interaction of differing industry sectors. In other words, some industry sectors are more sensitive in terms of employment and wages in regard to changes in the economy than others. Where more sensitive industry sectors experience negative change (or an outflow of capital), the associated negative impacts outweigh the positive change experienced by the benefitting industry sectors (those experiencing an inflow of capital).

Operation Phase

The operation phase refers to the period during which a strategy and its subprograms have already been implemented and the “end user” cost savings (or other monetary benefits) are being realized. In other words, it is the period during which the goals of the strategy and subprograms have been achieved and individuals and/or business entities are gaining something from these goals being achieved in the form of cost savings, increased income, etc.

In most cases, this phase is modeled based on the level of savings or increased earnings or some other measure as calculated from numbers included in the strategy write-ups and external research applied to those numbers. Therefore, the economic impacts represented are the total actual annual economic impacts.

An example of the steps undertaken by RESI and their results for one strategy with all of its subprograms for both phases can be found in Section B.2.

Exclusions and Limitations

Due to lack of data from agencies, some strategies have been modeled using all external data and assumptions. While impacts resulting from such inputs will not be as accurate as they could be, they will serve as a general frame of reference for potential impacts. For more detailed information regarding the steps undertaken and sources used to model specific strategies, please refer to Appendix C.

B.2 IMPLAN Model Overview

IMPLAN is an economic impact assessment software system. The system was originally developed and is now maintained by MIG, Inc. (formerly the Minnesota IMPLAN Group, Inc.). The software system combines a set of extensive databases concerning economic factors, multipliers, and demographic statistics with a highly refined and detailed system of modeling software. IMPLAN allows the user to develop local-level input-output models which can estimate the economic impact of new firms moving into an area as well as the impacts of professional sports teams, recreation and tourism, residential development, etc. The model accomplishes this by identifying direct impacts by sector, then developing a set of indirect and

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

induced impacts by sector through the use of industry-specific multipliers, local purchase coefficients, income-to-output ratios, and other factors and relationships.

The model enumerates the economic and fiscal impacts of each dollar earned and spent by the following: employees associated with the strategies, other supporting vendors (business services, retail, etc.), each dollar spent by these vendors on other firms, and each dollar spent by the households associated with the strategies' employees, other vendors' employees, and other businesses' employees.

The definitive centerpiece of an economic impact study is the classification of impacts. To quantify the economic impact of an event, economists measure three types of economic impacts: direct, indirect, and induced impacts. The direct economic effects are generated as an event creates jobs and hires workers to support the strategy's activities. Once the direct economic impacts have been identified, IMPLAN can calculate the indirect and induced impacts based on a set of multipliers and additional factors.

The indirect economic impacts occur as the vendors purchase goods and services from other firms. In other words, indirect impacts measure the positive effect on the economy resulting from businesses selling goods and services to the households. In either case, the increases in employment generate an increase in household income, as new job opportunities are created and income levels rise. This drives the induced economic impacts, which result from households increasing their purchases at local businesses. In other words, induced impacts include the effects of increased household spending resulting from direct and indirect effects. In summary, direct impacts are the immediate impacts of the incoming jobs. Indirect and induced impacts are derivative, flowing from direct impacts.

Indirect and induced impacts are estimated by applying multipliers to direct impacts. Multipliers are factors which are applied to a dollar expended toward a particular use. These factors estimate the total value of that dollar as it propagates through the economy. For instance, suppose that a dollar is spent in a certain industry. That dollar will increase the number of jobs in that industry by a certain amount. Furthermore, some of that dollar will go to pay the increased earnings in that industry, resulting in higher personal income. In turn, consumers will spend some share of that increase in personal income. The ultimate impact of that dollar initially spent in that certain industry, therefore, is greater than its direct impact on the earnings of that industry. Multipliers are industry-specific factors that estimate the value of a dollar spent in an industry, including not only its direct impacts, but also its indirect and induced impacts.

There are two major components to IMPLAN: data files and software. An impact analysis using IMPLAN starts by identifying expenditures in terms of the sectoring scheme for the model. Each spending category becomes a group of "events" under an "activity" in IMPLAN, where each event specifies the portion of price allocated to a specific IMPLAN sector. Groups of events then be used to run impact analyses individually or can be combined into a "scenario" consisting of several activities. Activity inputs signify some change in the economy of the model area (in this

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

case, Maryland) and can be any of the following: industry change (employment, industry sales, or employee compensation), commodity change, labor income change, household income change, industry spending pattern, or institution spending pattern.

The hallmark of IMPLAN is the specificity of its economic datasets. The database includes information for 440 different industries (generally at the four- or five-digit NAICS level) and a variety of economic variables. Along with these data files, national input-output structural matrices detail the interrelationships between and among these sectors. The database also contains a full schedule of SAM data. All of this data is available at the national, state, and county level.

The IMPLAN system is flexible. It allows the user to augment any of the data or algorithmic relationships within each model in order to more precisely account for regional relationships. This includes inputting different output-to-income ratios for a given industry, different wage rates, and different multipliers where appropriate. IMPLAN also provides the user with a choice of trade-flow assumptions, including the modification of regional purchase coefficients, which determine the mix of goods and services purchased locally with each dollar in each sector. Moreover, the system allows the user to create custom impact analyses by entering changes in final demand. This flexibility is a critically important feature in terms of the modeling approach. RESI is uniquely qualified to develop data and factors tailored to this project, and, overwrite the default data contained in the IMPLAN database where appropriate.

Another major advantage of IMPLAN is its credibility and acceptance within the profession. There are over five hundred active users of IMPLAN databases and software within the federal and state governments, universities, and among private sector consultants. Figure 373 provides a sampling of IMPLAN users.

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft
 RESI of Towson University

Figure 373: Sampling of IMPLAN Users

<p>Academic Institutions Alabama A&M University Albany State University Auburn University Cornell University Duke University Iowa State University Marshall University College of Business Michigan Tech University Ohio State Penn. State University Portland State University Purdue University Stanford University Texas A&M University University of California–Berkeley University of Wisconsin University of Minnesota Virginia Tech. West Virginia University</p>	<p>State Government California Energy Commission Florida Division of Forestry Illinois Dept. of Natural Resources Maryland Dept. of Natural Resources Missouri Dept. of Economic Dev. New Mexico Dept. of Tourism South Carolina Employment Security Utah Dept. of Natural Resources Wisconsin Dept. of Transportation</p>
<p>Federal Government Argonne National Lab Federal Emergency Management Agency U.S. Army Corps of Engineers U.S. Dept. of Agriculture, Econ. Research Service U.S. Dept. of Agriculture, Forest Service U.S. Dept. of Interior, Bureau of Land Mgmt. U.S. Dept. of Interior, Fish and Wildlife Service U.S. Dept. of Interior, National Parks Service</p>	<p>Private Consulting Firms American Economics Group, Inc. Batelle Pacific NW Laboratories Boise Cascade Corporation BTG/Delta Research Division Charles River Associates CIC Research Coopers & Lybrand Crestar Bank Deloitte & Touche Economic Research Associates Ernst & Young Jack Faucett Associates Kalorama Consulting Group KPMG Peat Marwick L.E. Peabody Associates, Inc. Price Waterhouse LLP SMS Research West Virginia Research League</p>

Source: IMPLAN

B.3 IMPLAN Industry Sectors

RESI determined the industry sectors which would be affected by strategy implementation for both the investment phase and the operation phase for each strategy and subprogram. A complete list of these sectors can be found in Figures 374 and 375.

Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft
 RESI of Towson University

Figure 374: IMPLAN Industry Codes—Investment Phase

Strategy	Subprogram	IMPLAN Code	Description		
Energy					
3.1.1	Regional Greenhouse Gas Initiative	31	Electric power generation, transmission, and distribution		
		375	Environmental and other technical consulting services		
		432	Other state and local government enterprises		
3.1.2	Greenhouse Gas Reductions from Imported Power	31	Electric power generation, transmission, and distribution		
		375	Environmental and other technical consulting services		
		432	Other state and local government enterprises		
3.1.3	Greenhouse Gas New Source Performance Standard	31	Electric power generation, transmission, and distribution		
		32	Natural gas distribution		
		375	Environmental and other technical consulting services		
		432	Other state and local government enterprises		
		21	Mining coal		
3.1.4	Maximum Achievable Control Technology (MACT)	28	Drilling oil and gas wells		
		29	Support activities for oil and gas operations		
		31	Electric power generation, transmission, and distribution		
		188	Power boiler and heat exchanger manufacturing		
		375	Environmental and other technical consulting services		
		432	Other state and local government enterprises		
3.1.5	GHG Prevention of Significant Deterioration Permitting Program	350	Internet publishing and broadcasting		
		352	Data processing, hosting, ISP, web search portals		
		375	Environmental and other technical consulting services		
		381	Management of companies and enterprises		
		432	Other state and local government enterprises		
		40	Maintenance & repair construction of residential structures		
3.1.6	EmPOWER Maryland Empowering Finance Initiative	322	Retail Stores - Electronics and appliances		
		330	Retail Stores - Miscellaneous		
		369	Architectural, engineering, and related services		
		375	Environmental and other technical consulting		
		432	Other state and local government enterprises		
		40	Maintenance & repair construction of residential structures		
		369	Architectural, engineering, and related services		
		375	Environmental and other technical consulting		
		EmPOWER Maryland Residential Incentives			
				375	Environmental and other technical consulting



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft

RESI of Towson University

Strategy	Subprogram	IMPLAN Code	Description
		432	Other state and local government enterprises
		40	Maintenance & repair construction of residential structures
		322	Retail Stores - Electronics and appliances
		330	Retail Stores - Miscellaneous
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting
		432	Other state and local government enterprises
		40	Maintenance & repair construction of residential structures
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting
		432	Other state and local government enterprises
		40	Maintenance & repair construction of residential structures
		322	Retail Stores - Electronics and appliances
		330	Retail Stores - Miscellaneous
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting
		424	Grantmaking, giving, and social advocacy organizations
		425	Civic, social, professional, and similar organizations
		432	Other state and local government enterprises
		40	Maintenance & repair construction of residential structures
		322	Retail Stores - Electronics and appliances
		330	Retail Stores - Miscellaneous
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting
		432	Other state and local government enterprises
		392	Private junior colleges, colleges, and universities
		375	Environmental and other technical consulting
		432	Other state and local government enterprises
		31	Electric power generation, transmission, and distribution
		322	Retail Stores - Electronics and appliances
		330	Retail Stores - Miscellaneous
		375	Environmental and other technical consulting
		432	Other state and local government enterprises
		31	Electric power generation, transmission, and distribution
		322	Retail Stores - Electronics and appliances
		330	Retail Stores - Miscellaneous
		375	Environmental and other technical consulting
		432	Other state and local government enterprises



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft

RESI of Towson University

Strategy	Subprogram	IMPLAN Code	Description
3.1.7	Maryland Save Energy Now	375	Environmental and other technical consulting
		432	Other state and local government enterprises
	Jane E. Lawton Conservation Loan Program	39	Maintenance & repair construction of nonresident structures
		319	Wholesale trade businesses
		322	Retail Stores - Electronics and appliances
		330	Retail Stores - Miscellaneous
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting
	Energy Efficiency and Conservation Block Grant Program	432	Other state and local government enterprises
		31	Electric power generation, transmission, and distribution
		39	Maintenance & repair construction of nonresident structures
		319	Wholesale trade businesses
		322	Retail Stores - Electronics and appliances
		330	Retail Stores - Miscellaneous
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting
		432	Other state and local government enterprises
State Agencies Loan Program		31	Electric power generation, transmission, and distribution
	39	Maintenance & repair construction of nonresident structures	
	215	Heating equipment (except warm air furnaces)	
	216	Air conditioning, refrigeration, and warm air furnace manufacturing	
	319	Wholesale trade businesses	
	322	Retail Stores - Electronics and appliances	
	330	Retail Stores - Miscellaneous	
	369	Architectural, engineering, and related services	
	375	Environmental and other technical consulting	
	432	Other state and local government enterprises	
3.1.8	Existing Programs	<i>See 3.1.6 and 3.1.7</i>	
	Programs Under Consideration	319	Wholesale trade businesses
		322	Retail Stores - Electronics and appliances
		330	Retail Stores - Miscellaneous
		377	Advertising and related services



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft
 RESI of Towson University

Strategy	Subprogram	IMPLAN Code	Description
3.1.9	Energy Efficiency in the Power Sector – General	432	Other state and local government enterprises
		31	Electric power generation, transmission, and distribution
		32	Natural gas distribution
		375	Environmental and other technical consulting
3.1.10	Energy Efficiency in the Power Sector – Utility Programs	432	Other state and local government enterprises
		31	Electric power generation, transmission, and distribution
		39	Maintenance & repair construction of nonresidential structures
		319	Wholesale trade businesses
		322	Retail Stores - Electronics and appliances
		330	Retail Stores - Miscellaneous
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting
		432	Other state and local government enterprises
		3.1.11	Maryland Renewable Energy Portfolio Standard
375	Environmental and other technical consulting		
432	Other state and local government enterprises		
39	Maintenance & repair construction of nonresidential structures		
215	Heating equipment (except warm air furnaces)		
222	Turbine and turbine generator set units manufacturing		
319	Wholesale trade businesses		
322	Retail Stores - Electronics and appliances		
330	Retail Stores - Miscellaneous		
369	Architectural, engineering, and related services		
3.1.12	Residential Clean Energy Grants Program	375	Environmental and other technical consulting
		39	Maintenance & repair construction of nonresidential structures
		215	Heating equipment (except warm air furnaces)
		222	Turbine and turbine generator set units manufacturing
		319	Wholesale trade businesses
		322	Retail Stores - Electronics and appliances
		330	Retail Stores - Miscellaneous
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting
		39	Maintenance & repair construction of nonresidential structures



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft

RESI of Towson University

Strategy	Subprogram	IMPLAN Code	Description
	Clean Energy Incentive Tax Credit Program	215	Heating equipment (except warm air furnaces)
		222	Turbine and turbine generator set units manufacturing
		253	Electricity and signal testing instruments manufacturing
		267	Motor and generator manufacturing
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting
		432	Other state and local government enterprises
		31	Electric power generation, transmission, and distribution
		375	Environmental and other technical consulting
		432	Other state and local government enterprises
		31	Electric power generation, transmission, and distribution
		215	Heating equipment (except warm air furnaces)
Project Sunburst		243	Semiconductor and related device manufacturing
		375	Environmental and other technical consulting
		432	Other state and local government enterprises
Biomass Programs		31	Electric power generation, transmission, and distribution
		375	Environmental and other technical consulting
		432	Other state and local government enterprises
Land-based Wind Programs		222	Turbine and turbine generator set units manufacturing
		375	Environmental and other technical consulting
		432	Other state and local government enterprises
3.1.13	Offshore Wind Initiatives to Support Renewable Energy	31	Electric power generation, transmission, and distribution
		222	Turbine and turbine generator set units manufacturing
		375	Environmental and other technical consulting
		432	Other state and local government enterprises
3.1.14	Combined Heat and Power	31	Electric power generation, transmission, and distribution
		375	Environmental and other technical consulting
		377	Advertising and related services
		432	Other state and local government enterprises
3.1.15	Main Street Initiatives	34	Construction of new nonresidential commercial and healthcare structures
		39	Maintenance & repair construction of nonresidential structures
		369	Architectural, engineering, and related services



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft

RESI of Towson University

Strategy	Subprogram	IMPLAN Code	Description		
3.1.16	Energy Efficiency for Affordable Housing	375	Environmental and other technical consulting services		
		377	Advertising and related services		
		432	Other state and local government enterprises		
		31	Electric power generation, transmission, and distribution		
		40	Maintenance & repair construction of residential structures		
		369	Architectural, engineering, and related services		
		375	Environmental and other technical consulting services		
		377	Advertising and related services		
		432	Other state and local government enterprises		
		Transportation			
3.2.1	Maryland Clean Cars Program	276	Automobile manufacturing		
		277	Light truck and utility vehicle manufacturing		
		279	Motor vehicle body manufacturing		
		281	Motor home manufacturing		
		282	Travel trailer and camper manufacturing		
		283	Motor vehicle parts manufacturing		
		319	Wholesale trade businesses		
		320	Retail Stores - Motor vehicle and parts		
		335	Transport by truck		
		375	Environmental and other technical consulting services		
		432	Other state and local government enterprises		
		3.2.2	National Fuel Efficiency and Emissions Standards for Medium- and Heavy-Duty Trucks	277	Light truck and utility vehicle manufacturing
				278	Heavy duty truck manufacturing
279	Motor vehicle body manufacturing				
283	Motor vehicle parts manufacturing				
319	Wholesale trade businesses				
320	Retail Stores - Motor vehicle and parts				
335	Transport by truck				
375	Environmental and other technical consulting services				
432	Other state and local government enterprises				
3.2.3	Clean Fuel Standard			20	Extraction of oil and natural gas
		28	Drilling oil and gas wells		
		29	Support activities for oil and gas operations		



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft
 RESI of Towson University

Strategy	Subprogram	IMPLAN Code	Description
3.2.4	Transportation and Climate Initiative	326	Retail Stores - Gasoline stations
		375	Environmental and other technical consulting services
		432	Other state and local government enterprises
		332	Transport by air
		333	Transport by rail
		334	Transport by water
		335	Transport by truck
		336	Transit and ground passenger transportation
		338	Scenic and sightseeing transportation and support activities
		339	Couriers and messengers
3.2.5	Charm City Circulator and Hampden Neighborhood Shuttle	319	Wholesale trade businesses
		336	Transit and ground passenger transportation
		375	Environmental and other technical consulting services
		432	Other state and local government enterprises
		336	Transit and ground passenger transportation
		432	Other state and local government enterprises
		294	All other transportation equipment manufacturing
		432	Other state and local government enterprises
		34	Construction of new nonresidential commercial and healthcare structures
		36	Construction of other new nonresidential structures
3.2.5	Locally Operated Transit Systems	38	Construction of other new residential structures
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		432	Other state and local government enterprises
		377	Advertising and related services
		432	Other state and local government enterprises
		336	Transit and ground passenger transportation
		432	Other state and local government enterprises
		392	Private junior colleges, colleges, universities
		432	Other state and local government enterprises
3.2.5	Smart Card Implementation	34	Construction of new nonresidential commercial and healthcare structures
		36	Construction of other new nonresidential structures
		38	Construction of other new residential structures
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		432	Other state and local government enterprises
		377	Advertising and related services
		432	Other state and local government enterprises
		336	Transit and ground passenger transportation
		432	Other state and local government enterprises
3.2.5	Transit-Oriented Development	34	Construction of new nonresidential commercial and healthcare structures
		36	Construction of other new nonresidential structures
		38	Construction of other new residential structures
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		432	Other state and local government enterprises
		377	Advertising and related services
		432	Other state and local government enterprises
		336	Transit and ground passenger transportation
		432	Other state and local government enterprises
3.2.5	Maryland Commuter Tax Credit	34	Construction of new nonresidential commercial and healthcare structures
		36	Construction of other new nonresidential structures
		38	Construction of other new residential structures
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		432	Other state and local government enterprises
		377	Advertising and related services
		432	Other state and local government enterprises
		336	Transit and ground passenger transportation
		432	Other state and local government enterprises
3.2.5	Guaranteed Ride Home	34	Construction of new nonresidential commercial and healthcare structures
		36	Construction of other new nonresidential structures
		38	Construction of other new residential structures
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		432	Other state and local government enterprises
		377	Advertising and related services
		432	Other state and local government enterprises
		336	Transit and ground passenger transportation
		432	Other state and local government enterprises
3.2.5	College Pass	34	Construction of new nonresidential commercial and healthcare structures
		36	Construction of other new nonresidential structures
		38	Construction of other new residential structures
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		432	Other state and local government enterprises
		377	Advertising and related services
		432	Other state and local government enterprises
		336	Transit and ground passenger transportation
		432	Other state and local government enterprises



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft
 RESI of Towson University

Strategy	Subprogram	IMPLAN Code	Description
3.2.6	Ride Share	377	Advertising and related services
		432	Other state and local government enterprises
	Commuter Connections – Washington, D.C. Region	377	Advertising and related services
		432	Other state and local government enterprises
	Baltimore Colleegetown Network	392	Private junior colleges, colleges, universities
		432	Other state and local government enterprises
	Hunt Valley Shuttle	432	Other state and local government enterprises
	Kent Street Transit Plaza	36	Construction of other new nonresidential structures
		369	Architectural, engineering, and related services
		432	Other state and local government enterprises
	University of Maryland College Park Carpool Program and Shuttle Bus Service	377	Advertising and related services
		392	Private junior colleges, colleges, universities
		432	Other state and local government enterprises
	<i>See 3.7.1</i>		
		<i>See 3.7.1</i>	<i>See 3.7.1</i>
	MARC East Baltimore Station	36	Construction of other new nonresidential structures
		369	Architectural, engineering, and related services
		432	Other state and local government enterprises
		36	Construction of other new nonresidential structures
		283	Motor vehicle parts manufacturing
	Expanded Transit (Purple Line, Corridor Cities Transitway, Red Line)	319	Wholesale trade businesses
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		432	Other state and local government enterprises
	MARC Growth and Investment Plan	36	Construction of other new nonresidential structures
		369	Architectural, engineering, and related services
		432	Other state and local government enterprises
		36	Construction of other new nonresidential structures
		39	Maintenance & repair construction of nonresidential structures
	MARC Station Parking Enhancements	369	Architectural, engineering, and related services
		432	Other state and local government enterprises
	Refurbishing MARC and Other Rail Vehicles	283	Motor vehicle parts manufacturing
		336	Transit and ground passenger transportation
		375	Environmental and other technical consulting services
3.2.7			



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft

RESI of Towson University

Strategy	Subprogram	IMPLAN Code	Description
3.2.8	Update on Maryland High Speed Rail	414	Automotive repair and maintenance, except car washes
		432	Other state and local government enterprises
		36	Construction of other new nonresidential structures
		225	Other engine equipment manufacturing
		289	Railroad and rolling stock manufacturing
		294	All other transportation equipment manufacturing
		319	Wholesale trade businesses
		336	Transit and ground passenger transportation
		369	Architectural, engineering, and related services
		432	Other state and local government enterprises
		36	Construction of other new nonresidential structures
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		377	Advertising and related services
432	Other state and local government enterprises		
3.2.8	Bicycle/Pedestrian Enhancements	292	Motorcycle, bicycle, and parts manufacturing
		432	Other state and local government enterprises
		36	Construction of other new nonresidential structures
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		432	Other state and local government enterprises
		36	Construction of other new nonresidential structures
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		432	Other state and local government enterprises
		36	Construction of other new nonresidential structures
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		432	Other state and local government enterprises
3.2.8	Bike Racks on Buses, MARC, Subway, Light Rail	432	Other state and local government enterprises
		292	Motorcycle, bicycle, and parts manufacturing
		432	Other state and local government enterprises
		36	Construction of other new nonresidential structures
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		432	Other state and local government enterprises
		36	Construction of other new nonresidential structures
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		432	Other state and local government enterprises
		432	Other state and local government enterprises
		292	Motorcycle, bicycle, and parts manufacturing
		319	Wholesale trade businesses
432	Other state and local government enterprises		
3.2.8	Bike Racks	292	Motorcycle, bicycle, and parts manufacturing
		319	Wholesale trade businesses
		363	General and consumer goods rental except video tape and disc rental
		432	Other state and local government enterprises
		292	Motorcycle, bicycle, and parts manufacturing
		319	Wholesale trade businesses
		363	General and consumer goods rental except video tape and disc rental
		432	Other state and local government enterprises
		292	Motorcycle, bicycle, and parts manufacturing
		319	Wholesale trade businesses
		363	General and consumer goods rental except video tape and disc rental
		432	Other state and local government enterprises
		292	Motorcycle, bicycle, and parts manufacturing
		319	Wholesale trade businesses
363	General and consumer goods rental except video tape and disc rental		
432	Other state and local government enterprises		



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft
 RESI of Towson University

Strategy	Subprogram	IMPLAN Code	Description
3.2.9	Electronic Toll Collection	239	Other communications equipment manufacturing
		369	Architectural, engineering, and related services
		432	Other state and local government enterprises
	High Occupancy Toll Lanes	369	Architectural, engineering, and related services
		432	Other state and local government enterprises
		432	Other state and local government enterprises
	Congestion Pricing and Managed Lanes	36	Construction of other new nonresidential structures
		39	Maintenance & repair construction of nonresidential structures
		369	Architectural, engineering, and related services
		432	Other state and local government enterprises
Parking Impact Fees	336	Transit and ground passenger transportation	
	422	Other personal services	
	375	Environmental and other technical consulting services	
Employer Commute Incentives	432	Other state and local government enterprises	
	377	Advertising and related services	
3.2.10	Traffic Flow Improvements	239	Other communications equipment manufacturing
		294	All other transportation equipment manufacturing
		369	Architectural, engineering, and related services
		432	Other state and local government enterprises
	Truck Stop Electrification	226	Pump and pumping equipment manufacturing
		294	All other transportation equipment manufacturing
		319	Wholesale trade businesses
		326	Retail Stores - Gasoline Stations
		389	Other support services
		432	Other state and local government enterprises
Timing of Highway Construction Schedules	375	Environmental and other technical consulting services	
	432	Other state and local government enterprises	
Electronic Toll Collection	239	Other communications equipment manufacturing	
	369	Architectural, engineering, and related services	
Traffic Signal Synchronization	432	Other state and local government enterprises	
	369	Architectural, engineering, and related services	
		432	Other state and local government enterprises



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft

RESI of Towson University

Strategy	Subprogram	IMPLAN Code	Description
	Variable Message Signs	239	Other communications equipment manufacturing
		369	Architectural, engineering, and related services
		432	Other state and local government enterprises
	Telework Partnership With Employers	377	Advertising and related services
		432	Other state and local government enterprises
	Smart Card Implementation	294	All other transportation equipment manufacturing
		432	Other state and local government enterprises
	Light-Emitting Diode Traffic Signals	239	Other communications equipment manufacturing
		260	Lighting fixture manufacturing
		294	All other transportation equipment manufacturing
369		Architectural, engineering, and related services	
432		Other state and local government enterprises	
20		Extraction of oil and natural gas	
Vehicle Technologies	28	Drilling oil and gas wells	
	29	Support activities for oil and gas operations	
	31	Electric power generation, transmission, and distribution	
	276	Automobile manufacturing	
	283	Motor vehicle parts manufacturing	
	326	Retail Stores - Gasoline stations	
	375	Environmental and other technical consulting services	
	432	Other state and local government enterprises	
	20	Extraction of oil and natural gas	
	28	Drilling oil and gas wells	
Transportation Fuels	29	Support activities for oil and gas operations	
	31	Electric power generation, transmission, and distribution	
	375	Environmental and other technical consulting services	
	381	Management of companies and enterprises	
	432	Other state and local government enterprises	
<i>Other Areas</i>		<i>See 3.2.14 and 3.2.15</i>	
3.2.11	Vehicle-to-Grid (V2G)	31	Electric power generation, transmission, and distribution
		36	Construction of other new nonresidential structures
		294	All other transportation equipment manufacturing



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft

RESI of Towson University

Strategy	Subprogram	IMPLAN Code	Description
Electric Vehicles		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		432	Other state and local government enterprises
		31	Electric power generation, transmission, and distribution
		36	Construction of other new nonresidential structures
		294	All other transportation equipment manufacturing
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		432	Other state and local government enterprises
		36	Construction of other new nonresidential structures
Maryland Electric Vehicles Initiative		226	Pump and pumping equipment manufacturing
		283	Motor vehicle parts manufacturing
		294	All other transportation equipment manufacturing
		319	Wholesale trade businesses
		326	Retail Stores - Gasoline Stations
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		389	Other support services
		414	Automotive repair and maintenance, except car washes
		432	Other state and local government enterprises
Maryland Transit Administration Support for Howard County Electric Bus Project		283	Motor vehicle parts manufacturing
		294	All other transportation equipment manufacturing
		319	Wholesale trade businesses
		377	Advertising and related services
		432	Other state and local government enterprises
Clean and Efficient Strategies		36	Construction of other new nonresidential structures
		283	Motor vehicle parts manufacturing
		294	All other transportation equipment manufacturing
		369	Architectural, engineering, and related services
		414	Automotive repair and maintenance, except car washes
Baltimore City Electric Vehicles Infrastructure		432	Other state and local government enterprises
		31	Electric power generation, transmission, and distribution
		36	Construction of other new nonresidential structures



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft
 RESI of Towson University

Strategy	Subprogram	IMPLAN Code	Description	
3.2.12	Howard Transit Paratransit Fleet Replacement Vehicles	294	All other transportation equipment manufacturing	
		369	Architectural, engineering, and related services	
		375	Environmental and other technical consulting services	
		432	Other state and local government enterprises	
	Clean and Efficient Strategies		283	Motor vehicle parts manufacturing
			294	All other transportation equipment manufacturing
			319	Wholesale trade businesses
			432	Other state and local government enterprises
			277	Light truck and utility vehicle manufacturing
			278	Heavy duty truck manufacturing
			279	Motor vehicle body manufacturing
			283	Motor vehicle parts manufacturing
	294	All other transportation equipment manufacturing		
	369	Architectural, engineering, and related services		
	414	Automotive repair and maintenance, except car washes		
	432	Other state and local government enterprises		
3.2.13	<i>Evaluating GHG Emissions Impacts of Major Projects</i>	<i>OMITTED</i>	<i>OMITTED</i>	
3.2.14	Compressed Natural Gas Buses	32	Natural gas distribution	
		283	Motor vehicle parts manufacturing	
		294	All other transportation equipment manufacturing	
		319	Wholesale trade businesses	
	Air Emissions Reductions	432	Other state and local government enterprises	
		31	Electric power generation, transmission, and distribution	
		32	Natural gas distribution	
		375	Environmental and other technical consulting services	
	BW1 Energy Audit	432	Other state and local government enterprises	
		375	Environmental and other technical consulting services	
		432	Other state and local government enterprises	
		31	Electric power generation, transmission, and distribution	
BW1 Utility Master Plan	32	Natural gas distribution		
	33	Water, sewage and other treatment and delivery systems		
	315	Telecommunications		



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft

RESI of Towson University

Strategy	Subprogram	IMPLAN Code	Description
	BWI Energy Efficiency	375	Environmental and other technical consulting services
		432	Other state and local government enterprises
		39	Maintenance & repair construction of nonresidential structures
		214	Air purification and ventilation equipment manufacturing
		215	Heating equipment (except warm air furnaces)
		216	Air conditioning, refrigeration, and warm air heating equipment manufacturing
		260	Lighting fixture manufacturing
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		432	Other state and local government enterprises
		332	Transport by air
		375	Environmental and other technical consulting services
		432	Other state and local government enterprises
		375	Environmental and other technical consulting services
432	Other state and local government enterprises		
3.2.15	Port of Baltimore Initiatives	207	Other industrial machinery manufacturing
		277	Light truck and utility vehicle manufacturing
		278	Heavy duty truck manufacturing
		283	Motor vehicle parts manufacturing
		294	All other transportation equipment manufacturing
		319	Wholesale trade businesses
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		432	Other state and local government enterprises
		225	Other engine equipment manufacturing
3.2.16	Auxiliary Power Units for Existing Locomotives	294	All other transportation equipment manufacturing
		319	Wholesale trade businesses
		336	Transit and ground passenger transportation
		338	Scenic and sightseeing transportation and support activities
		375	Environmental and other technical consulting services
		417	Commercial and industrial machinery and equipment repair
		432	Other state and local government enterprises



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft

RESI of Towson University

Strategy	Subprogram	IMPLAN Code	Description
3.2.17	Renewable Fuels Standard	225	Other engine equipment manufacturing
		294	All other transportation equipment manufacturing
		319	Wholesale trade businesses
		336	Transit and ground passenger transportation
		338	Scenic and sightseeing transportation and support activities
		375	Environmental and other technical consulting services
		377	Advertising and related services
		417	Commercial and industrial machinery and equipment repair
		432	Other state and local government enterprises
		20	Extraction of oil and natural gas
		28	Drilling oil and gas wells
		29	Support activities for oil and gas operations
		381	Management of companies and enterprises
375	Environmental and other technical consulting services		
432	Other state and local government enterprises		
3.2.18	Café Standards: Model Years 2008-2011	276	Automobile manufacturing
		277	Light truck and utility vehicle manufacturing
		279	Motor vehicle body manufacturing
		283	Motor vehicle parts manufacturing
		319	Wholesale trade businesses
		320	Retail Stores - Motor vehicle and parts
		335	Transport by truck
		375	Environmental and other technical consulting services
		432	Other state and local government enterprises
		36	Construction of other new nonresidential structures
		226	Pump and pumping equipment manufacturing
		283	Motor vehicle parts manufacturing
		294	All other transportation equipment manufacturing
319	Wholesale trade businesses		
326	Retail Stores - Gasoline Stations		
369	Architectural, engineering, and related services		
375	Environmental and other technical consulting services		
389	Other support services		
3.2.19	Electric Vehicle Infrastructure Program	36	Construction of other new nonresidential structures
		226	Pump and pumping equipment manufacturing
		283	Motor vehicle parts manufacturing
		294	All other transportation equipment manufacturing
		319	Wholesale trade businesses
		326	Retail Stores - Gasoline Stations
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		389	Other support services



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft

RESI of Towson University

Strategy	Subprogram	IMPLAN Code	Description
		414	Automotive repair and maintenance, except car washes
		432	Other state and local government enterprises
	Maryland Hybrid Truck Goods Movement Initiative	278	Heavy duty truck manufacturing
		319	Wholesale trade businesses
		432	Other state and local government enterprises
		357	Insurance carriers
3.2.20	Pay-As-You-Drive Insurance	358	Insurance agencies, brokerages, and related agencies
		375	Environmental and other technical consulting services
		432	Other state and local government enterprises
Agriculture			
		15	Forestry, forest products, and timber tract production
		16	Commercial logging
		19	Support activities for agriculture and forestry
3.3.1	Managing Forests to Capture Carbon	95	Sawmills and wood preservation
		375	Environmental and other technical consulting services
		381	Management of companies and enterprises
		424	Grantmaking, giving, and social advocacy organizations
		432	Other state and local government enterprises
		19	Support activities for agriculture and forestry
		33	Water, sewage and other treatment and delivery
		36	Construction of other new nonresidential structures
	Wetland Markets	39	Maintenance & repair construction of nonresident structures
		375	Environmental and other technical consulting services
		381	Management of companies and enterprises
		432	Other state and local government enterprises
3.3.2		19	Support activities for agriculture and forestry
		33	Water, sewage and other treatment and delivery
		36	Construction of other new nonresidential structures
		39	Maintenance & repair construction of nonresident structures
		375	Environmental and other technical consulting services
		381	Management of companies and enterprises
		432	Other state and local government enterprises
		19	Support activities for agriculture and forestry
		33	Water, sewage and other treatment and delivery
		36	Construction of other new nonresidential structures
	Stream and Waterway Markets	39	Maintenance & repair construction of nonresident structures
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		381	Management of companies and enterprises
		432	Other state and local government enterprises



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft

RESI of Towson University

Strategy	Subprogram	IMPLAN Code	Description
Forest Markets		6	Greenhouse, nursery, and floriculture production
		15	Forestry, forest products, and timber tract production
		19	Support activities for agriculture and forestry
		36	Construction of other new nonresidential structures
		39	Maintenance & repair construction of nonresident structures
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		381	Management of companies and enterprises
		432	Other state and local government enterprises
		19	Support activities for agriculture and forestry
		33	Water, sewage and other treatment and delivery
		36	Construction of other new nonresidential structures
		39	Maintenance & repair construction of nonresident structures
Critical Area Markets		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		381	Management of companies and enterprises
		432	Other state and local government enterprises
		6	Greenhouse, nursery, and floriculture production
		19	Support activities for agriculture and forestry
		36	Construction of other new nonresidential structures
		39	Maintenance & repair construction of nonresident structures
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		381	Management of companies and enterprises
		424	Grantmaking, giving, and social advocacy organizations
		432	Other state and local government enterprises
Species and Habitat Markets		19	Support activities for agriculture and forestry
		375	Environmental and other technical consulting services
		381	Management of companies and enterprises
		432	Other state and local government enterprises
		6	Greenhouse, nursery, and floriculture production
		19	Support activities for agriculture and forestry
		36	Construction of other new nonresidential structures
		39	Maintenance & repair construction of nonresident structures
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		381	Management of companies and enterprises
		424	Grantmaking, giving, and social advocacy organizations
		432	Other state and local government enterprises
Nutrient Markets		19	Support activities for agriculture and forestry
		375	Environmental and other technical consulting services
		381	Management of companies and enterprises
		432	Other state and local government enterprises
Carbon Markets: RGGI and Maryland CO2 Budget Trading Program Offsets		31	Electric power generation, transmission, and distribution
		375	Environmental and other technical consulting services
		381	Management of companies and enterprises



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft

RESI of Towson University

Strategy	Subprogram	IMPLAN Code	Description
		432	Other state and local government enterprises
		31	Electric power generation, transmission, and distribution
	Carbon Markets: GGRA of 2009 - Offsets and Early Reductions	375	Environmental and other technical consulting services
		381	Management of companies and enterprises
		432	Other state and local government enterprises
	Carbon Markets: GGRA of 2009 - Nutrient Trading with Carbon Co-benefits	375	Environmental and other technical consulting services
		381	Management of companies and enterprises
		432	Other state and local government enterprises
		15	Forestry, forest products, and timber tract production
		19	Support activities for agriculture and forestry
		31	Electric power generation, transmission, and distribution
		36	Construction of other new nonresidential structures
	Biomass Markets	39	Maintenance & repair construction of nonresident structures
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		381	Management of companies and enterprises
		432	Other state and local government enterprises
		6	Greenhouse, nursery, and floriculture production
		31	Electric power generation, transmission, and distribution
		319	Wholesale trade businesses
3.3.3	Increasing Urban Trees to Capture Carbon	375	Environmental and other technical consulting services
		388	Services to buildings and dwellings
		432	Other state and local government enterprises
		19	Support activities for agriculture and forestry
		33	Water, sewage and other treatment and delivery
		36	Construction of other new nonresidential structures
		39	Maintenance & repair construction of nonresidential structures
3.3.4	Creating and Protecting Wetlands and Waterway Borders to Capture Carbon	95	Sawmills and wood preservation
		127	Plastics material and resin manufacturing
		375	Environmental and other technical consulting services
		424	Grantmaking, giving, and social advocacy organizations
		432	Other state and local government enterprises
3.3.5	Geological Opportunities to Store Carbon	30	Support activities for other mining



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft

RESI of Towson University

Strategy	Subprogram	IMPLAN Code	Description
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		376	Scientific research and development services
		432	Other state and local government enterprises
		6	Greenhouse, nursery, and floriculture production
		19	Support activities for agriculture and forestry
		33	Water, sewage and other treatment and delivery
		36	Construction of other new nonresidential structures
3.3.6	Planting Forests in Maryland	39	Maintenance & repair construction of nonresidential structures
		95	Sawmills and wood preservation
		319	Wholesale trade businesses
		375	Environmental and other technical consulting services
		424	Grantmaking, giving, and social advocacy organizations
		432	Other state and local government enterprises
		15	Forestry, forest products, and timber tract production
		19	Support activities for agriculture and forestry
		31	Electric power generation, transmission, and distribution
3.3.7	Expanded Use of Forests and Feedstocks for Energy Production	36	Construction of other new nonresidential structures
		39	Maintenance & repair construction of nonresidential structures
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		432	Other state and local government enterprises
		19	Support activities for agriculture and forestry
		36	Construction of other new nonresidential structures
		39	Maintenance & repair construction of nonresidential structures
3.3.8	Conservation of Agricultural Land for GHG Benefits	369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		424	Grantmaking, giving, and social advocacy organizations
		432	Other state and local government enterprises
		319	Wholesale trade businesses
3.3.9	Buy Local for GHG Benefits	324	Retail Stores - Food and beverage
		375	Environmental and other technical consulting services
		377	Advertising and related services



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft

RESI of Towson University

Strategy	Subprogram	IMPLAN Code	Description
		413	Food services and drinking places
		425	Civic, social, professional, and similar organizations
		432	Other state and local government enterprises
		19	Support activities for agriculture and forestry
		33	Water, sewage and other treatment and delivery services
		36	Construction of other new nonresidential structures
		39	Maintenance & repair construction of nonresidential structures
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		381	Management of companies and other enterprises
		390	Waste management and remediation services
		432	Other state and local government enterprises
			Recycling
		33	Water, sewage and other treatment and delivery
		375	Environmental and other technical consulting services
		390	Waste management and remediation services
		432	Other state and local government enterprises
			Multisector
			<i>Greenhouse Gas Emissions Inventory</i>
			<i>Development</i>
			<i>OMITTED</i>
			<i>OMITTED</i>
			<i>Program Analysis, Goals, and Overall Implementation</i>
			<i>OMITTED</i>
			<i>OMITTED</i>
		350	Internet publishing and broadcasting
		352	Data processing, hosting, ISP, web search portals
		375	Environmental and other technical consulting services
		377	Advertising and related services
		432	Other state and local government enterprises
			Buildings
		36	Construction of new nonresidential structures
		39	Maintenance & repair construction of nonresidential structures
		375	Environmental and other technical consulting services
		432	Other state and local government enterprises
		31	Electric power generation, transmission, and distribution



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft

RESI of Towson University

Strategy	Subprogram	IMPLAN Code	Description
		34	Construction of new nonresidential commercial and healthcare structures
		39	Maintenance & repair construction of nonresidential structures
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		432	Other state and local government enterprises
Land Use			
		36	Construction of other new nonresidential structures
	Reducing GHG Emissions from the Transportation Sector through Land Use and Location Efficiency	369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		432	Other state and local government enterprises
3.7.1	Sustainable Communities Tax Credit	375	Environmental and other technical consulting services
	PlanMaryland	432	Other state and local government enterprises
		36	Construction of other new nonresidential structures
3.7.2	Transportation GHG Targets for Local Governments and Metropolitan Planning Organizations	369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		432	Other state and local government enterprises
		36	Construction of other new nonresidential structures
		38	Construction of other new residential structures
3.7.3	Funding Mechanisms for Smart Growth	39	Maintenance & repair construction of nonresidential structures
		40	Maintenance & repair construction of residential structures
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		432	Other state and local government enterprises
		36	Construction of other new nonresidential structures
		38	Construction of other new residential structures
3.7.4	GHG Benefits from Priority Funding Areas and Other Growth Boundaries	39	Maintenance & repair construction of nonresidential structures
		40	Maintenance & repair construction of residential structures
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		424	Grantmaking, giving, and social advocacy organizations



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft
 RESI of Towson University

Strategy	Subprogram	IMPLAN Code	Description
Innovative Initiatives			
		432	Other state and local government enterprises
3.8.1	Leadership-by-Example - Local Government	31	Electric power generation, transmission, and distribution
		33	Water, sewage and other treatment and delivery
		34	Construction of new nonresidential commercial and healthcare structures
		39	Maintenance & repair construction of nonresidential structures
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		390	Waste management and remediation services
		432	Other state and local government enterprises
3.8.2	Leadership-by-Example - Federal Government	31	Electric power generation, transmission, and distribution
		33	Water, sewage and other treatment and delivery
		34	Construction of new nonresidential commercial and healthcare structures
		39	Maintenance & repair construction of nonresidential structures
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		390	Waste management and remediation services
		429	Other federal government enterprises
3.8.3	Leadership-by-Example – Maryland Colleges and Universities	31	Electric power generation, transmission, and distribution
		33	Water, sewage and other treatment and delivery
		36	Construction of other new nonresidential structures
		39	Maintenance & repair construction of nonresidential structures
		261	Small electrical appliance manufacturing
		319	Wholesale trade businesses
		332	Transport by air
		336	Transit and ground passenger transportation
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		390	Waste management and remediation services
		392	Private junior colleges, colleges, universities
		432	Other state and local government enterprises



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft

RESI of Towson University

Strategy	Subprogram	IMPLAN Code	Description
3.8.4	Greenhouse Gas Early Voluntary Reductions	31	Electric power generation, transmission, and distribution
		33	Water, sewage and other treatment and delivery
		34	Construction of new nonresidential commercial and healthcare structures
		36	Construction of other new nonresidential structures
		39	Maintenance & repair construction of nonresidential structures
		369	Architectural, engineering, and related services
		375	Environmental and other technical consulting services
		390	Waste management and remediation services
		432	Other state and local government enterprises
		3.8.5	Maryland Environmental Footprint
36	Construction of other new nonresidential structures		
39	Maintenance & repair construction of nonresidential structures		
369	Architectural, engineering, and related services		
375	Environmental and other technical consulting services		
432	Other state and local government enterprises		
319	Wholesale trade businesses		
375	Environmental and other technical consulting services		
432	Other state and local government enterprises		
See 3.8.6	See 3.8.6		
3.8.6	Maryland Environmental Footprint	31	Electric power generation, transmission, and distribution
		375	Environmental and other technical consulting
		432	Other state and local government enterprises
		31	Electric power generation, transmission, and distribution
		215	Heating equipment (except warm air furnaces)
		243	Semiconductor and related device manufacturing
		375	Environmental and other technical consulting
		432	Other state and local government enterprises
		31	Electric power generation, transmission, and distribution
		33	Water, sewage, and other treatment and delivery
3.8.6	Maryland Environmental Footprint	319	Wholesale trade businesses
		385	Facilities support services
		388	Services to buildings and dwellings



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft
 RESI of Towson University

Strategy	Subprogram	IMPLAN Code	Description
3.8.7	Job Creation and Economic Development Initiatives	390	Waste management and remediation services
		375	Environmental and other technical consulting services
		432	Other state and local government enterprises
3.8.8	Public Health Initiatives Related to Climate Change	375	Environmental and other technical consulting services
		432	Other state and local government enterprises
		345	Software publishers
		353	Other information services
		357	Insurance carriers
		375	Environmental and other technical consulting services
		396	Medical and diagnostic labs and outpatient care centers
3.8.9	Title V Permits for GHG Sources	394	Offices of physicians, dentists, and other health practitioners
		397	Private hospitals
		432	Other state and local government enterprises
		352	Data processing, hosting, ISP, web search portals
		376	Scientific research and development services
		375	Environmental and other technical consulting services
		432	Other state and local government enterprises

Source: IMPLAN



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft
 RESI of Towson University

Figure 375: IMPLAN Industry Codes—Operation Phase

Strategy	Subprogram	IMPLAN Code	Description
Energy			
3.1.1	Regional Greenhouse Gas Initiative	432	Other state and local government enterprises
3.1.2	Greenhouse Gas Reductions from Imported Power	31	Electric power generation, transmission, and distribution
3.1.3	Greenhouse Gas New Source Performance Standard	31	Electric power generation, transmission, and distribution
3.1.4	Maximum Achievable Control Technology (MACT)	31	Electric power generation, transmission, and distribution
3.1.5	<i>GHG Prevention of Significant Deterioration Permitting Program</i>	OMITTED	OMITTED
	EmPOWER Maryland Empowering Finance Initiative	10001 - 10009	Households - All income levels
	EmPOWER Maryland Residential Incentives	10001 - 10009	Households - All income levels
	MEA Home Performance Rebate Program	10001 - 10009	Households - All income levels
	DHCD Weatherization	10001 - 10009	Households - All income levels
3.1.6	Clean Energy Communities Grant	10001 - 10009	Households - All income levels
	Maryland Home Energy Loan Program	10001 - 10009	Households - All income levels
	Energy Workforce Training	10001 - 10009	Households - All income levels
	State Energy Efficiency Appliance Rebate Program	10001 - 10009	Households - All income levels
	Maryland Save Energy Now	381	Management of companies and enterprises
	Jane E. Lawton Conservation Loan Program	381	Management of companies and enterprises
3.1.7	Energy Efficiency and Conservation Block Grant Program	381	Management of companies and enterprises
	State Agencies Loan Program	381	Management of companies and enterprises
	Programs Under Consideration	381	Management of companies and enterprises
	<i>Existing Programs</i>	See elsewhere	See elsewhere
3.1.8	Programs Under Consideration	381	Management of companies and enterprises
		10001 - 10009	Households - All income levels
3.1.9	Energy Efficiency in the Power Sector - General	31	Electric power generation, transmission, and distribution
	Energy Efficiency in the Power Sector - BGE	31	Electric power generation, transmission, and distribution
	Energy Efficiency in the Power Sector - PEPSCO	31	Electric power generation, transmission, and distribution
	Energy Efficiency in the Power Sector - SMECO	31	Electric power generation, transmission, and distribution
3.1.10	Energy Efficiency in the Power Sector - Potomac Edison	31	Electric power generation, transmission, and distribution
	Energy Efficiency in the Power Sector - Delmarva Power	31	Electric power generation, transmission, and distribution
3.1.11	Maryland Renewable Energy Portfolio Standard	31	Electric power generation, transmission, and distribution
		381	Management of companies and enterprises
		10001 - 10009	Households - All income levels
3.1.12	Commercial Clean Energy Grant Program	381	Management of companies and enterprises



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft

RESI of Towson University

Strategy	Subprogram	IMPLAN Code	Description
	Residential Clean Energy Grants Program	10001 - 10009	Households - All income levels
	Clean Energy Incentive Tax Credit Program	381	Management of companies and enterprises
	Generating Clean Horizons Program	10001 - 10009	Households - All income levels
	Project Sunburst	432	Other state and local government enterprises
	Biomass Programs	381	Management of companies and enterprises
	Land-based Wind Programs	381	Management of companies and enterprises
	Offshore Wind Initiatives to Support Renewable Energy	10001 - 10009	Households - All income levels
3.1.13		381	Management of companies and enterprises
3.1.14	Combined Heat and Power	31	Electric power generation, transmission, and distribution
3.1.15	Main Street Initiatives	381	Management of companies and enterprises
3.1.16	Energy Efficiency for Affordable Housing	10001 - 10009	Households - All income levels
	Transportation		
3.2.1	Maryland Clean Cars Program	10001 - 10009	Households - All income levels
3.2.2	National Fuel Efficiency and Emissions Standards for Medium- and Heavy-Duty Trucks	10001 - 10009	Households - All income levels
3.2.3	Clean Fuel Standard	335	Transport by truck
		10001 - 10009	Households - All income levels
		332	Transport by air
		333	Transport by rail
		334	Transport by water
		335	Transport by truck
3.2.4	Transportation and Climate Initiative	336	Transit and ground passenger transportation
		338	Scenic and sightseeing transportation and support activities
3.2.5	Charm City Circulator and Hampden Neighborhood Shuttle	10001 - 10009	Households - All income levels
	Locally Operated Transit Systems	432	Other state and local government enterprises
	Smart Card Implementation	10001 - 10009	Households - All income levels
	Transit-Oriented Development	10001 - 10009	Households - All income levels



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft

RESI of Towson University

Strategy	Subprogram	IMPLAN Code	Description
	Maryland Commuter Tax Credit	10001 - 10009	Households - All income levels
	Guaranteed Ride Home	10001 - 10009	Households - All income levels
	College Pass	10001 - 10009	Households - All income levels
	Ride Share	10001 - 10009	Households - All income levels
	Commuter Connections – Washington, D.C. Region	10001 - 10009	Households - All income levels
	Baltimore Collegetown Network	10001 - 10009	Households - All income levels
	Hunt Valley Shuttle	10001 - 10009	Households - All income levels
	Kent Street Transit Plaza	10001 - 10009	Households - All income levels
	University of Maryland College Park Carpool Program and Shuttle Bus Service	10001 - 10009	Households - All income levels
	<i>PlanMaryland</i>	<i>See 3.7.1</i>	<i>See 3.7.1</i>
	MARC East Baltimore Station	10001 - 10009	Households - All income levels
3.2.6	Expanded Transit (Purple Line, Corridor Cities Transitway, Red Line)	10001 - 10009	Households - All income levels
	MARC Growth and Investment Plan	10001 - 10009	Households - All income levels
3.2.7	MARC Station Parking Enhancements	336	Transit and ground passenger transportation
	Refurbishing MARC and Other Rail Vehicles	10001 - 10009	Households - All income levels
	Update on Maryland High Speed Rail	336	Transit and ground passenger transportation
	Bicycle/Pedestrian Enhancements	10001 - 10009	Households - All income levels
	Bike Racks on Buses, MARC, Subway, Light Rail	10001 - 10009	Households - All income levels
	Construction of Bike Lanes and Bike Paths	10001 - 10009	Households - All income levels
3.2.8	East Coast Greenway	10001 - 10009	Households - All income levels
	Bike Stations	10001 - 10009	Households - All income levels
	Bike Rentals	10001 - 10009	Households - All income levels
	Bike Racks	10001 - 10009	Households - All income levels
	Electronic Toll Collection	10001 - 10009	Households - All income levels
	High Occupancy Toll Lanes	10001 - 10009	Households - All income levels
3.2.9	VMT Fees	432	Other state and local government enterprises
	Congestion Pricing and Managed Lanes	10001 - 10009	Households - All income levels
	Parking Impact Fees	432	Other state and local government enterprises
	Employer Commute Incentives	10001 - 10009	Households - All income levels
3.2.10	Traffic Flow Improvements	335	Transport by truck
		10001 - 10009	Households - All income levels



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft
 RESI of Towson University

Strategy	Subprogram	IMPLAN Code	Description
	Truck Stop Electrification	335	Transport by truck
	Timing of Highway Construction Schedules	335	Transport by truck
	Electronic Toll Collection	10001 - 10009	Households - All income levels
	Traffic Signal Synchronization	10001 - 10009	Households - All income levels
	Variable Message Signs	335	Transport by truck
	Telework Partnership With Employers	10001 - 10009	Households - All income levels
	Smart Card Implementation	10001 - 10009	Households - All income levels
	Light-Emitting Diode Traffic Signals	432	Other state and local government enterprises
	Vehicle Technologies	335	Transport by truck
	Transportation Fuels	10001 - 10009	Households - All income levels
	<i>Other Areas</i>	432	Other state and local government enterprises
		<i>See 3.2.14 and 3.2.15</i>	<i>See 3.2.14 and 3.2.15</i>
	Vehicle-to-Grid (V2G)	31	Electric power generation, transmission, and distribution
	Electric Vehicles	10001 - 10009	Households - All income levels
	Maryland Electric Vehicles Initiative	10001 - 10009	Households - All income levels
3.2.11	Maryland Transit Administration Support for Howard County Electric Bus Project	432	Households - All income levels
	Clean and Efficient Strategies	432	Other state and local government enterprises
	Baltimore City Electric Vehicles Infrastructure	10001 - 10009	Households - All income levels
3.2.12	Howard Transit Paratransit Fleet Replacement Vehicles	432	Other state and local government enterprises
	Clean and Efficient Strategies	432	Other state and local government enterprises
3.2.13	<i>Evaluating GHG Emissions Impacts of Major Projects</i>	<i>OMITTED</i>	<i>OMITTED</i>
	Compressed Natural Gas Buses	332	Transport by air
	Air Emissions Reductions	332	Transport by air
	BWI Energy Audit	332	Transport by air
3.2.14	BWI Utility Master Plan	332	Transport by air
	BWI Energy Efficiency	332	Transport by air
	Enhanced Access to BWI by Other Travel Modes	332	Transport by air
	BWI's Periodic Air Quality Assessments	332	Transport by air



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft

RESI of Towson University

Strategy	Subprogram	IMPLAN Code	Description
3.2.15	Port of Baltimore Initiatives	334	Transport by water
		335	Transport by truck
	Auxiliary Power Units for Existing Locomotives	333	Transport by rail
		336	Transit and ground passenger transportation
3.2.16	Technology Advances for Existing Locomotives	338	Scenic and sightseeing transportation and support activities
		333	Transport by rail
	Technology Advances for Non-highway Vehicles	336	Transit and ground passenger transportation
		338	Scenic and sightseeing transportation and support activities
3.2.17	Renewable Fuels Standard	10001 - 10009	Households - All income levels
3.2.18	CAFE Standards: Model Years 2008-2011	10001 - 10009	Households - All income levels
3.2.19	Electric Vehicle Infrastructure Program	10001 - 10009	Households - All income levels
	Maryland Hybrid Truck Goods Movement Initiative	335	Transport by truck
3.2.20	Pay-As-You-Drive Insurance	10001 - 10009	Households - All income levels
Agriculture			
3.3.1	Managing Forests to Capture Carbon	381	Management of companies and enterprises
	Wetland Markets	381	Management of companies and enterprises
	Stream and Waterway Markets	381	Management of companies and enterprises
	Forest Markets	381	Management of companies and enterprises
	Critical Area Markets	381	Management of companies and enterprises
	Species and Habitat Markets	381	Management of companies and enterprises
	Nutrient Markets	381	Management of companies and enterprises
	Carbon Markets: RGGI and Maryland CO2 Budget Trading Program Offsets	432	Other state and local government enterprises
	Carbon Markets: GGRA of 2009 - Offsets and Early Reductions	381	Management of companies and enterprises
	Carbon Markets: GGRA of 2009 - Nutrient Trading with Carbon Co-benefits	381	Management of companies and enterprises
3.3.2	Biomass Markets	381	Management of companies and enterprises
	Increasing Urban Trees to Capture Carbon	381	Management of companies and enterprises
3.3.3	Creating and Protecting Wetlands and Waterway Borders to Capture Carbon	10001 - 10009	Households - All income levels
3.3.4	Geological Opportunities to Store Carbon	381	Management of companies and enterprises
	Planting Forests in Maryland	10001 - 10009	Households - All income levels



Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft
 RESI of Towson University

Strategy	Subprogram	IMPLAN Code	Description
3.3.7	Expanded Use of Forests and Feedstocks for Energy Production	31	Electric power generation, transmission, and distribution
3.3.8	Conservation of Agricultural Land for GHG Benefits	10001 - 10009	Households - All income levels
3.3.9	Buy Local for GHG Benefits	319	Wholesale trade businesses
3.3.10	Nutrient Trading for GHG Benefits	381	Management of companies and enterprises
Recycling			
3.4.1	Recycling and Source Reduction	381	Management of companies and enterprises
		432	Other state and local government enterprises
Multisector			
3.5.1	<i>Greenhouse Gas Emissions Inventory Development</i>	<i>OMITTED</i>	<i>OMITTED</i>
3.5.2	<i>Program Analysis, Goals, and Overall Implementation</i>	<i>OMITTED</i>	<i>OMITTED</i>
3.5.3	Outreach and Public Education	10001 - 10009	Households - All income levels
Buildings			
3.6.1	Green Buildings	381	Management of companies and enterprises
3.6.2	Building and Trade Codes in Maryland	381	Management of companies and enterprises
		10001 - 10009	Households - All income levels
Land Use			
3.7.1	Reducing GHG Emissions from the Transportation Sector through Land Use and Location Efficiency	10001 - 10009	Households - All income levels
	Sustainable Communities Tax Credit	381	Management of companies and enterprises
	PlanMaryland	10001 - 10009	Households - All income levels
3.7.2	Transportation GHG Targets for Local Governments and Metropolitan Planning Organizations	432	Other state and local government enterprises
3.7.3	Funding Mechanisms for Smart Growth	432	Other state and local government enterprises
3.7.4	GHG Benefits from Priority Funding Areas and Other Growth Boundaries	10001 - 10009	Households - All income levels
Innovative Initiatives			
3.8.1	Leadership-by-Example - Local Government	432	Other state and local government enterprises
3.8.2	Leadership-by-Example - Federal Government	429	Other federal government enterprises
3.8.3	Leadership-by-Example - Maryland Colleges and Universities	392	Private junior colleges, colleges, and universities
		432	Other state and local government enterprises
3.8.4	Greenhouse Gas Early Voluntary Reductions	381	Management of companies and enterprises
3.8.5	High Performance Buildings	432	Other state and local government enterprises
	Green Maryland Act of 2010	432	Other state and local government enterprises

**Appendices A and B to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft**

RESI of Towson University

Strategy	Subprogram	IMPLAN Code	Description
	Maryland Environmental Footprint	See 3.8.6	See 3.8.6
	Generating Clean Horizons Program	432	Other state and local government enterprises
	Project Sumburst	381	Management of companies and enterprises
3.8.6	Maryland Environmental Footprint	432	Other state and local government enterprises
3.8.7	Job Creation and Economic Development Initiatives	432	Other state and local government enterprises
		10001 - 10009	Households - All income levels
3.8.9	Title V Permits for GHG Sources	432	Other state and local government enterprises

Source: IMPLAN



Appendices to Economic Impact Analysis for the GGRA 2012 Plan**Task Order #2—Final Draft**

RESI of Towson University

B.4 Modeling Example**Overview**

For the purpose of providing a transparent and accessible analysis, an example of the steps undertaken by RESI (the modeling assumptions) and their results for one strategy with all of its subprograms for both phases has been included below. First, RESI determined the IMPLAN industry codes which would be affected by the strategy and its subprograms. Next, RESI determined the dollar values to be applied for the investment phase as well as the operation phase. The strategy modeled as an example is “Intercity Transportation Initiatives,” under Transportation.

According to the strategy write-up provided by MDE, three subprograms have been designed for this strategy: MARC Station Parking Enhancements, Refurbishing MARC and Other Rail Vehicles, and Update on Maryland High Speed Rail. The subprograms were modeled separately as each involves unique goals.

Assumptions***Investment Phase***

1. Determine IMPLAN industry sectors which will receive investment funds for each subprogram under the strategy.
 - a. MARC Station Parking Enhancements
 - i. 36—Construction of other new nonresidential structures
 - ii. 39—Maintenance and repair construction of nonresidential structures
 - iii. 369—Architectural, engineering, and related services
 - iv. 432—Other state and local government enterprises
 - b. Refurbishing MARC and Other Rail Vehicles
 - i. 283—Motor vehicle parts manufacturing
 - ii. 336—Transit and ground passenger transportation
 - iii. 375—Environmental and other technical consulting services
 - iv. 414—Automotive repair and maintenance, except car washes
 - v. 432—Other state and local government enterprises
 - c. Update on Maryland High Speed Rail
 - i. 36—Construction of other new nonresidential structures
 - ii. 225—Other engine equipment manufacturing
 - iii. 289—Railroad and rolling stock manufacturing
 - iv. 294—All other transportation equipment manufacturing
 - v. 319—Wholesale trade businesses
 - vi. 336—Transit and ground passenger transportation
 - vii. 369—Architectural, engineering, and related services
 - viii. 432—Other state and local government enterprises

Appendices to Economic Impact Analysis for the GGRA 2012 Plan

Task Order #2—Final Draft

RESI of Towson University

2. Determine overall cost of strategy implementation for each subprogram under the strategy. If no funding levels have been provided for a strategy, use a per \$1 million basis.
 - a. MARC Station Parking Enhancements
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - b. Refurbishing MARC and Other Rail Vehicles
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - c. Update on Maryland High Speed Rail
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. MARC Station Parking Enhancements
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing strategy—\$300,000 each
 - b. Refurbishing MARC and Other Rail Vehicles
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing strategy—\$225,000 each
 - c. Update on Maryland High Speed Rail
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing strategy—approx. \$128,571.43 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.
6. Scale overall strategy impacts to a per \$1 million basis.

Operation Phase

1. Determine relevant IMPLAN sectors for each subprogram under the strategy.
 - a. MARC Station Parking Enhancements
 - i. 432—Other state and local government enterprises
 - ii. 10001-10009—Households – All income levels
 - b. Refurbishing MARC and Other Rail Vehicles
 - i. 432—Other state and local government enterprises
 - c. Update on Maryland High Speed Rail
 - i. 432—Other state and local government enterprises
 - ii. 10001-10009—Households – All income levels
2. Determine part of subprogram to be affected by savings (from 6.2.3 write-up).
 - a. MARC Station Parking Enhancements
 - i. Phase I—428 new parking spaces
 - ii. Odenton station feasibility study—2,500 additional parking spaces

Appendices to Economic Impact Analysis for the GGRA 2012 Plan

Task Order #2—Final Draft

RESI of Towson University

- b. Refurbishing MARC and Other Rail Vehicles
 - i. 23 cars scheduled to be overhauled between FY 2005 and FY 2012
- c. Update on Maryland High Speed Rail
 - i. \$9.4 million allocation to MDOT for high-speed stimulus to complete environmental and engineering work to replace BWI Station as of Sept. 2010
3. Research savings data for each strategy according to part of subprogram to be affected by savings.
 - a. MARC Station Parking Enhancements
 - i. Average cost of monthly MARC pass—\$349/month (Transit Link Card)²
 - ii. Average cost savings of using public transit—\$9,383/year for Baltimore City³
 - iii. Average cost of MARC station parking—\$6.39/day average (between 7 stations and not including outliers)⁴
 - iv. Note about Transit Link Card data use: A Monthly Transit Link pass is used in the calculations of all rail passes. Often users of the MARC system traveling in and around the metropolitan region of Maryland/Washington, D.C. will wish to visit areas within the city which are accessible through walking or easy-to-navigate light rail systems. Instead of purchasing separate fares for each point of travel, most individuals prefer having one card designated for travel within the region. The cost benefit ranges from easy parking to less time spent searching for dollars to pay for extra fare cards or to add value to existing fare cards. The average cost of monthly fares for MARC has been calculated using the transit link pass over a span of stations from Aberdeen to Washington, D.C.
 - b. Refurbishing MARC and Other Rail Vehicles
 - i. Average cost of monthly MARC pass—\$349/month (Transit Link Card)⁵
 - ii. Capacity of MARC train cars (single-level and bi-level)—121 seats (average)⁶
 - iii. Note about Transit Link Card data use: A Monthly Transit Link pass is used in the calculations of all rail passes. Often users of the MARC system

² "MARC Train Service Order Form." *CommuterDirect.com*. Arlington County Commuter Services, 2011. Web. 19 Aug. 2011.

³ "Riding Public Transit Saves Individuals \$9,242 Annually." *American Public Transportation Association*. American Public Transportation Association, 12 Jan. 2010. Web. 19 Aug. 2011.

⁴ "MARC Train System Parking Information." Maryland Transit Administration. Department of Transportation, Aug. 2010. Web. 19 Aug. 2011.

⁵ "MARC Train Service Order Form." *CommuterDirect.com*. Arlington County Commuter Services, 2011. Web. 19 Aug. 2011.

⁶ "New cars may ease MARC crowding." *The Baltimore Sun*. The Baltimore Sun, 20 Aug. 2008. Web. 19 Aug. 2011.

Appendices to Economic Impact Analysis for the GGRA 2012 Plan

Task Order #2—Final Draft

RESI of Towson University

traveling in and around the metropolitan region of Maryland/Washington, D.C. will wish to visit areas within the city which are accessible through walking or easy-to-navigate light rail systems. Instead of purchasing separate fares for each point of travel, most individuals prefer having one card designated for travel within the region. The cost benefit ranges from easy parking to less time spent searching for dollars to pay for extra fare cards or to add value to existing fare cards. The average cost of monthly fares for MARC has been calculated using the transit link pass over a span of stations from Aberdeen to Washington, D.C.

- c. Update on Maryland High Speed Rail
 - i. Average cost of monthly MARC pass for BWI Rail Station between stations for Baltimore City and Washington, D.C.—\$227/month (Transit Link Card)⁷
 - ii. Number of parking spots at BWI Rail Station—3,187 spots⁸
 - iii. Cost of MARC station parking at BWI Rail Station—\$9/day⁹
 - iv. Cost of BWI Garage (daily)—\$12/day¹⁰
 - v. Note about Transit Link Card data use: A Monthly Transit Link pass is used in the calculations of all rail passes. Often users of the MARC system traveling in and around the metropolitan region of Maryland/Washington, D.C. will wish to visit areas within the city which are accessible through walking or easy-to-navigate light rail systems. Instead of purchasing separate fares for each point of travel, most individuals prefer having one card designated for travel within the region. The cost benefit ranges from easy parking to less time spent searching for dollars to pay for extra fare cards or to add value to existing fare cards. The average cost of fare for the BWI Rail Station has been calculated under the assumption that most tourists will travel from BWI to Baltimore and BWI to Washington, D.C.
- 4. Estimate total annual increase in savings/revenue for each subprogram.
 - a. MARC Station Parking Enhancements
 - i. $432 - [(428 \text{ new Phase I parking spots} + 2,500 \text{ new Odenton parking spots (assume 1 vehicle parked per day)} * \$349/\text{month (assume all buy monthly pass)} * 12 \text{ months})] + [(2,500 \text{ new Odenton parking spots (assume 1 vehicle parked per day)} * \$6.39/\text{day on average (assume all park at station garage)} * 365 \text{ days})] = \text{annual increase in revenue}$

⁷ “MARC Train Service Order Form.” *CommuterDirect.com*. Arlington County Commuter Services, 2011. Web. 19 Aug. 2011.

⁸ “MARC Train System Parking Information.” Maryland Transit Administration. Department of Transportation, Aug. 2010. Web. 19 Aug. 2011.

⁹ *Ibid.*

¹⁰ “Daily Garage.” Parking. Baltimore/Washington International Thurgood Marshall Airport, 2011. Web. 19 Aug. 2011.



Appendices to Economic Impact Analysis for the GGRA 2012 Plan

Task Order #2—Final Draft

RESI of Towson University

- ii. 10001-10009—\$21,642,549 [(428 new Phase I riders + 2,500 new Odenton riders (assume 1 new rider per spot per day) * \$9,383 in savings] - [2,500 new Odenton riders (assume 1 new rider per spot per day) * \$6.39/day on average (assume all park at station garage) * 365 days] = annual savings for riders of \$18,093,339
- b. Refurbishing MARC and Other Rail Vehicles
 - i. 432—(23 cars refurbished (assume still in use in addition to newer cars) * 121 seats per car on average * \$349/month (assume all buy monthly pass) * 12 months = annual increase in revenue of \$11,655,204)
- c. Update on Maryland High Speed Rail
 - i. 432—[(3,187 spots at BWI Rail Station (assume 1 vehicle parked per day) * \$227/month (assume all buy monthly pass) * 12 months)] + [(3,187 spots at BWI Rail Station (assume 1 vehicle parked per day) * \$9/day (assume all park at station) * 365 days)] = annual increase in revenue of \$19,150,683
 - ii. 10001-10009—(3,187 spots at BWI Rail Station (assume 1 vehicle parked per day) * \$3/day savings (comparing \$12/day and \$9/day parking fees) * 365 days = annual savings for riders of \$3,489,765)
5. Input savings by sector into IMPLAN model and run impacts.
 - a. Household savings inputs were distributed among household income ranges using household income distribution percentages taken from the Census' 2005-2009 American Community Survey 5-Year estimates for Maryland. (Note: In some cases, totals do not add up to 100.0 percent due to margin of error.)
6. Export impacts and analyze.

Results

Figures 376 through 378 include the economic and fiscal impacts (based on the steps and research outlined in the previous subsection) of each subprogram as well as the overall strategy for both the investment phase and the operation phase. The example results include the impacts of each separate subprogram under the strategy in order to reflect the process undertaken for each strategy and subprogram. The impacts presented in Section 3.0 reflect the aggregate impacts of all subprograms within a strategy.

Appendices to Economic Impact Analysis for the GGRA 2012 Plan**Task Order #2—Final Draft**

RESI of Towson University

Figure 376: Example Strategy Economic Impacts—Investment Phase

Impact Type	Direct	Indirect	Induced	Total
MARC Station Parking Enhancements				
Employment	7.0	2.4	3.5	12.9
Output	\$1,000,000	\$352,688	\$465,890	\$1,818,578
Wages	\$399,940	\$123,264	\$144,978	\$668,182
Refurbishing MARC and Other Rail Vehicles				
Employment	10.3	2.0	3.3	15.6
Output	\$1,000,000	\$299,537	\$431,479	\$1,731,016
Wages	\$394,537	\$99,644	\$134,269	\$628,450
Update on Maryland High Speed Rail				
Employment	6.2	2.2	2.6	11.0
Output	\$1,000,000	\$345,964	\$341,725	\$1,687,689
Wages	\$289,398	\$114,995	\$106,339	\$510,732
Intercity Transportation Initiatives (Total)				
Employment	23.5	6.6	9.4	39.5
Output	\$3,000,000	\$998,189	\$1,239,094	\$5,237,283
Wages	\$1,083,875	\$337,903	\$385,586	\$1,807,364
Intercity Transportation Initiatives (Scaled)				
Employment	7.8	2.2	3.1	13.2
Output	\$1,000,000	\$332,730	\$413,031	\$1,745,761
Wages	\$361,292	\$112,634	\$128,529	\$602,455

Source: RESI

Appendices to Economic Impact Analysis for the GGRA 2012 Plan**Task Order #2—Final Draft**

RESI of Towson University

Figure 377: Example Strategy Economic Impacts—Operation Phase

Impact Type	Direct	Indirect	Induced	Total
MARC Station Parking Enhancements				
Employment	64.8	69.1	198.3	332.3
Output	\$18,093,338	\$10,908,298	\$26,129,133	\$55,130,769
Wages	\$4,567,938	\$3,456,613	\$8,135,196	\$16,159,747
Refurbishing MARC and Other Rail Vehicles				
Employment	41.7	44.5	32.0	118.2
Output	\$11,655,204	\$7,026,809	\$4,201,871	\$22,883,885
Wages	\$2,942,533	\$2,226,650	\$1,307,540	\$6,476,723
Update on Maryland High Speed Rail				
Employment	68.6	73.2	76.5	218.3
Output	\$19,150,683	\$11,545,760	\$10,065,515	\$40,761,958
Wages	\$4,834,880	\$3,658,612	\$3,132,888	\$11,626,380
Intercity Transportation Initiatives (Annual)				
Employment	175.1	186.8	306.8	668.7
Output	\$48,899,225	\$29,480,868	\$40,396,519	\$118,776,612
Wages	\$12,345,352	\$9,341,875	\$12,575,623	\$34,262,850

Source: RESI

Figure 378: Example Strategy Fiscal Impacts¹¹

Subprogram	Investment Phase	Operation Phase
MARC Station Parking Enhancements	\$25,676	\$1,626,128
Refurbishing MARC and Other Rail Vehicles	\$31,158	\$38,120
Update on Maryland High Speed Rail	\$27,215	\$315,300
<i>Intercity Transportation Initiatives (Total)</i>	<i>\$84,049</i>	<i>\$1,979,548</i>

Source: RESI

¹¹ Total fiscal impacts for the investment phase have been scaled to reflect the per \$1 million invested basis for the overall strategy. The fiscal impacts for the operation phase are on an annual basis.

Appendices C through E
Economic Impact Analysis for the GGRA 2012 Plan
Final Draft

Prepared for
Maryland Department of the Environment

Submitted by



December 30, 2011

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

Table of Contents

Appendix C—Modeling Steps	8
C.1 Energy	8
3.1.1 Regional Greenhouse Gas Initiatives	8
3.1.2 GHG Emission Reductions from Imported Power	9
3.1.3 GHG New Source Performance Standard.....	10
3.1.4 Maximum Achievable Control Technology (MACT)	12
3.1.5 GHG Prevention of Significant Deterioration Permitting Program.....	13
3.1.6 Energy Efficiency in the Residential Sector	15
3.1.7 Energy Efficiency in the Business Community	21
3.1.8 Energy Efficiency Appliances and Other Products	25
3.1.9 Energy Efficiency in the Power Sector – General	27
3.1.10 Energy Efficiency in the Power Sector – Utility Subprograms	28
3.1.11 Maryland Renewable Energy Portfolio Standard	34
3.1.12 Incentives and Grant Programs to Support Renewable Energy.....	36
3.1.13 Offshore Wind Initiatives to Support Renewable Energy	41
3.1.14 Combined Heat and Power	43
3.1.15 Main Street.....	45
3.1.16 Energy Efficiency for Affordable Housing.....	47
C.2 Transportation	48
3.2.1 Maryland Clean Cars Program.....	48
3.2.2 National Fuel Efficiency and Emission Standards for Medium- and Heavy-Duty Trucks	51
3.2.3 Clean Fuel Standard.....	53
3.2.4 Transportation and Climate Initiative	55
3.2.5 Public Transportation Initiatives.....	56
3.2.6 Initiatives to Double Ridership by 2020	68
3.2.7 Intercity Transportation Initiatives	72
3.2.8 Bike and Pedestrian Initiatives.....	76
3.2.9 Pricing Initiatives	84
3.2.10 Transportation Technology Initiatives	90
3.2.11 Electric Vehicles Initiatives	102
3.2.12 Low-Emitting Vehicles Initiatives.....	113
3.2.14 Airport Initiatives.....	116
3.2.15 Port Initiatives.....	121
3.2.16 Freight and Freight Rail Strategies	123
3.2.17 Federal Renewable Fuel Standard	126
3.2.18 Café Standards: Model Years 2008-2011	127
3.2.19 Electric Vehicles Infrastructure	129
3.2.20 Pay-as-You-Drive (PAYD) Insurance	131
C.3 Agriculture and Forestry	133
3.3.1 Managing Forests to Capture Carbon	133
3.3.2 Creating Ecosystem Markets to Encourage GHG Emissions Reductions	134
3.3.3 Increasing Urban Trees to Capture Carbon	142



Regional Economic Studies Institute

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.3.4	Creating and Protecting Wetlands and Waterway Borders to Capture Carbon	143
3.3.5	Geological Opportunities to Store Carbon.....	145
3.3.6	Planting Forests in Maryland.....	146
3.3.7	Expanded Use of Forests and Feedstocks for Energy Production.....	148
3.3.8	Conservation of Agricultural Land for GHG Benefits.....	149
3.3.9	Buy Local for GHG Benefits.....	150
3.3.10	Nutrient Trading for GHG Benefits.....	151
C.4	Recycling.....	152
3.4.1	Recycling and Source Reduction.....	152
C.5	Multi-Sector.....	154
3.5.3	Outreach and Public Education.....	154
C.6	Buildings.....	155
3.6.1	Green Buildings.....	155
3.6.2	Building and Trade Codes in Maryland.....	156
C.7	Land Use.....	158
3.7.1	Funding Mechanisms for Smart Growth.....	158
3.7.2	Transportation GHG Targets for Local Governments and Metropolitan Planning Organizations.....	159
3.7.3	Reducing GHG Emissions from the Transportation Sector through Land Use and Location Efficiency.....	158
3.7.4	GHG Benefits from Priority Funding Areas and Other Growth Boundaries.....	162
C.8	Innovative Initiatives.....	164
3.8.1	Leadership-by-Example—Local Government.....	164
3.8.2	Leadership-by-Example—Federal Government.....	166
3.8.3	Leadership-by-Example—Maryland Colleges and Universities.....	168
3.8.4	GHG Early Voluntary Reductions.....	170
3.8.5	State of Maryland Initiative to Lead by Example.....	171
3.8.6	State of Maryland Carbon and Footprint Initiatives.....	174
3.8.7	Job Creation and Economic Development.....	176
3.8.8	Public Health Initiatives Related to Climate Change.....	177
3.8.9	Title V Permits for GHG Sources.....	178
Appendix D—Occupational Data.....		181
D.1	Energy.....	183
3.1.1	Regional Greenhouse Gas Initiative (RGGI)—Investment Phase.....	183
3.1.1	Regional Greenhouse Gas Initiative (RGGI)—Operation Phase.....	184
3.1.2	GHG Reductions from Imported Power—Investment Phase.....	185
3.1.2	GHG Reductions from Imported Power—Operation Phase.....	186
3.1.3	Federal New Source Performance Standard—Investment Phase.....	187
3.1.3	Federal New Source Performance Standard—Operation Phase.....	188
3.1.4	MACT—Investment Phase.....	189
3.1.4	MACT—Operation Phase.....	190
3.1.5	GHG Prevention of Significant Deterioration Permitting Program—Investment Phase	191



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.1.5	GHG Prevention of Significant Deterioration Permitting Program—Operation Phase	192
3.1.6	Energy Efficiency in the Residential Sector—Investment Phase	193
3.1.6	Energy Efficiency in the Residential Sector—Operation Phase.....	194
3.1.7	Energy Efficiency in the Commercial and Industrial Sectors—Operation Phase	196
3.1.8	Energy Efficiency – Appliances and Other Products—Investment Phase	197
3.1.8	Energy Efficiency – Appliances and Other Products—Operation Phase	198
3.1.9	Energy Efficiency in the Power Sector – General—Investment Phase	199
3.1.9	Energy Efficiency in the Power Sector – General—Operation Phase	200
3.1.10	EmPOWER – Utility Subprograms—Investment Phase	201
3.1.10	EmPOWER – Utility Subprograms—Operation Phase.....	202
3.1.11	Maryland Renewable Energy Portfolio Standard Subprogram—Investment Phase	203
3.1.11	Maryland Renewable Energy Portfolio Standard Subprogram—Operation Phase	204
3.1.12	Incentives and Grant Subprograms to Support Renewable Energy—Investment Phase	205
3.1.13	Offshore Wind Initiatives to Support Renewable Energy—Investment Phase	207
3.1.14	Combined Heat and Power—Investment Phase	209
3.1.14	Combined Heat and Power—Operation Phase.....	210
3.1.15	Main Street—Investment Phase.....	211
3.1.15	Main Street—Operation Phase	212
3.1.16	Weatherization and Energy Efficiency for Low-Income Houses—Investment Phase	213
3.1.16	Weatherization and Energy Efficiency for Low-Income Houses—Operation Phase	214
D.2	Transportation	215
3.2.1	Maryland Clean Cars Subprogram—Investment Phase	215
3.2.1	Maryland Clean Cars Subprogram—Operation Phase	216
3.2.2	Federal Medium- and Heavy-Duty GHG Standards—Investment Phase.....	217
3.2.2	Federal Medium- and Heavy-Duty GHG Standards—Investment Phase.....	218
3.2.3	Clean Fuel Standard—Investment Phase.....	219
3.2.3	Clean Fuel Standard—Operation Phase.....	220
3.2.4	Transportation Climate Initiative—Investment Phase.....	221
3.2.4	Transportation Climate Initiative—Operation Phase.....	222
3.2.5	Public Transportation Initiatives—Investment Phase.....	223
3.2.5	Public Transportation Initiatives—Operation Phase	224
3.2.6	Initiatives to Double Transit Ridership by 2020—Investment Phase.....	225
3.2.6	Initiatives to Double Transit Ridership by 2020—Operation Phase	226
3.2.7	Intercity Transportation Initiatives—Investment Phase	227
3.2.7	Intercity Transportation Initiatives—Operation Phase	228
3.2.8	Bike and Pedestrian Initiatives—Investment Phase	229
3.2.8	Bike and Pedestrian Initiatives—Operation Phase	230
3.2.9	Pricing Initiatives—Investment Phase.....	231



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.9	Pricing Initiatives—Operation Phase.....	232
3.2.10	Transportation Technology Initiatives—Investment Phase.....	233
3.2.10	Transportation Technology Initiatives—Operation Phase.....	234
3.2.11	Electric Vehicle Initiatives—Investment Phase.....	235
3.2.11	Electric Vehicle Initiatives—Operation Phase.....	236
3.2.12	Low-Emitting Vehicles Initiatives—Investment Phase.....	237
3.2.12	Low-Emitting Vehicles Initiatives—Operation Phase.....	238
3.2.14	Airport Initiatives—Investment Phase.....	239
3.2.14	Airport Initiatives—Operation Phase.....	240
3.2.15	Port Initiatives—Investment Phase.....	241
3.2.15	Port Initiatives—Operation Phase.....	242
3.2.16	Freight and Freight Rail Strategies—Investment Phase.....	243
3.2.16	Freight and Freight Rail Strategies—Operation Phase.....	244
3.2.17	Renewable Fuels Standard—Investment Phase.....	245
3.2.17	Renewable Fuels Standard—Operation Phase.....	246
3.2.18	CAFÉ Standards: Model Years 2008-2011—Investment Phase.....	247
3.2.18	CAFÉ Standards: Model Years 2008-2011—Operation Phase.....	248
3.2.19	Promoting Hybrid and Electric Vehicles—Investment Phase.....	249
3.2.19	Promoting Hybrid and Electric Vehicles—Operation Phase.....	250
3.2.20	PAYD Insurance in Maryland—Investment Phase.....	251
3.2.20	PAYD Insurance in Maryland—Operation Phase.....	252
D.3	Agriculture and Forestry.....	253
3.3.1	Managing Forests to Capture Carbon—Investment Phase.....	253
3.3.1	Managing Forests to Capture Carbon—Operation Phase.....	254
3.3.2	Creating Ecosystem Markets to Encourage GHG Emissions Reductions— Investment Phase.....	255
3.3.2	Creating Ecosystem Markets to Encourage GHG Emissions Reductions— Operation Phase.....	256
3.3.3	Increasing Urban Trees to Capture Carbon—Investment Phase.....	257
3.3.3	Increasing Urban Trees to Capture Carbon—Operation Phase.....	258
3.3.4	Creating and Protecting Wetlands and Waterway Borders to Capture Carbon— Investment Phase.....	259
3.3.4	Creating and Protecting Wetlands and Waterway Borders to Capture Carbon— Operation Phase.....	260
3.3.5	Geological Opportunities to Store Carbon—Investment Phase.....	261
3.3.5	Geological Opportunities to Store Carbon—Operation Phase.....	262
3.3.6	Planting Forests in Maryland—Investment Phase.....	263
3.3.6	Planting Forests in Maryland—Operation Phase.....	264
3.3.7	Biomass for Energy Production—Investment Phase.....	265
3.3.7	Biomass for Energy Production—Operation Phase.....	266
3.3.8	Conservation of Agricultural Land for GHG Benefits—Investment Phase.....	267
3.3.8	Conservation of Agricultural Land for GHG Benefits—Operation Phase.....	268
3.3.9	Buy Local for GHG Benefits—Investment Phase.....	269
3.3.9	Buy Local for GHG Benefits—Operation Phase.....	270



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.3.10	Nutrient Trading for GHG Benefits—Investment Phase.....	271
3.3.10	Nutrient Trading for GHG Benefits—Operation Phase.....	272
D.4	Recycling.....	273
3.4.1	Recycling and Source Reduction—Investment Phase.....	273
3.4.1	Recycling and Source Reduction—Operation Phase.....	274
D.5	Multi-Sector.....	275
3.5.3	Outreach and Public Education—Investment Phase.....	275
3.5.3	Outreach and Public Education—Operation Phase.....	276
D.6	Buildings.....	277
3.6.1	Green Building Initiatives—Investment Phase.....	277
3.6.1	Green Building Initiatives—Operation Phase.....	278
3.6.2	Building Codes—Investment Phase.....	279
3.6.2	Building Codes—Operation Phase.....	280
D.7	Land Use.....	281
3.7.1	Reducing Transportation Issues through Smart Growth—Investment Phase.....	281
3.7.1	Reducing Transportation Issues through Smart Growth—Operation Phase.....	282
3.7.2	GHG Targets for Local Government’s Transportation and Land Use Planning— Investment Phase.....	283
3.7.2	GHG Targets for Local Government’s Transportation and Land Use Planning— Operation Phase.....	284
3.7.3	Land Use Planning GHG Benefits—Investment Phase.....	285
3.7.4	Growth Boundary GHG Benefits—Investment Phase.....	287
3.7.4	Growth Boundary GHG Benefits—Operation Phase.....	288
D.8	Innovative Initiatives.....	289
3.8.1	Leadership-by-Example – Local Government—Investment Phase.....	289
3.8.1	Leadership-by-Example – Local Government—Operation Phase.....	290
3.8.2	Leadership-by-Example – Federal Government—Investment Phase.....	291
3.8.2	Leadership-by-Example – Federal Government—Operation Phase.....	292
3.8.3	Leadership-by-Example – Maryland University Lead-by-Example Initiatives— Investment Phase.....	293
3.8.3	Leadership-by-Example – Maryland University Lead-by-Example Initiatives— Operation Phase.....	294
3.8.4	Voluntary Stationary Source Reductions—Investment Phase.....	295
3.8.4	Voluntary Stationary Source Reductions—Operation Phase.....	296
3.8.5	State of Maryland Initiatives to Lead by Example—Investment Phase.....	297
3.8.5	State of Maryland Initiatives to Lead by Example—Operation Phase.....	298
3.8.6	State of Maryland Carbon and Footprint Initiatives—Investment Phase.....	299
3.8.6	State of Maryland Carbon and Footprint Initiatives—Operation Phase.....	300
3.8.7	Job Creation and Economic Development Initiatives Related to Climate Change— Investment Phase.....	301
3.8.7	Job Creation and Economic Development Initiatives Related to Climate Change— Operation Phase.....	302
3.8.8	Public Health Initiatives Related to Climate Change—Investment Phase.....	303
3.8.8	Public Health Initiatives Related to Climate Change—Operation Phase.....	304



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.8.9	Title V Permits for GHG Sources—Investment Phase.....	305
3.8.9	Title V Permits for GHG Sources—Operation Phase.....	306
Appendix E—Works Cited by Subject Area		307
E.1	Energy	307
E.2	Transportation	310
E.3	Agriculture & Forestry	318
E.4	Recycling.....	319
E.5	Multi-Sector	319
E.6	Buildings	320
E.7	Land Use	321
E.8	Innovative Initiatives.....	321



Appendix C—Modeling Steps

C.1 Energy

3.1.1 Regional Greenhouse Gas Initiatives

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. Regional Greenhouse Gas Initiatives**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 375—Environmental and other technical consulting services
 - iii. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. Regional Greenhouse Gas Initiatives**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. Regional Greenhouse Gas Initiatives**
 - i. 100% from industries in electric production to purchase allowances—(\$1,000,000)
 - ii. 10% for government administrative costs/responsibilities—\$100,000
 - iii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$900,000
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. Regional Greenhouse Gas Initiatives**
 - i. 432— Other state and local government enterprises
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. Regional Greenhouse Gas Initiatives**
 - i. Total allowances yearly by the state of Maryland for GHG—37,503,983 metric tons
 - ii. Number of years of auctions – 4 years
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. Regional Greenhouse Gas Initiatives**
 - i. Proceeds From Auctions¹—\$169,600,423.80 (total to date)

¹ "Regional Greenhouse Gas Initiative (RGGI) CO2 Budget Trading Program - Auction 13." Regional Greenhouse Gas Initiative (RGGI) CO2 Budget Trading Program - Welcome. 7 Sept. 2011. 11 Nov. 2011 <http://www.rggi.org/market/co2_auctions/results/auction_13>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **Regional Greenhouse Gas Initiatives**
 - i. 432—\$42,400,105.95 [(\$169,600,423.80 total proceeds from auctions to date / 4 years)]=annual revenue from sales of allowances
5. Input savings by sector into IMPLAN model and run impacts.
6. Export impacts and analyze.

3.1.2 GHG Emission Reductions from Imported Power

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **GHG Emission Reductions from Imported Power**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 375—Environmental and other technical consulting services
 - iii. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **GHG Emission Reductions from Imported Power**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. **GHG Emission Reductions from Imported Power**
 - i. 100% from industries in electric production to purchase allowances—(\$1,000,000)
 - ii. 10% for government administrative costs/responsibilities—\$100,000
 - iii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$900,000
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. **GHG Emission Reductions from Imported Power**
 - i. 31— Electric power generation, transmission, and distribution
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **GHG Emission Reductions from Imported Power**
 - i. 30% Energy is Imported from Outside of Maryland
 - ii. Target to be achieved by 2020—2.75 Million Metric Tons
 - iii. Number of years until Target – 8 years
 - iv. Average Reductions per year – 343,750 allowances annually

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **GHG Emission Reductions from Imported Power**
 - i. Average GHG emissions associated with Electricity²—31.43 million metric tons
 - ii. Allowances Sold to Date³-- 68,507,184
 - iii. Total Proceeds from Auctions to date⁴--\$169,600,423.80 total proceeds
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **GHG Emission Reductions from Imported Power**
 - i. \$2.48 [(\$169,600,423.80 total proceeds from auctions to date / 68,507,184 total carbon allowances sold to date)]=average cost of carbon allowances
 - ii. \$77,809,961.07 [(31,430,000 total carbon allowances sold *\$2.48 per allowance for electricity)]=average carbon credits sold annually to firms
 - iii. 31,086,250 [(31,430,000 total carbon allowances sold – 343,750 proposed annual reduction target)]=average annual carbon credit to be purchased under reductions
 - iv. \$76,958,953.30 [(31,086,250 average annual carbon credits purchased under reduction target * \$2.48 average cost per carbon credit allowance)]=average cost to firm for carbon credits under new reduction target
 - v. 31 – \$851,007.77 [(\$77,809,961.07 current average annual carbon credit costs - \$76,958,953.30 average carbon credit costs under target reduction policy)]=savings to firms from reductions
5. Input savings by sector into IMPLAN model and run impacts.
6. Export impacts and analyze.

3.1.3 GHG New Source Performance Standard

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **GHG New Source Performance Standard**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 375—Environmental and other technical consulting services
 - iii. 432—Other state and local government enterprises

² "Maryland Energy Consumption Data." ERedux Energy: Sustainable Geosocial Products and Services Network. 11 Nov. 2011. Maryland Energy Portal - Maryland's Carbon Footprint. 11 Nov. 2011 <http://www.eredux.com/states/state_detail.php?id=1129>.

³ "Regional Greenhouse Gas Initiative (RGGI) CO2 Budget Trading Program - Auction 13." Regional Greenhouse Gas Initiative (RGGI) CO2 Budget Trading Program - Welcome. 7 Sept. 2011. 11 Nov. 2011 <http://www.rggi.org/market/co2_auctions/results/auction_13>.

⁴ See note 3.



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **GHG New Source Performance Standard**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. **GHG New Source Performance Standard**
 - i. 100% from industries in electric production to purchase allowances—(\$1,000,000)
 - ii. 10% for government administrative costs/responsibilities—\$100,000
 - iii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$900,000
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. **GHG New Source Performance Standard**
 - i. 31— Electric power generation, transmission, and distribution
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **GHG New Source Performance Standard**
 - i. Annual Reduction Target by 2020 – 4.48 million metric tons
 - ii. Number of years until Target – 8 years
 - iii. Average Reductions per year – 128,750 allowances annually
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **GHG New Source Performance Standard**
 - i. Average GHG emissions associated with Electricity⁵—31.43 million metric tons
 - ii. Allowances Sold to Date⁶-- 68,507,184
 - iii. Total Proceeds from Auctions to date⁷--\$169,600,423.80 total proceeds
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **GHG New Source Performance Standard**
 - i. \$2.48 [(\$169,600,423.80 total proceeds from auctions to date / 68,507,184 total carbon allowances sold to date)]=average cost of carbon allowances
 - ii. \$77,809,961.07 [(31,430,000 total carbon allowances sold *\$2.48 per allowance for electricity)]=average carbon credits sold annually to firms

⁵ "Maryland Energy Consumption Data." ERedux Energy: Sustainable Geosocial Products and Services Network. 11 Nov. 2011. Maryland Energy Portal - Maryland's Carbon Footprint. 11 Nov. 2011 <http://www.eredux.com/states/state_detail.php?id=1129>.

⁶ MD Proceeds by Auction. Regional Greenhouse Gas Initiative (RGGI) CO2 Budget Trading Program - Welcome. Regional Greenhouse Gas Initiative CO2 Budget Trading Program, 2011. Web. 14 Nov. 2011. <http://rggi.org/docs/MD_Proceeds_by_Auction.pdf>.

⁷ Ibid.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- iii. 30,825,000 [(31,430,000 total carbon allowances sold – 605,000 proposed annual reduction target)]=average annual carbon credit to be purchased under reductions
 - iv. \$76,312,187.40 [(30,825,000 average annual carbon credits purchased under reduction target * \$2.48 average cost per carbon credit allowance)]=average cost to firm for carbon credits under new reduction target
 - v. 31 – \$1,497,773.67 [(\$77,809,961.07 current average annual carbon credit costs - \$76,312,187.40 average carbon credit costs under target reduction policy)]=savings to firms from reductions
5. Input savings by sector into IMPLAN model and run impacts.
 6. Export impacts and analyze.

3.1.4 Maximum Achievable Control Technology (MACT)

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. Boiler Maximum Achievable Control Technology (MACT)**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 375—Environmental and other technical consulting services
 - iii. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. Boiler Maximum Achievable Control Technology (MACT)**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. Boiler Maximum Achievable Control Technology (MACT)**
 - i. 100% from industries in electric production to purchase allowances—(\$1,000,000)
 - ii. 10% for government administrative costs/responsibilities—\$100,000
 - iii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$900,000
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. Boiler Maximum Achievable Control Technology (MACT)**
 - i. 31— Electric power generation, transmission, and distribution
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. Boiler Maximum Achievable Control Technology (MACT)**
 - i. Target to 25 combined, 10 of single HAP
 - ii. Base Cost - \$200 for license + \$52.23 per ton
 - iii. Target by 2020 – .10 million metric tons of CO2 emissions



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Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Boiler Maximum Achievable Control Technology (MACT)**
 - i. Number of Boilers (Nationally)⁸—13,500 boilers
 - ii. Number of Boilers in Maryland⁹--16
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **Boiler Maximum Achievable Control Technology (MACT)**
 - i. 12,500 [(10 million metric tons of CO₂ emissions / 8 years)]=average reduction of CO₂ emissions per year
 - ii. \$914,025,200.00 [(17.5 metric tons of HAPs * \$52.23 per metric ton) + \$200.00 base fee]=average credit purchase annually from firms
 - iii. 31 – \$10,446,000.00 [(\$15,039,337.50 cost to purchase HAP not under rule) -(17,500,000 average metric tons HAP output - 17,487,500 average output in metric tons from rule)] * [(\$52.23 per metric ton)] + [(\$200.00 base fee)] * [(16 boilers Maryland)]=average annual HAP credits to be purchased under new rule
5. Input savings by sector into IMPLAN model and run impacts.
6. Export impacts and analyze.

3.1.5 GHG Prevention of Significant Deterioration Permitting Program

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **GHG Prevention of Significant Deterioration Permitting Program**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 375—Environmental and other technical consulting services
 - iii. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **GHG Prevention of Significant Deterioration Permitting Program**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)

⁸ "Maryland Energy Consumption Data." ERedux Energy: Sustainable Geosocial Products and Services Network. 11 Nov. 2011. Maryland Energy Portal - Maryland's Carbon Footprint. 11 Nov. 2011 <http://www.eredux.com/states/state_detail.php?id=1129>.

⁹ Princeton Energy Resources International, LLC, and Exter Associates, Inc. "The Potential for Biomass Cofiring in Maryland." Maryland Powerplant Research Program. Mar. 2006. Maryland Department of Natural Resources (DNR). 11 Nov. 2011 <http://esm.versar.com/pprp/bibliography/PPES_06_02/PPES_06_02.pdf>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3. Distribute inputs among identified IMPLAN sectors.
 - a. GHG Prevention of Significant Deterioration Permitting Program**
 - i. 100% from industries in electric production to purchase allowances—(\$1,000,000)
 - ii. 10% for government administrative costs/responsibilities—\$100,000
 - iii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$900,000
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. GHG Prevention of Significant Deterioration Permitting Program**
 - i. 432—Other state and local government enterprises
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. GHG Prevention of Significant Deterioration Permitting Program**
 - i. Company is emitting=100,000 tons
 - ii. Limit=50,000 tons
 - iii. Total Over Limit=50,000 tons (Company is emitting-Limit)
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. GHG Prevention of Significant Deterioration Permitting Program**
 - i. Recent Clearing Price of Carbon Credits¹⁰=1.89 per metric ton
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. GHG Prevention of Significant Deterioration Permitting Program**
 - i. 432--\$94,500.00 (total over limit*percent clearing price of carbon credits)
=Revenue Received to reinvest in State
5. Export impacts and analyze.

¹⁰ "Regional Greenhouse Gas Initiative (RGGI) CO2 Budget Trading Program - Auction 13." Regional Greenhouse Gas Initiative (RGGI) CO2 Budget Trading Program - Welcome. 7 Sept. 2011. 11 Nov. 2011 <http://www.rggi.org/market/co2_auctions/results/auction_13>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.1.6 Energy Efficiency in the Residential Sector

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. EMPOWER Maryland Empowering Finance Initiative**
 - i. 40—Maintenance & repair construct of residential structures
 - ii. 322—Retail Stores – Electronics and appliances
 - iii. 330—Retail Stores – Miscellaneous
 - iv. 369—Architectural, engineering, and related services
 - v. 375—Environmental and other technical consulting services
 - vi. 432—Other state and local government enterprises
 - b. EMPOWER Maryland Residential Incentives**
 - i. 40—Maintenance & repair construct of residential structures
 - ii. 369—Architectural, engineering, and related services
 - iii. 375—Environmental and other technical consulting services
 - iv. 432—Other state and local government enterprises
 - c. MEA Home Performance Rebate Program**
 - i. 40—Maintenance & repair construct of residential structures
 - ii. 322—Retail Stores – Electronics and appliances
 - iii. 330—Retail Stores – Miscellaneous
 - iv. 369—Architectural, engineering, and related services
 - v. 375—Environmental and other technical consulting services
 - vi. 432—Other state and local government enterprises
 - d. DHCD Weatherization**
 - i. 40—Maintenance & repair construct of residential structures
 - ii. 369—Architectural, engineering, and related services
 - iii. 375—Environmental and other technical consulting services
 - iv. 432—Other state and local government enterprises
 - e. Clean Energy Communities**
 - i. 40—Maintenance & repair construct of residential structures
 - ii. 322—Retail Stores – Electronics and appliances
 - iii. 330—Retail Stores – Miscellaneous
 - iv. 369—Architectural, engineering, and related services
 - v. 375—Environmental and other technical consulting services
 - vi. 425—Civic, social, professional, and similar organizations
 - vii. 432—Other state and local government enterprises
 - f. Maryland Home Energy Loan Program**
 - i. 40—Maintenance & repair construct of residential structures
 - ii. 322—Retail Stores – Electronics and appliances
 - iii. 330—Retail Stores – Miscellaneous
 - iv. 369—Architectural, engineering, and related services
 - v. 375—Environmental and other technical consulting services
 - vi. 432—Other state and local government enterprises

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- g. Energy Workforce Training**
 - i. 392—Private junior colleges, colleges, and universities
 - ii. 375—Environmental and other technical consulting services
 - iii. 432—Other state and local government enterprises
 - h. State Energy Efficiency Appliance Rebate Program**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 322—Retail Stores – Electronics and appliances
 - iii. 330—Retail Stores – Miscellaneous
 - iv. 375—Environmental and other technical consulting services
 - v. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
- a. EmPOWER Maryland Empowering Finance Initiative**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - b. EmPOWER Maryland Residential Incentives**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - c. MEA Home Performance Rebate Program**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - d. DHCD Weatherization**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - e. Clean Energy Communities**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - f. Maryland Home Energy Loan Program**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - g. Energy Workforce Training**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - h. State Energy Efficiency Appliance Rebate Program**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
- a. EmPOWER Maryland Empowering Finance Initiative**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$180,000 each
 - b. EmPOWER Maryland Residential Incentives**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$300,000 each
 - c. MEA Home Performance Rebate Program**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$180,000 each

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- d. DHCD Weatherization**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$300,000 each
 - e. Clean Energy Communities**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$128,571 each
 - f. Maryland Home Energy Loan Program**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$180,000 each
 - g. Energy Workforce Training**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$450,000 each
 - h. State Energy Efficiency Appliance Rebate Program**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$225,000 each
- 4. Input sales by sector into IMPLAN model and run impacts.
 - 5. Export impacts and analyze.

Operation Phase

- 1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file). (Note: IMPLAN code 336 (Transit and ground passenger transportation) has been changed to 432 (Other state and local government enterprises) in all instances due to the state/local government overseeing MARC operations via MTA.)
 - a. EmPOWER Maryland Empowering Finance Initiative**
 - i. 10001-10009—Households – All income levels
 - b. EmPOWER Maryland Residential Incentives**
 - i. 10001-10009—Households – All income levels
 - c. MEA Home Performance Rebate Program**
 - i. 10001-10009—Households – All income levels
 - d. DHCD Weatherization**
 - i. 10001-10009—Households – All income levels
 - e. Clean Energy Communities**
 - i. 432—Other state and local government enterprises
 - f. Maryland Home Energy Loan Program**
 - i. 432—Other state and local government enterprises
 - ii. 10001-10009—Households - All income levels
 - g. Energy Workforce Training**
 - i. 10001-10009—Households – All income levels

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- h. **State Energy Efficiency Appliance Rebate Program**
 - i. 10001-10009—Households – All income levels
- 2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **EMPOWER Maryland Empowering Finance Initiative**
(<http://energy.maryland.gov/facts/empower.html>)
 - i. CFL Light Replacement=\$130
 - ii. Blow in Wall-Insulation=\$90
 - iii. Seal Ductwork=\$85
 - iv. Repair Ceiling Leaks=\$80
 - v. Upgrade to Energy Star Washer=\$50
 - vi. Upgrade Attic Insulation=\$40
 - vii. Upgrade refrigerator to Energy Star=\$40
 - viii. Energy Star Room Air=\$30
 - ix. Low Flow Showerhead=\$30
 - b. **EMPOWER Maryland Residential Incentives**
 - i. CFL Light Replacement=\$130
 - ii. Blow in Wall-Insulation=\$90
 - iii. Seal Ductwork=\$85
 - iv. Repair Ceiling Leaks=\$80
 - v. Upgrade to Energy Star Washer=\$50
 - vi. Upgrade Attic Insulation=\$40
 - vii. Upgrade refrigerator to Energy Star=\$40
 - viii. Energy Star Room Air=\$30
 - ix. Low Flow Showerhead=\$30
 - x. Annual Sum of Savings=\$575
 - xi. Number of Awards since 2009¹¹=5,703
 - xii. Number of Awards that are only Residential=5,609
 - c. **MEA Home Performance Rebate Program**
 - i. Money available for rebate=\$1,500,000.00
 - d. **DHCD Weatherization**
 - i. Cost Incurred=\$1,234,223 (from strategy write up)
 - e. **Clean Energy Communities Grant**
 - i. Grants available to State and Local Governments (from MEA website)
=2.13 million
 - f. **Maryland Home Energy Loan Program**
 - i. Total Awarded thus Far=400,000
 - g. **Energy Workforce Training**
 - h. **State Energy Efficiency Appliance Rebate Program**
 - i. Total allocated=\$5,400,000

¹¹ Residential Clean Energy Grant Program. Maryland Energy Administration. Maryland Energy Administration, 2011. Web. 16 Nov. 2011. <<http://energy.maryland.gov/Residential/cleanenergygrants/index.html#updates>>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **EMPOWER Maryland Empowering Finance Initiative**
 - b. **EMPOWER Maryland Residential Incentives**
 - c. **MEA Home Performance Rebate Program**
 - d. **DHCD Weatherization**
 - i. Number of Assist/Completions Yearly¹²=6,164
 - ii. Average Savings Yearly in Energy Bills¹³=\$437
 - e. **Clean Energy Communities**
 - f. **Maryland Home Energy Loan Program**
 - i. Loans Average of Those Possible Max¹⁴=\$11,250
 - ii. Total Homes Applied=36
 - iii. Replacement period=10 years
 - iv. Average Interest Rate on Loan=8.49%
 - v. Total Loan=\$12,205.125
 - vi. Total Owed every year on loan=\$1,220.51
 - vii. Annual Savings from Programmable Thermostat – \$150
 - viii. Annual Savings from Plugging Leaks – \$440
 - g. **Energy Workforce Training**
 - i. Total Trained to date=1,000 (assumed since 2009)
 - ii. Avg. Trained Yearly=333 (total trained to date/3 years since program initiated)
 - iii. Avg. Income of Green Job¹⁵=\$47,000
 - h. **State Energy Efficiency Appliance Rebate Program**
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **EMPOWER Maryland Empowering Finance Initiative**
 - i. 10001 - 10009 -- \$3,278,650 [(\$575 Average Annual Savings from Energy Efficiency Measures in Household * 5,702 Applicants since 2009)]=Average Savings Associated from Program to All Applicants

¹² StateStat. Maryland StateStat Report. Department of Housing & Community Development, July 2011. Web. 11 Nov. 2011. <http://www.statestat.maryland.gov/reports/20110825_DHCD_Template.pdf>.

¹³ Weatherization and Intergovernmental Program: Weatherization Assistance Program. EERE: EERE Server Maintenance. U.S. Department of Energy, 25 Apr. 2011. Web. 11 Nov. 2011. <<http://www1.eere.energy.gov/wip/wap.html>>.

¹⁴ Maryland Home Energy Loan Program. Maryland Home Energy Loan Program. Maryland Clean Energy Centre, 2010. Web. 16 Nov. 2011. <<http://www.mcecloans.com/Module/Ext/ExtInfo.aspx?ModulePageAdmin=0fe789d7-d5fc-4297-9917-db58ccb8a660&&ModulePageVisitor=4b0b3b8a-4f4a-4192-98e8-4f0e35b75d90>>.

¹⁵ 2009 County Business Patterns. Censtats Database. NAICS, 2009. Web. 11 Nov. 2011. <<http://censtats.census.gov/cgi-bin/cbpnaic/cbpsect.pl>>.



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- b. EmPOWER Maryland Residential Incentives**
 - i. 10001-10009 – \$3,225,175 [((\$575 Average Annual Savings from Energy Efficiency Measures in Households * 5,609 Residential Applicants for MEA Grants since 2009)]=Average Savings Associated with Program Since 2009 for Residential Sector
- c. MEA Home Performance Rebate Program**
 - i. 10001 - 10009 Households – \$1,500,000 [(From Strategy Write Up, Money Available for Grants)]
- d. DHCD Weatherization**
 - i. \$200.23 [(\$1,234,223 Cost Incurred for All Units to be Weatherized / 6,164 Units to be Completed Yearly)]=Average per Unit Cost of Weatherization
 - ii. \$236.77 [(\$437 Average Annual Savings from Weatherization - \$200.23 Cost per Unit of Weatherization)]=Average Annual Savings of Weatherization
 - iii. 10001 - 10009 -- \$1,459,445 [(\$236.77 Average Annual Savings of Weatherization per unit * 6,164 Units to be treated)]=Average Savings Across All Households
- e. Clean Energy Communities**
 - i. 432 – \$2,130,000 [(Grant Money Available per strategy write up)]
- f. Maryland Home Energy Loan Program**
 - i. \$1,220.51 [(\$12,205 Average Loan made through Program / 10 Year Payback period)] = Average Annual Loan Payment without Interest
 - ii. \$955 [(\$1,220.51 Average Annual Loan Payment Without Interest * 8.49% Interest Rate Associated with Loan Program)]=Average Annual Interest Paid on Loans
 - iii. 432 – \$34,385 [(\$955 Average Annual Interest Paid on Loans * 36 Applicants for Program)]=Average Annual Revenue Received by Government from Loans
 - iv. 10001-10009 – \$21,240 [(36 Applicants * \$590 Overall Savings from Program Annually)]=Average Annual Savings to Households that Applied
- g. Energy Workforce Training**
 - i. 10001 – 10009 – \$15,666,666.67 [(333 Newly Trained Energy Workforce Labor Every Year * \$47,000 Average Annual Income of Green Job)]=Average Additional Income to Households Annually
- h. State Energy Efficiency Appliance Rebate Program**
 - i. 10001 - 10009 -- \$5,400,000 [(Allocated per Strategy Write Up)]
- 5. Input savings by sector into IMPLAN model and run impacts.
 - a. Household savings inputs were distributed among household income ranges using household income distribution percentages taken from the Census' 2005-2009 American Community Survey 5-Year estimates for Maryland. (Note: In some cases, totals do not add up to 100.0 percent due to margin of error.)
- 6. Export impacts and analyze.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.1.7 Energy Efficiency in the Business Community

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. Maryland Save Energy Now**
 - i. 375—Environmental and other technical consulting services
 - ii. 432—Other state and local government enterprises
 - b. Jane E. Lawton Conservation Loan Program**
 - i. 39—Maint & repair construct of nonresident structures
 - ii. 319—Wholesale trade businesses
 - iii. 322—Retail Stores – Electronics and appliances
 - iv. 330—Retail Stores – Miscellaneous
 - v. 369—Architectural, engineering, and related services
 - vi. 375—Environmental and other technical consulting services
 - vii. 432—Other state and local government enterprises
 - c. Energy Efficiency and Conservation Block Grant Program**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 39—Maint & repair construct of nonresident structures
 - iii. 319—Wholesale trade businesses
 - iv. 322—Retail Stores – Electronics and appliances
 - v. 330—Retail Stores – Miscellaneous
 - vi. 369—Architectural, engineering, and related services
 - vii. 375—Environmental and other technical consulting services
 - viii. 432—Other state and local government enterprises
 - d. State Agencies Loan Program**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 39—Maint & repair construct of nonresident structures
 - iii. 215—Heating equipment (except warm air furnaces)
 - iv. 216—Air conditioning, refrigeration, and warm air furnace manufacturing
 - v. 319—Wholesale trade businesses
 - vi. 322—Retail Stores – Electronics and appliances
 - vii. 330—Retail Stores – Miscellaneous
 - viii. 369—Architectural, engineering, and related services
 - ix. 375—Environmental and other technical consulting services
 - x. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- a. Maryland Save Energy Now**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - b. Jane E. Lawton Conservation Loan Program**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - c. Energy Efficiency and Conservation Block Grant Program**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - d. State Agencies Loan Program**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 3. Distribute inputs among identified IMPLAN sectors.
 - a. Maryland Save Energy Now**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$900,000
 - b. Jane E. Lawton Conservation Loan Program**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$150,000 each
 - c. Energy Efficiency and Conservation Block Grant Program**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$128,571 each
 - d. State Agencies Loan Program**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$100,000 each
 4. Input sales by sector into IMPLAN model and run impacts.
 5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file). (Note: IMPLAN code 336 (Transit and ground passenger transportation) has been changed to 432 (Other state and local government enterprises) in all instances due to the state/local government overseeing MARC operations via MTA.)
 - a. Maryland Save Energy Now**
 - i. 381—Management of companies and enterprises
 - b. Jane E. Lawton Conservation Loan Program**
 - i. 381—Management of companies and enterprises

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- c. **Energy Efficiency and Conservation Block Grant Program**
 - i. 381—Management of companies and enterprises
- d. **State Agencies Loan Program**
 - i. 381—Management of companies and enterprises
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **Maryland Save Energy Now**
 - b. **Jane E. Lawton Conservation Loan Program**
 - i. Total Energy Used by Government in 2009 – 1,500,000,000 kilowatts
 - c. **Energy Efficiency and Conservation Block Grant Program**
 - i. Potential Energy Reduction from Program – 4,200,000 kilowatts
 - ii. Potential Energy Reduction from Program in Natural Gas (in kilowatts) – 967,135 kilowatts
 - iii. Potential Energy Reductions from Program in Oil (in gallons) – 35,000 kilowatts
 - d. **State Agencies Loan Program**
 - i. Savings in kilowatts from program – 11,000,000 kilowatts
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Maryland Save Energy Now**
 - i. Estimated Energy Savings from CHP training¹⁶=2,000,000,000 Goal to 2020
 - ii. Maryland Electricity cost (in KWh)¹⁷--\$0.11 per kW/h
 - b. **Jane E. Lawton Conservation Loan Program**
 - i. Total Amount Available This Year (per MEA website) – \$2,500,000
 - ii. Interest Rate – 2.5%
 - iii. Assume Energy Savings from program – 5%
 - iv. Maryland Electricity cost (in KWh)¹⁸--\$0.11 per kW/h
 - c. **Energy Efficiency and Conservation Block Grant Program**
 - i. Available Fund to the 10 Largest Counties (from MEA website) – \$9,600,000
 - ii. Assumed Price of Fuel – \$3.43 per gallon
 - iii. Maryland Electricity cost (in KWh)¹⁹--\$0.11 per kW/h

¹⁶ Maryland Save Energy Now. Maryland Energy Administration. Maryland Energy Administration. Web. 16 Nov. 2011. <<http://energy.maryland.gov/sen/index.html>>.

¹⁷ Average Energy Prices in the Washington-Baltimore Area. Mid-Atlantic Information Office. 27 Sept. 2011. U.S. Bureau of Labor Statistics (BLS). 11 Nov. 2011 <http://www.bls.gov/ro3/apwb.htm#wb_energy_table1>.

¹⁸ Average Energy Prices in the Washington-Baltimore Area. Mid-Atlantic Information Office. 27 Sept. 2011. U.S. Bureau of Labor Statistics (BLS). 11 Nov. 2011 <http://www.bls.gov/ro3/apwb.htm#wb_energy_table1>.

¹⁹ Average Energy Prices in the Washington-Baltimore Area. Mid-Atlantic Information Office. 27 Sept. 2011. U.S. Bureau of Labor Statistics (BLS). 11 Nov. 2011 <http://www.bls.gov/ro3/apwb.htm#wb_energy_table1>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- d. **State Agencies Loan Program**
 - i. Maryland Electricity cost (in KWh)²⁰--\$0.11 per kW/h
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **Maryland Save Energy Now**
 - i. 250,000,000 [(2,000,000,000 Estimated Energy Savings from CHP Training / 8 Years until 2020)]=Average Annual Reduction in kilowatts Consumed
 - ii. 381 – \$28,525,000 [(250,000,000 Average Annual Reduction in kilowatts Consumed * \$0.11 Average Cost of Electricity per kwh)]=Average Annual Savings from Reduction
 - b. **Jane E. Lawton Conservation Loan Program**
 - i. 75,000,000 [(1,500,000,000 Total Government kilowatt Consumption in 2009 * 5% Assumed Reduction from Program)]=Average Reduction from Program in kilowatts
 - ii. \$2,562,500 [(\$2,500,000 Total Amount Available in Loans * 2.5 % Interest Rate) + \$2,500,000 Total Amount Available in Loans]=Average Cost to Take Loan from This Program
 - iii. \$8,557,500 [(75,000,000 Average Reduction from Program in kilowatts * \$0.11 Average Cost per kilowatt hour of electricity)]=Average Annual Savings from Program
 - iv. 381 – \$5,995,000 [(\$8,557,500 Average Annual Savings from Program - \$2,562,500 Average Cost to Take a Loan from This Program)]=Average Savings to Participants in this Program
 - c. **Energy Efficiency and Conservation Block Grant Program**
 - i. 381–\$709,620.07 [(4,200,000 kilowatts in Electricity + 967,135 kilowatts of Gas Reductions) * \$0.11 Average Cost of Electricity per kilowatt hour + (35,000 gallons of oil reduction * \$3.43 average cost per gallon)]=Average Annual Savings from Block Grant Program
 - d. **State Agencies Loan Program**
 - i. 381–\$1,235,100 [(11,000,000 Savings in kilowatts from Program * \$0.11 Average Cost of Electricity per kilowatt hour)]=Average Savings from Program
5. Input savings by sector into IMPLAN model and run impacts.
 - a. Household savings inputs were distributed among household income ranges using household income distribution percentages taken from the Census' 2005-2009 American Community Survey 5-Year estimates for Maryland. (Note: In some cases, totals do not add up to 100.0 percent due to margin of error.)
6. Export impacts and analyze.

²⁰ Average Energy Prices in the Washington-Baltimore Area. Mid-Atlantic Information Office. 27 Sept. 2011. U.S. Bureau of Labor Statistics (BLS). 11 Nov. 2011 <http://www.bls.gov/ro3/apwb.htm#wb_energy_table1>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.1.8 Energy Efficiency Appliances and Other Products

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. Energy Efficiency Appliances and Other Products**
 - i. 319—Wholesale trade businesses
 - ii. 322—Retail Stores – Electronics and appliances
 - iii. 330—Retail Stores – Miscellaneous
 - iv. 377—Advertising and related services
 - v. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. Energy Efficiency Appliances and Other Products**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. Energy Efficiency Appliances and Other Products**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$225,000 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file). (Note: IMPLAN code 336 (Transit and ground passenger transportation) has been changed to 432 (Other state and local government enterprises) in all instances due to the state/local government overseeing MARC operations via MTA.)
 - a. Energy Efficiency Appliances and Other Products**
 - i. 10001 – 10009—Households – All income levels
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. Energy Efficiency Appliances and Other Products**
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. Energy Efficiency Appliances and Other Products**
 - i. Avg. purchase price of an incandescent bulb²¹—0.25
 - ii. Avg. purchase price of a CFL bulb²²—5
 - iii. Lifetime of Incandescent Bulb²³—1,000 hours
 - iv. Lifetime of a CFL Bulb²⁴—8,000 hours

²¹ Innovation. Performance. Savings. ENERGY STAR. United States Department of Energy, 2011. Web. 16 Nov. 2011. <http://www.energystar.gov/ia/partners/manuf_res/CFL_PRG_FINAL.pdf>.

²² Ibid.

²³ Ibid.

²⁴ Innovation. Performance. Savings. ENERGY STAR. United States Department of Energy, 2011. Web. 16 Nov. 2011. <http://www.energystar.gov/ia/partners/manuf_res/CFL_PRG_FINAL.pdf>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- v. Price per hour of Incandescent bulb²⁵—0.00025
 - vi. Price per hour of CFL Bulb²⁶—0.000625
 - vii. Number of replacements in 7 years - Incandescent²⁷—7
 - viii. Number of replacements in 7 year - CFL²⁸—7
 - ix. Avg. Cost per kwh²⁹—0.11
 - x. Amount of Watts of Incandescent³⁰—60
 - xi. Amount of Equivalent CLF³¹—13
 - xii. Annual Savings in KWH change from Inca to CFL³²—51
 - xiii. Number of Households³³—2,092,538
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
- a. **Energy Efficiency Appliances and Other Products**
 - i. \$1.75 [(7 Number of replacements in 7 years incandescent * 0.25 Avg. purchase price of an incandescent bulb)]=Total Cost in 7 Years on Replacements Incandescent
 - ii. \$0 [(0 Number of replacements in 7 years CFL * 5 Avg. purchase price of an CFL bulb)]=Total Cost in 7 Years on Replacements CFL
 - iii. 0.714285714 [(5 Avg. purchase price of an CFL bulb / 7)]=Total Cost Over Lifetime of CFL per year
 - iv. \$0.71 [(5 Avg. purchase price of an CFL bulb / 7)]=Cost of CFL Annually
 - v. 5.8191 [(51 Annual Savings in kwh change from Inca to CFL * 0.11 Avg. Cost per kwh)]=Savings from CFL Annually
 - vi. \$5.11 [(5.8191 Savings from CFL Annually - 0.714285714 Savings from CFL Annually)]=Savings from ONE CFL Bulb
 - vii. \$10,682,017.88 [(2,092,538 Number of Households * 5.10481 Savings from ONE CFL Bulb)]=Savings Annually
 - viii. 10001–10009–Households—\$10,682,017.88 [(2,092,538 Number of Households * 5.10481 Savings from ONE CFL Bulb)]=Savings Annually

²⁵ Ibid.

²⁶ Ibid.

²⁷ Ibid.

²⁸ Ibid.

²⁹ Strong Finish to 2011 Natural Gas Storage Injection Season. U.S. Energy Information Administration (EIA). U.S. Energy Information Administration (EIA), Oct. 2011. Web. 14 Nov. 2011. <<http://www.eia.gov/>>.

³⁰ Innovation. Performance. Savings. ENERGY STAR. United States Department of Energy, 2011. Web. 16 Nov. 2011. <http://www.energystar.gov/ia/partners/manuf_res/CFL_PRG_FINAL.pdf>.

³¹ Ibid.

³² Ibid.

³³ Maryland QuickFacts from the US Census Bureau. State and County QuickFacts. U.S. Census Bureau, 13 Oct. 2011. Web. 11 Nov. 2011. <<http://quickfacts.census.gov/qfd/states/24000.html>>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

5. Input savings by sector into IMPLAN model and run impacts.
 - a. Household savings inputs were distributed among household income ranges using household income distribution percentages taken from the Census' 2005-2009 American Community Survey 5-Year estimates for Maryland. (Note: In some cases, totals do not add up to 100.0 percent due to margin of error.)
6. Export impacts and analyze.

3.1.9 Energy Efficiency in the Power Sector – General

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **Energy Efficiency in the Power Sector – General**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 32—Natural gas distribution
 - iii. 375—Environmental and other technical consulting
 - iv. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **Energy Efficiency in the Power Sector – General**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. **Energy Efficiency in the Power Sector – General**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$900,000
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file). (Note: IMPLAN code 336 (Transit and ground passenger transportation) has been changed to 432 (Other state and local government enterprises) in all instances due to the state/local government overseeing MARC operations via MTA.)
 - a. **Energy Efficiency in the Power Sector – General**
 - i. 31—Electric power generation, transmission, and distribution
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **Energy Efficiency in the Power Sector – General**
 - i. Potential Biomass=2,700,000 in tons

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Energy Efficiency in the Power Sector – General**
 - i. Assume only 5% per year=135,000 (potential biomass*0.05)
 - ii. Assumptions:
 1. #2 Fuel Oil³⁴=\$3.82/gallon
 2. Wood fuel:³⁵=\$20.00/ton
 3. Wood fuel consumed=135,000 tons
 4. Total wood fuel cost=\$2,700,000 (wood fuel*wood fuel consumed)
 5. Labor (1 hour/day)=\$30.00 an hour
 6. Oil displaced:=8,573,770 gallons
 7. Dollars not spent on fuel oil=\$32,751,803 (#2 fuel oil*oil displaced)
 8. Net fuel savings:=\$30,051,803 (dollars not spent on fuel oil-total wood fuel cost)
 9. Less labor cost=\$8,250
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **Energy Efficiency in the Power Sector – General**
 - i. 31–\$30,043,553 [(\$30,051,803 net fuel savings – \$8,250 less labor cost)]=Average Annual savings Associated with Energy Efficiency in the Power Sector
5. Input savings by sector into IMPLAN model and run impacts.
 - a. Household savings inputs were distributed among household income ranges using household income distribution percentages taken from the Census' 2005-2009 American Community Survey 5-Year estimates for Maryland. (Note: In some cases, totals do not add up to 100.0 percent due to margin of error.)
6. Export impacts and analyze.

3.1.10 Energy Efficiency in the Power Sector – Utility Subprograms

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).

³⁴ Average Home Heating Oil Prices. U.S. Energy Information Agency. EIA. Web. 16 Nov 2011. <<http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=RCLC1&f=D>>

³⁵ Fuel Cost Comparison: Wood vs. Natural Gas. Forester's Coop. Forester's Coop. Web. 16 Nov. 2011. <http://www.forco-op.com/project/wood_fuel_comp.pdf>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- a. Energy Efficiency in the Power Sector – BGE**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 39—Maintenance & repair construction of nonresident structures
 - iii. 319—Wholesale trade businesses
 - iv. 322—Retail Stores – Electronics and appliances
 - v. 330—Retail Stores - Miscellaneous
 - vi. 369—Architectural, engineering, and related services
 - vii. 375—Environmental and other technical consulting
 - viii. 432—Other state and local government enterprises
- b. Energy Efficiency in the Power Sector – Pepco**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 39—Maintenance & repair construction of nonresident structures
 - iii. 319—Wholesale trade businesses
 - iv. 322—Retail Stores – Electronics and appliances
 - v. 330—Retail Stores - Miscellaneous
 - vi. 369—Architectural, engineering, and related services
 - vii. 375—Environmental and other technical consulting
 - viii. 432—Other state and local government enterprises
- c. Energy Efficiency in the Power Sector – SMECO**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 39—Maintenance & repair construction of nonresident structures
 - iii. 319—Wholesale trade businesses
 - iv. 322—Retail Stores – Electronics and appliances
 - v. 330—Retail Stores - Miscellaneous
 - vi. 369—Architectural, engineering, and related services
 - vii. 375—Environmental and other technical consulting
 - viii. 432—Other state and local government enterprises
- d. Energy Efficiency in the Power Sector – Potomac Edison**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 39—Maintenance & repair construction of nonresident structures
 - iii. 319—Wholesale trade businesses
 - iv. 322—Retail Stores – Electronics and appliances
 - v. 330—Retail Stores - Miscellaneous
 - vi. 369—Architectural, engineering, and related services
 - vii. 375—Environmental and other technical consulting
 - viii. 432—Other state and local government enterprises

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- e. Energy Efficiency in the Power Sector – Delmarva Power**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 39—Maintenance & repair construction of nonresident structures
 - iii. 319—Wholesale trade businesses
 - iv. 322—Retail Stores – Electronics and appliances
 - v. 330—Retail Stores - Miscellaneous
 - vi. 369—Architectural, engineering, and related services
 - vii. 375—Environmental and other technical consulting
 - viii. 432—Other state and local government enterprises
- 2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. Energy Efficiency in the Power Sector – BGE**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - b. Energy Efficiency in the Power Sector – Pepco**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - c. Energy Efficiency in the Power Sector – SMECO**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - d. Energy Efficiency in the Power Sector – Potomac Edison**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - e. Energy Efficiency in the Power Sector – Delmarva Power**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
- 3. Distribute inputs among identified IMPLAN sectors.
 - a. Energy Efficiency in the Power Sector – BGE**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$150,000 each
 - iii. 100% Paid out for Compliance by the Energy Companies--\$1,000,000
 - b. Energy Efficiency in the Power Sector – Pepco**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$150,000 each
 - iii. 100% Paid out for Compliance by the Energy Companies--\$1,000,000
 - c. Energy Efficiency in the Power Sector – SMECO**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$150,000 each
 - iii. 100% Paid out for Compliance by the Energy Companies--\$1,000,000
 - d. Energy Efficiency in the Power Sector – Potomac Edison**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$150,000 each
 - iii. 100% Paid out for Compliance by the Energy Companies--\$1,000,000

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- e. **Energy Efficiency in the Power Sector – Delmarva Power**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$150,000 each
 - iii. 100% Paid out for Compliance by the Energy Companies--\$1,000,000
- 4. Input sales by sector into IMPLAN model and run impacts.
- 5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file). (Note: IMPLAN code 336 (Transit and ground passenger transportation) has been changed to 432 (Other state and local government enterprises) in all instances due to the state/local government overseeing MARC operations via MTA.)
 - a. **Energy Efficiency in the Power Sector – BGE**
 - i. 381—Management of companies and enterprises
 - ii. 10001-10009 Households – All income levels
 - b. **Energy Efficiency in the Power Sector – Pepco**
 - i. 381—Management of companies and enterprises
 - ii. 10001-10009 Households – All income levels
 - c. **Energy Efficiency in the Power Sector – SMECO**
 - i. 381—Management of companies and enterprises
 - ii. 10001-10009 Households – All income levels
 - d. **Energy Efficiency in the Power Sector – Potomac Edison**
 - i. 381—Management of companies and enterprises
 - ii. 10001-10009 Households – All income levels
 - e. **Energy Efficiency in the Power Sector – Delmarva Power**
 - i. 381—Management of companies and enterprises
 - ii. 10001-10009 Households – All income levels
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **Energy Efficiency in the Power Sector – BGE**
 - i. Number of BGE Customers=1,231,481
 - ii. BGE Residential Customers=1,113,818
 - iii. BGE Business Customers=117,663
 - b. **Energy Efficiency – PEPCO**
 - i. Number of Pepco Customers=519,743
 - ii. Pepco Residential Customers=472,874
 - iii. Pepco Business Customers=46,869
 - c. **Energy Efficiency – SMECO**
 - i. Number of SMECO Customers=147,036
 - ii. SMECO Residential Customers=133,560
 - iii. SMECO Commercial Customers=13,476

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- d. Energy Efficiency - Delmarva Power**
 - i. Number of SMECO Customers=198,861
 - ii. DPL Residential Customers=172,766
 - iii. DPL Commercial Customers=26,095
 - e. Energy Efficiency - AP (Potomac Edison)**
 - i. Number of AP (Potomac Edison)=198,861
 - ii. DPL Residential Customers=172,766
 - iii. DPL Commercial Customers=26,095
3. Research savings data for each policy according to part of program to be affected by savings.
- a. Energy Efficiency in the Power Sector – BGE**
 - i. Percentage Businesses=0.095545932 (117,663/number of BGE customers)
 - ii. Percentage Households=0.904454068
 - iii. Min Rebate - For Appliances³⁶=25
 - iv. Max Energy Savings - CFL Fixtures - Businesses³⁷=65
 - b. Energy Efficiency – PEPCO**
 - i. Min Appliance Rebate for Residential Customers³⁸=20
 - ii. Max Energy Savings - per CFL Fixture - Businesses³⁹=40
 - iii. Pepco Residential Customers=472,874
 - iv. Pepco Commercial Customers=46,869
 - c. Energy Efficiency – SMECO**
 - i. Min Appliance Rebate for Residential Customers⁴⁰=50
 - ii. Max Energy Savings - per CFL Fixture - Businesses⁴¹=50
 - d. Energy Efficiency – Delmarva Power**
 - i. Min Appliance Rebate for Residential Customers⁴²=20
 - ii. Max Energy Savings - per CFL Fixture - Businesses⁴³=40

³⁶ Lighting and Appliances Appliance Rebates | BGE Smart Energy Savers Program. Smart Energy Savers Programs | BGE Smart Energy Savers Program. Baltimore Gas and Electric, 2010. Web. 16 Nov. 2011.

<https://www.bgesmartenergy.com/residential/lighting-appliances/appliance-rebates>.

³⁷ Energy Solutions for Business Lighting & Controls | BGE Smart Energy Savers Program. Smart Energy Savers Programs | BGE Smart Energy Savers Program. Baltimore Gas and Electric, 2010. Web. 16 Nov. 2011. <<https://www.bgesmartenergy.com/business/energy-solutions-business/lighting-controls>>.

³⁸ Delmarva - Appliance Rebate Program. Delmarva Power. Pepco Holdings Inc., 2011. Web. 16 Nov. 2011. <<http://homeenergysavings.delmarva.com/md/appliance-rebate>>.

³⁹ Energy Savings Program - Delmarva Power. Energy Savings Program - Delmarva Power. Pepco Holdings Inc., 2010. Web. 16 Nov. 2011. <<https://cienergyefficiency.delmarva.com/Lighting.aspx>>.

⁴⁰ Appliances. SMECO - Southern Maryland Electric Cooperative. Rebates for New Appliances. Web. 16 Nov. 2011. <<https://www.smeco.coop/save/appliance/>>.

⁴¹ Ibid.

⁴² Ibid.

⁴³ Ibid.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- e. **Energy Efficiency – Potomac Edison**
 - i. Min Appliance Rebate for Residential Customers⁴⁴=25
 - ii. Max Energy Savings - per CFL Fixture - Businesses⁴⁵=30
- 4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **Energy Efficiency in the Power Sector – BGE**
 - i. 10001-10009 – \$27,845,450.00 [(1,113,818 Number of BGE Customers * \$25.00 Minimum Rebate for Appliances)]=Average Savings For BGE Customer Households
 - ii. 381 – \$7,648,095.00 [(117,663 Number of BGE Business Customers * \$65.00 Maximum Rebate for CFL Fixtures for Businesses)]=Average Savings for BGE Business Customers
 - b. **Energy Efficiency – PEPCO**
 - i. 381 – \$1,874,760 [(46,869 Number of Pepco Business Customers * \$40.00 Maximum Energy Savings per CFL Fixture)]=Average Savings to Pepco Business Customers
 - ii. 10001 – 10009 – \$9,457,480 [(472,874 Number of Pepco Residential Customers * \$20.00 Minimum Energy Savings Rebate for Appliances)]=Average Savings to Pepco Residential Customers
 - c. **Energy Efficiency –SMECO**
 - i. 381 – \$673,800 [(13,476 Number of SMECO Business Customers * \$50.00 Max Energy Savings per CFL Fixture for Businesses)]=Average Savings for SMECO Business Customers
 - ii. 10001-10009 – \$6,678,000 [(133,560 Number of SMECO Residential Customers * \$50.00 Minimum Appliance Rebate for Residential Customers)]=Average Savings for SMECO Residential Customers
 - d. **Energy Efficiency - Delmarva Power**
 - i. 381 – \$1,043,800 [(26,095 Number of Delmarva Power Business Customers * \$40.00 Max Energy Savings Rebate per CFL Fixture)]=Average Savings for Delmarva Business Customers
 - ii. 10001-10009 – \$3,455,320 [(172,766 Number of Delmarva Power Residential Customers * \$20.00 Minimum Appliance Rebate)]=Average Savings for Delmarva Power Residential Customers

⁴⁴ Appliances. SMECO - Southern Maryland Electric Cooperative. Rebates for New Appliances. Web. 16 Nov. 2011. <<https://www.smeco.coop/save/appliance/>>.

⁴⁵ Commercial and Industrial Rebate Program. Allegheny Energy, Inc. Allegheny Energy, Inc., 25 June 2011. Web. 16 Nov. 2011. <<http://www.alleghenypower.com/EngConserv/MDBus/Lighting.asp>>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- e. **Energy Efficiency - Potomac Edison**
 - i. $381 - \$782,850 [(26,095 \text{ Number of Potomac Energy Business Customers} * \$30.00 \text{ Maximum CFL Fixture Rebate})]=\text{Average Savings for Potomac Energy Business Customers}$
 - ii. $10001-10009 - \$4,319,150 [(172,766 \text{ Number of Potomac Energy Residential Customers} * \$25.00 \text{ Minimum Appliance Rebate for Residential Customers})]=\text{Average Savings for Potomac Energy Residential Customers}$
- 5. Input savings by sector into IMPLAN model and run impacts.
 - a. Household savings inputs were distributed among household income ranges using household income distribution percentages taken from the Census' 2005-2009 American Community Survey 5-Year estimates for Maryland. (Note: In some cases, totals do not add up to 100.0 percent due to margin of error.)
- 6. Export impacts and analyze.

3.1.11 Maryland Renewable Energy Portfolio Standard

Investment Phase

- 1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **Maryland Renewable Energy Portfolio Standard**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 36—Construction of other new nonresidential structures
 - iii. 375—Environmental and other technical consulting
 - iv. 432—Other state and local government enterprises
- 2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **Maryland Renewable Energy Portfolio Standard**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
- 3. Distribute inputs among identified IMPLAN sectors.
 - a. **Maryland Renewable Energy Portfolio Standard**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$450,000 each
- 4. Input sales by sector into IMPLAN model and run impacts.
- 5. Export impacts and analyze.

Operation Phase

- 1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file). (Note: IMPLAN code 336 (Transit and ground passenger transportation) has been changed to 432 (Other state and local government enterprises) in all instances due to the state/local government overseeing MARC operations via MTA.)

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- a. **Maryland Renewable Energy Portfolio Standard**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 381—Management of companies and enterprises
 - iii. 10001 – 10009—Households – All income levels
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **Maryland Renewable Energy Portfolio Standard**
 - i. Total Energy Used by Government in 2009 – 1,500,000,000 kilowatts
 - ii. Reduction by 2020 – 20%
 - iii. Annual Reduction Rate – 2.5%
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Maryland Renewable Energy Portfolio Standard**
 - i. Annual Energy Consumed by Households in MD in 2005 per capita⁴⁶— 5,130 kilowatts
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **Maryland Renewable Energy Portfolio Standard**
 - i. 37,500,000 kilowatts [(1,500,000,000 kilowatts consumed by Government for Electricity * 2.5% reduction Annually)]=Average Annual Reduction of Consumption in kilowatts
 - ii. \$4,278,750.00 [(37,500,000 Average Annual Reduction to Achieve 20% Reduction by 2020 * \$0.11 Average Cost per kwh)]=Average Annual Savings from Reduction
 - iii. 31 – \$2,139,375.00
 - iv. 351 – \$2,139,375.00
 - v. 127.58 kilowatts [(5,103 Household Consumption of Electricity in 2005 * 2.5% Annual Reduction Goal)]=Average Annual Reduction in kilowatts per Household
 - vi. \$14.57 [(127.58 Average Annual Reduction in kilowatts per Household * \$0.11 Average Cost per kwh)]=Average Annual Savings from Reduction to Households
 - vii. 10001-10009 – \$29,992,820.36 [(\$14.57 Average Annual Savings from Reduction to Households * 2,060,469 Household Customers (totaled top five Energy Companies in MD))]=Average Annual Savings Across Households in MD
5. Input savings by sector into IMPLAN model and run impacts.
 - a. Household savings inputs were distributed among household income ranges using household income distribution percentages taken from the Census' 2005-2009 American Community Survey 5-Year estimates for Maryland. (Note: In some cases, totals do not add up to 100.0 percent due to margin of error.)
6. Export impacts and analyze.

⁴⁶ Energy Consumption in Maryland Homes. Web. 7 Nov. 2011. <<http://apps1.eere.energy.gov/states/residential.cfm/state=MD#elec>>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.1.12 Incentives and Grant Programs to Support Renewable Energy

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).

a. Commercial Clean Energy Grant Program

- i. 39—Maintenance & repair construction of nonresident structures
- ii. 215—Heating equipment (except warm air furnaces)
- iii. 222—Turbine and turbine generator set units manufacturing
- iv. 319—Wholesale trade businesses
- v. 322—Retail Stores – Electronics and appliances
- vi. 330—Retail Stores – Miscellaneous
- vii. 369—Architectural, engineering, and related services
- viii. 375—Environmental and other technical consulting
- ix. 432—Other state and local government enterprises

b. Residential Clean Energy Grants Program

- i. 39—Maint & repair construction of nonresident structures
- ii. 215—Heating equipment (except warm air furnaces)
- iii. 222—Turbine and turbine generator set units manufacturing
- iv. 319—Wholesale trade businesses
- v. 322—Retail Stores – Electronics and appliances
- vi. 330—Retail Stores – Miscellaneous
- vii. 369—Architectural, engineering, and related services
- viii. 375—Environmental and other technical consulting
- ix. 432—Other state and local government enterprises

c. Clean Energy Incentive Tax Credit Program

- i. 215—Heating equipment (except warm air furnaces)
- ii. 222—Turbine and turbine generator set units manufacturing
- iii. 253—Electricity and signal testing instruments manufacturing
- iv. 267—Motor and generator manufacturing
- v. 369—Architectural, engineering, and related services
- vi. 375—Environmental and other technical consulting
- vii. 432—Other state and local government enterprises

d. Generating Clean Horizons Program

- i. 31—Electric power generation, transmission, and distribution
- ii. 375—Environmental and other technical consulting
- iii. 432—Other state and local government enterprises

e. Project Sunburst

- i. 31—Electric power generation, transmission, and distribution
- ii. 215—Heating equipment (except warm air furnaces)
- iii. 243—Semiconductor an related device manufacturing
- iv. 375—Environmental and other technical consulting
- v. 432—Other state and local government enterprises

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- f. **Biomass Program**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 375—Environmental and other technical consulting
 - iii. 432—Other state and local government enterprises
- g. **Land-based Wind Programs**
 - i. 222—Turbine and turbine generator set units manufacturing
 - ii. 375—Environmental and other technical consulting
 - iii. 432—Other state and local government enterprises
- 2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **Commercial Clean Energy Grant Program**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - b. **Residential Clean Energy Grants Program**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - c. **Clean Energy Incentive Tax Credit Program**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - d. **Generating Clean Horizons Program**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - e. **Project Sunburst**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - f. **Biomass Program**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - g. **Land-based Wind Programs**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
- 3. Distribute inputs among identified IMPLAN sectors.
 - a. **Commercial Clean Energy Grant Program**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$112,500 each
 - b. **Residential Clean Energy Grants Program**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$112,500 each
 - c. **Clean Energy Incentive Tax Credit Program**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$150,000 each
 - d. **Generating Clean Horizons Program**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$450,000 each

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- e. **Project Sunburst**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$225,000 each
 - f. **Biomass Program**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$450,000 each
 - g. **Land-based Wind Programs**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$450,000 each
4. Input sales by sector into IMPLAN model and run impacts.
 5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file). (Note: IMPLAN code 336 (Transit and ground passenger transportation) has been changed to 432 (Other state and local government enterprises) in all instances due to the state/local government overseeing MARC operations via MTA.)
 - a. **Commercial Clean Energy Grant Program**
 - i. 381—Management of companies and enterprises
 - b. **Residential Clean Energy Grants Program**
 - i. 10001 – 10009—Households – All income levels
 - c. **Clean Energy Incentive Tax Credit Program**
 - i. 381—Management of companies and enterprises
 - ii. 10001 – 10009—Households – All income levels
 - d. **Generating Clean Horizons Program**
 - i. 432—Other state and local government enterprises
 - e. **Project Sunburst**
 - i. 381—Management of companies and enterprises
 - f. **Biomass Program**
 - i. 10001 – 10009—Households – All income levels
 - g. **Land – based Wind Programs**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 381—Management of companies and enterprises
 - iii. 10001 – 10009—Households – All income levels
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **Commercial Clean Energy Grant Program**
 - b. **Residential Clean Energy Grants Program**
 - c. **Clean Energy Incentive Tax Credit Program**
 - i. Claimed Tax Credits Since 2009 – \$8,500,000
 - ii. Average Annual Tax Credit – \$1,750



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- d. **Generating Clean Horizons Program**
 - i. Total Energy Used by Government in 2009 – 1,500,000,000 kilowatts
 - ii. Reduction Goal by 2016 – 16%
- e. **Project Sunburst**
- f. **Biomass Program**
- g. **Land-based Wind Programs**
 - i. Total Wind Energy Generated Annually—120,000 kilowatts
 - ii. Total Wind Energy Generation Added Since Project Windswept—421 kilowatts
 - iii. Average Annual Wind Energy Generated—120,421 kilowatts
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Commercial Clean Energy Grant Program**
 - i. Potential Savings from Clean Energy Grant – \$575
 - ii. Total Applicants for Grants (from MEA website) – 42 Businesses
 - b. **Residential Clean Energy Grants Program**
 - i. Total Applicants for Grants (from MEA website)—5,609 Residential Applicants
 - ii. Average Grantees A Year – 1,870 Residential Grantees a year
 - iii. Potential Savings from Clean Energy Grant – \$575
 - c. **Clean Energy Incentive Tax Credit Program**
 - i. Number of Business Tax Credit Applicants (From MEA website) – 42
 - d. **Generating Clean Horizons Program**
 - i. Maryland Electricity cost (in KWh)⁴⁷--\$0.11 per kW/h
 - e. **Project Sunburst**
 - i. Total Awardees (from MEA website)—17
 - ii. Total Money Granted (from MEA website)--\$9,381,130.00
 - f. **Biomass Program**
 - i. Annual Savings from Biomass Production – \$4,282,740.00 (from DNR)
 - g. **Land-based Wind Programs**
 - i. Maryland Electricity cost (in KWh)⁴⁸--\$0.11 per kW/h
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **Commercial Clean Energy Grant Program**
 - i. $381 - \$24,150 [(42 \text{ Applicants to date for Commercial Clean Energy Grants} * \$575 \text{ Annual Savings Associated with Clean Energy Initiatives})]=\text{Average Annual Savings from Strategy}$

⁴⁷ Average Energy Prices in the Washington-Baltimore Area. Mid-Atlantic Information Office. 27 Sept. 2011. U.S. Bureau of Labor Statistics (BLS). 11 Nov. 2011 <http://www.bls.gov/ro3/apwb.htm#wb_energy_table1>.

⁴⁸ Ibid.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

b. Residential Clean Energy Grants Program

- i. $10001-10009 - \$1,075,058.33 [(1,870 \text{ Residential Applicants Annually for Grants} * \$575 \text{ Potential Energy Savings from Grants})]=\text{Average Annual Savings to Households}$

c. Clean Energy Incentive Tax Credit Program

- i. $4,857 [(\$8,500,000 \text{ Total Tax Credits Claimed since 2009} / \$1,750 \text{ Average Tax Credit})]=\text{Average Potential Maryland Residents that have Claimed the Tax Credit since 2009}$
- ii. $1,619 [(4,857 \text{ Average Potential Maryland Residents that have Claimed the Tax Credit since 2009} / 3 \text{ Years Since Program Began})]=\text{Average Annual Potential Maryland Residents that Have Claimed Credit}$
- iii. $10001-10009 - \$2,833,333.33 [(\$1,750 \text{ Average Annual Tax Credit Claimed} * 1,619 \text{ Average Annual Potential Maryland Residents that Have Claimed Credit})]=\text{Average Annual Savings to Maryland Households from Tax Credit}$
- iv. $\$2,833,333.33 [(\text{Total Annually Distributed from previous calculation})]$
- v. $1,619 [(4,857 \text{ Average Potential Maryland Residents that have Claimed the Tax Credit since 2009} / 3 \text{ Years Since Program Began})]=\text{Average Annual Potential Maryland Residents that Have Claimed Credit}$
- vi. $2.5\% [(42 \text{ Clean Energy Grant Applicants that have been Businesses} / 1,619 \text{ Average Annual Potential Maryland Residents that Have Claimed Credits})]=\text{Potential of Annual Applicants that may be businesses}$
- vii. $381--\$73,500 [(\$2,833,333.33 \text{ Total Annually Distributed from previous calculations} * 2.5\% \text{ of Average Annual Applicants may be businesses})]=\text{Average Annual Awards to Businesses}$

d. Generating Clean Horizons Program

- i. $\$171,150,000.00 [(1,500,000,000 \text{ kilowatts of Energy used by Government in 2009} * \$0.11 \text{ Average Cost of Electricity per kwh})]=\text{Average Cost to Government in 2009 for Energy Consumption}$
- ii. $240,000,000 [(1,500,000,000 \text{ kilowatts of Energy used by Government in 2009} * 16\% \text{ Reduction goal by 2016})]=\text{Kilowatt Consumption Reduction Goal by 2016}$
- iii. $60,000,000 [(240,000,000 \text{ Kilowatt Consumption Reduction Goal by 2016} / 4 \text{ Years until 2016 Deadline})]=\text{Average Annual Reduction Goal until 2016}$
- iv. $1,440,000,000 [(1,500,000,000 \text{ kilowatts of Energy used by Government in 2009} - 60,000,000 \text{ Average Annual Reduction Goal Until 2016})]=\text{Average Annual Amount to be used by Government in Next Year}$
- v. $\$164,304,000.00 [(1,440,000,000 \text{ Average Annual Amount to be used by Government in Next Year} * \$0.11 \text{ Average Cost per kilowatt hour})]=\text{Average Annual Cost to Government in Next Year}$

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- vi. 432 – \$6,846,000.00 [(\$171,150,000.00 Average Annual Cost of Electricity in 2009 to Government - \$164,304,000.00 Average Annual Cost of Electricity Next Year to Government)]=Average Annual Savings Associated with Reduction
- e. **Project Sunburst**
 - i. 381 – \$9,381,130.00 [(Total Money Granted Under this Project Via the MEA website)]
- f. **Biomass Program**
 - i. 10001-10009 – \$4,282,740.00 [(Biomass Savings Annually provided by DNR)]
- g. **Land-based Wind Programs**
 - i. \$13,740.04 [(\$0.11 Average Cost per kwh of Electricity * 120,421 kilowatts generated by Wind Energy)]=Average Annual Savings to Consumers for Wind Energy
 - ii. 381 – \$6,870.02
 - iii. 31 – \$6,870.02
 - iv. \$13,740.04 [(\$0.11 Average Cost per kwh of Electricity * 120,421 kilowatts generated by Wind Energy)]=Average Annual Savings to Consume Wind Energy
 - v. 10001-10009 – \$13,740.04
- 5. Input savings by sector into IMPLAN model and run impacts.
 - a. Household savings inputs were distributed among household income ranges using household income distribution percentages taken from the Census' 2005-2009 American Community Survey 5-Year estimates for Maryland. (Note: In some cases, totals do not add up to 100.0 percent due to margin of error.)
- 6. Export impacts and analyze.

3.1.13 Offshore Wind Initiatives to Support Renewable Energy

Investment Phase

- 1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **Offshore Wind Initiative to Support Renewable Energy**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 222—Turbine and turbine generator set units manufacturing
 - iii. 375—Environmental and other technical consulting
 - iv. 432—Other state and local government enterprises
- 2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **Offshore Wind Initiative to Support Renewable Energy**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
- 3. Distribute inputs among identified IMPLAN sectors.



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- a. **Offshore Wind Initiative to Support Renewable Energy**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$300,000 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file). (Note: IMPLAN code 336 (Transit and ground passenger transportation) has been changed to 432 (Other state and local government enterprises) in all instances due to the state/local government overseeing MARC operations via MTA.)
 - a. **Offshore Wind Initiative to Support Renewable Energy**
 - i. 381—Management of companies and enterprises
 - ii. 10001 – 10009—Households – All income levels
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **Offshore Wind Initiative to Support Renewable Energy**
 - i. Reduction Total by 2020 – 20%
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Offshore Wind Initiative to Support Renewable Energy**
 - i. Maryland Electricity cost (in KWh)⁴⁹--\$0.11 per kW/h
 - ii. Total Energy Used by Government as of 2009 – 1,500,000,000
 - iii. Average Spent by Households on Energy Annually⁵⁰--\$2,200
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **Offshore Wind Initiative to Support Renewable Energy**
 - i. 37,500,000 [(1,500,000,000 Total Energy Used by Government as of 2009 * (20% Reduction by 2020 / 8 Years until 2020))]=Average Annual Reduction Associated with Wind Energy in kwh
 - ii. 381 – \$4,278,750 [(37,500,000 Average Annual Reduction Associated with Wind Energy 8 \$0.11 Average Cost per kilowatt hour)]=Average Annual Savings Associated with Wind Energy
 - iii. 20,000 kilowatts [(\$2,200 Average Annual Cost to Households for Energy Consumption / \$0.11 Average Cost per kilowatt hour)]=Average Annual kilowatts consumed per Household

⁴⁹ Average Energy Prices in the Washington-Baltimore Area. Mid-Atlantic Information Office. 27 Sept. 2011. U.S. Bureau of Labor Statistics (BLS). 11 Nov. 2011 <http://www.bls.gov/ro3/apwb.htm#wb_energy_table1>.

⁵⁰ “A Guide to Energy-Efficient Heating and Cooling.” Aug. 2009. U.S. Environmental Protection Agency (EPA). 27 Oct. 2011. <http://www.energystar.gov/ia/partners/publications/pubdocs/HeatingCoolingGuide%20FINAL_9-4-09.pdf>.



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- iv. 500 kilowatts [(20,000 kilowatts Average Annual kilowatts consumed per Household * 2.5% Annual Reduction from Wind Energy)]=Average Annual Kilowatts Reduced from Wind Energy
 - v. \$57.05 [(500 kilowatts Average Annual kilowatts Reduced from Wind Energy * \$0.11 Average Cost per kilowatt hour)]=Average Annual Savings to Households from Wind Energy
 - vi. 10001-10009 – \$319,993.45 [(5,609 Maryland Residents that Have Taken Advantage of Energy Saving Opportunities * \$57.05 Average Annual Savings to Households from Wind Energy)]=Average Annual Savings Associated with Total Households taking Advantage of Energy Efficient Strategies
5. Input savings by sector into IMPLAN model and run impacts.
 - a. Household savings inputs were distributed among household income ranges using household income distribution percentages taken from the Census' 2005-2009 American Community Survey 5-Year estimates for Maryland. (Note: In some cases, totals do not add up to 100.0 percent due to margin of error.)
 6. Export impacts and analyze.

3.1.14 Combined Heat and Power

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **Combined Heat and Power**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 375—Environmental and other technical consulting
 - iii. 377—Advertising and related services
 - iv. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **Combined Heat and Power**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. **Combined Heat and Power**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$300,000 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file). (Note: IMPLAN code 336 (Transit and ground passenger transportation) has been changed to 432 (Other state and local government enterprises) in all instances due to the state/local government overseeing MARC operations via MTA.)



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- a. **Combined Heat and Power**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 381—Management of companies and enterprises
 - iii. 10001 – 10009—Households – All income levels
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **Combined Heat and Power**
 - i. Total Energy Used by State Government As of 2009 – 1,500,000,000 kwh
 - ii. Number of Clean Energy Awards since 2009 – 5,702
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Combined Heat and Power**
 - i. Maryland Electricity cost (in KWh)⁵¹--\$0.11 per kW/h
 - ii. Total Power Provided by Turbines⁵²– 300,000,000
 - iii. Total Power Provided by Previous Methods– 1,200,000,000
 - iv. Cost of Turbine Power⁵³ – \$0.06 per kwh
 - v. Average Spent by Households on Energy Annually⁵⁴--\$2,200
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **Combined Heat and Power**
 - i. \$171,150,000 [(1,500,000,000 Total Energy Used by State Government in 2009 in kwh * 0.11 Average Cost of Electricity per kwh)]=Average Cost Annually to State Government in Electricity
 - ii. 1,200,000,000 [(1,500,000,000 Total Energy Used by State Government in 2009 in kwh – 300,000,000 kwh that can be generated using Turbine CHP)]=Total Energy to Be Created Using Previous Methods
 - iii. \$18,000,000 [(300,000,000 kwh that can be Generated using Turbine CHP * \$0.06 Cost of Turbine Power in kwh)]=Cost Associated with Power Generated by CHP Turbines
 - iv. \$136,920,000 [(1,200,000,000 Total Energy to be Created Using Previous Methods net the CHP Boiler * \$0.11 Average Energy Costs Currently per kwh)]=Total Cost for Energy Production Not From CHP Turbine
 - v. \$154,920,000 [(\$18,000,000 Cost Associated with Power Generated by CHP Turbines + \$136,920,000 Total Costs for Energy Production Not from CHP Turbine)]=Total Costs Under CHP Strategy for Same Production from 2009

⁵¹ Average Energy Prices in the Washington-Baltimore Area. Mid-Atlantic Information Office. 27 Sept. 2011. U.S. Bureau of Labor Statistics (BLS). 11 Nov. 2011 <http://www.bls.gov/ro3/apwb.htm#wb_energy_table1>.

⁵² "Combined Heat & Power (CHP) Resource Guide." 2nd edition. Sept. 2003. Midwest CHP Application Center (MAC). 27 Oct. 2011. <http://www.chpcentermw.org/pdfs/Resource_Guide_10312005_Final_Rev5.pdf>.

⁵³ Ibid.

⁵⁴ "A Guide to Energy-Efficient Heating and Cooling." Aug. 2009. U.S. Environmental Protection Agency (EPA). 27 Oct. 2011. <http://www.energystar.gov/ia/partners/publications/pubdocs/HeatingCoolingGuide%20FINAL_9-4-09.pdf>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- vi. \$16,230,000 [(\$171,150,000 Average Cost Annually to State Government in Electricity - \$154,920,000 Total Costs Under CHP Strategy For Same Production in 2009)]=Average Annual Savings to Commercial Industries
 - vii. 31--\$8,115,000
 - viii. 351--\$8,115,000
 - ix. 20,000 kilowatts [(\$2,200 Spent on Electricity by Households Annually / \$0.11 Average Cost Per Kilowatt Hour)]=Average Annual kilowatts used by a household in Electricity Annually
 - x. 4,000 kilowatts [(20,000 Average Annual kilowatts used by a Household in Electricity Annually * 20% reduction from turbine potential in kwh)]=Average Annual Reduction in Household Kilowatt Usage from previous methods
 - xi. 16,000 kilowatts [(20,000 Average Annual kilowatts used by a Household in Electricity Annually – 4,000 kilowatts Average Annual Reduction in Household Kilowatt Usage from previous methods)]=Average Annual kilowatt needs to Households from Previous Methods
 - xii. \$1,825.60 [(16,000 Average Annual kilowatt needs to Households from Previous Methods * \$0.11 Average Cost per kilowatt hour)]=Average Cost Associated with Mix of Previous Methods and CHP
 - xiii. \$240.00 [(4,000 Average Annual kilowatt needs to Households from CHP Turbines * \$0.06 Costs Associated with CHP Turbines)]=Average Annual Cost Associated with CHP generated Energy
 - xiv. \$2,065.60 [(\$1,825.60 Average Cost Associated with Mix of Previous Methods and CHP + \$240.00 Average Annual Cost Associated with CHP generated Energy)]=Average Costs for Consumption of Electricity Annually per Household
 - xv. \$134.40 [(\$2,200 Average Cost to Households Yearly for Energy Needs - \$2,065.60 Average Costs for Consumption of Electricity Annually per Household)]=Average Annual Savings from CHP to Households
 - xvi. 10001-10009 – \$753,849.60 [(5,609 Number of Potential Awards that are for Residential Areas * \$134.40 Average Annual Savings from CHP to Households)]=Average Annual Savings in MD from CHP Strategy Total
5. Input savings by sector into IMPLAN model and run impacts.
 - a. Household savings inputs were distributed among household income ranges using household income distribution percentages taken from the Census' 2005-2009 American Community Survey 5-Year estimates for Maryland. (Note: In some cases, totals do not add up to 100.0 percent due to margin of error.)
 6. Export impacts and analyze.

3.1.15 Main Street

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- a. **Main Street Initiatives**
 - i. 34—Construction of new nonresidential commercial and healthcare structures
 - ii. 39—Maintenance & repair construction of nonresidential structures
 - iii. 369—Architectural, engineering, and related services
 - iv. 375—Environmental and other technical consulting services
 - v. 377—Advertising and related services
 - vi. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **Main Street Initiatives**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. **Main Street Initiatives**
 - i. 100% from industries in electric production to purchase allowances—(\$1,000,000)
 - ii. 10% for government administrative costs/responsibilities—\$100,000
 - iii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$180,000 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. **Main Street Initiatives**
 - i. 381—Management of companies and enterprises
 - ii. 10001 – 10009—Households – All income levels
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **Main Street Initiatives**
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Main Street Initiatives**
 - i. Retail Trade Average Annual Pay per QCEW = \$27,754/year
 - ii. Number of New Jobs=241
 - iii. Number of Retail Businesses located in Main Street Areas (per DHCD) = 84
 - iv. Retail Sector Addition to Annual GDP in Maryland=\$23,114,000,000
 - v. Number of Listed Retail Establishments in Maryland=65,489
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **Main Street Initiatives**
 - i. 10001-10009 – \$6,688,714 [(241 Number of New Jobs * \$27,754 Average Annual Pay in Retail Industry)]=Average Annual Increase to Income

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- ii. $\$352,945 [(\$23,114,000,000 \text{ Retail Sector Addition to Annual GDP in Maryland} / 65,489 \text{ Number of Listed Retail Establishment in Maryland})]=\text{Average Contribution to GDP from Retail Establishments in Maryland}$
- iii. $381 - \$29,647,361 [(84 \text{ Number of Retail Businesses located in the Main Street Areas (per DHCD)} * \$352,945 \text{ Average Contribution to GDP from Retail Establishments in Maryland})]=\text{Average Annual Contribution per Main Street Businesses on a Yearly Basis to GDP}$
- 5. Input savings by sector into IMPLAN model and run impacts.
- 6. Export impacts and analyze.

3.1.16 Energy Efficiency for Affordable Housing

Investment Phase

- 1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **Energy Efficiency for Affordable Housing**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 40—Maintenance & repair construction of residential structures
 - iii. 369—Architectural, engineering, and related services
 - iv. 375—Environmental and other technical consulting services
 - v. 377—Advertising and related services
 - vi. 432—Other state and local government enterprises
- 2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **Energy Efficiency for Affordable Housing**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
- 3. Distribute inputs among identified IMPLAN sectors.
 - a. **Energy Efficiency for Affordable Housing**
 - i. 100% from industries in electric production to purchase allowances—(\$1,000,000)
 - ii. 10% for government administrative costs/responsibilities—\$100,000
 - iii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$180,000 each
- 4. Input sales by sector into IMPLAN model and run impacts.
- 5. Export impacts and analyze.

Operation Phase

- 1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. **Energy Efficiency for Affordable Housing**
 - i. 10001 – 10009—Households – All income levels
- 2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **Energy Efficiency for Affordable Housing**
 - i. Number of Assist/Completions Yearly=435



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Energy Efficiency for Affordable Housing**
 - i. Average Savings⁵⁵=\$437 a year per unit
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **Energy Efficiency for Affordable Housing**
 - i. $10001-10009 - \$190,095 [(\$437 \text{ Average Annual Savings per Unit} * 435 \text{ number of assist/completions yearly})]=\text{Total Savings Across Units Treated}$
5. Input savings by sector into IMPLAN model and run impacts.
6. Export impacts and analyze.

C.2 Transportation

3.2.1 Maryland Clean Cars Program

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **Maryland Clean Cars Program**
 - i. 276—Automobile manufacturing
 - ii. 277—Light truck and utility manufacturing
 - iii. 279—Motor vehicle body manufacturing
 - iv. 281—Motor home manufacturing
 - v. 282—Travel trailer and camper manufacturing
 - vi. 283—Motor vehicle parts manufacturing
 - vii. 319—Wholesale trade business
 - viii. 320—Retail stores—Motor vehicle and parts
 - ix. 335—Transport by truck
 - x. 375—Environmental and other technical consulting services
 - xi. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **Maryland Clean Cars Program**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. **Maryland Clean Cars Program**
 - i. Vehicle Manufacturers pay into program to comply and continue producing
 1. 100% paid out by manufacturing—\$500,000 each

⁵⁵ Weatherization and Intergovernmental Program: Weatherization Assistance Program. EERE: EERE Server Maintenance. U.S. Department of Energy, 25 Apr. 2011. Web. 11 Nov. 2011. <<http://www1.eere.energy.gov/wip/wap.html>>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- ii. Parts, and industries associated with the production and retrofitting of motor vehicles will benefit:
 - 1. 10% spread to government--\$100,000
 - 2. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$128,571.43 each
- 4. Input sales by sector into IMPLAN model and run impacts.
- 5. Export impacts and analyze.

Operation Phase

- 1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. Maryland Clean Cars Program**
 - i. 10001-10009—Households-all income levels
- 2. Determine part of program to be affected by savings (from strategy write-up).
 - a. Maryland Clean Cars Program**
 - i. New CAFE standards for MPG⁵⁶—37.8 mpg
 - ii. New CAFE standards for MPG (Light Trucks)⁵⁷—28.8 mpg
- 3. Research savings data for each policy according to part of program to be affected by savings.
 - a. Maryland Clean Cars Program**
 - i. Average fuel price per gallon (regular unleaded)⁵⁸—\$3.43 per gallon
 - ii. Average Annual Miles Driven By Population⁵⁹—13,041 miles
 - iii. Annual New Vehicle Registration in Maryland (2010)⁶⁰—186,759 (total for cars and light trucks)
 - iv. Average Interest Rate for New Auto Loans in Maryland (2011) for New 48 Month Auto Loans⁶¹—4.11%
 - v. Current CAFE standards for MPG(Light Vehicles)⁶²—27.5 mpg
 - vi. Current CAFE standards for MPG(Light Trucks)⁶³—23.5 mpg
 - vii. Average Price for Fuel Efficient Vehicles (Light Vehicles)--\$27,107.50

⁵⁶ Csere, Csaba. "How Automakers Will Meet 2016 CAFE Standards - Feature - Car and Driver." Car Reviews - 2011 Car Reviews and 2012 New Cars at Car and Driver. May 2011. Car and Driver. 11 Nov. 2011 <<http://www.caranddriver.com/features/how-automakers-will-meet-2016-cafe-standards>>.

⁵⁷ Ibid.

⁵⁸ Daily Fuel Gauge Report--national, state and local average prices for gasoline, diesel and E-85. 11 Nov. 2011. Oil Price Information Service (OPIS). 11 Nov. 2011

<<http://fuelgaugereport.aaa.com/?redirectto=http://fuelgaugereport.opisnet.com/index.asp>

⁵⁹ State and Urbanized Area Statistics. U.S. Department of Transportation, 4 April. 2011. Web. 11 Nov. 2011. <<http://www.fhwa.dot.gov/ohim/onh00/onh2p11.htm>>.

⁶⁰ "Maryland Auto Outlook." Wwww.mdauto.org. 9 Aug. 2011. Maryland Automobile Dealers Association. 11 Nov. 2011 <<http://www.mdauto.org/admin/publications/AutoOutlookQuarter22011.pdf>>.

⁶¹ Car Loan Calculator | Monthly Payments | Incentives - Cars.com. New Cars, Used Cars, Car Reviews, Car Finance Advice - Cars.com. 2011. Cars.com. 14 Nov. 2011 <<http://www.cars.com/finance/>>.

⁶² Csere, Csaba. "How Automakers Will Meet 2016 CAFE Standards - Feature - Car and Driver." Car Reviews - 2011 Car Reviews and 2012 New Cars at Car and Driver. May 2011. Car and Driver. 11 Nov. 2011 <<http://www.caranddriver.com/features/how-automakers-will-meet-2016-cafe-standards>>.

⁶³ Ibid.



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

- viii. Average Price for Fuel Efficient Light Trucks (Light Trucks)--\$50,887.50
 - ix. *Note: External research was conducted to construct a price difference between popular non-hybrid models of light vehicles and their hybrid counterparts currently on the market. The prices used are the MSRP (Manufacturer Suggested Retail Price) and reflect no markup from the dealers. Cars compared had similar engine size, and features. Where tank size differed RESI used the non-hybrid model tank size to give an estimate on the amount of gallons the tank could hold, and then derive the cost to fill the tank from this number. RESI assumes that the price difference reflected in these samples would reflect the differences consumers would face for new vehicles at new CAFE standards. RESI will assume for the calculations that new car buyers put down at least 20% of the vehicles value. This 20% can be a combination of cash and trade-in, all trade-in, or all cash.*
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
- a. Maryland Clean Cars Program**
 - i. $\$443.22 \text{ per year } [(13,041 \text{ miles in one year} / 27.5 \text{ miles per gallon}) * [(\$3.43 \text{ per gallon of regular unleaded}) - [(13,041 \text{ miles in one year} / 37.8 \text{ miles per gallon}) * [\$3.43 \text{ per gallon of regular unleaded}]] = \text{savings in gasoline by consumer (Light Vehicles)}$
 - ii. $\$350.28 \text{ per year } [(13,041 \text{ miles in one year} / 23.5 \text{ miles per gallon}) * [\$3.43 \text{ per gallon of regular unleaded}) - [(13,041 \text{ miles in one year} / 28.8 \text{ miles per gallon}) * [\$3.43 \text{ per gallon of regular unleaded}]] = \text{savings in gasoline by consumer (Light Trucks)}$
 - iii. $\$396.75 [(\$443.22 \text{ savings in gasoline by consumer for light vehicles} + \$350.28 \text{ savings in gasoline per year by consumer for light trucks}) / (2)] = \text{average savings in gasoline yearly for all new vehicle purchases}$
 - iv. $\$320.56 [((\$27,107.50 \text{ price of new light vehicle} - \$5,421.50 \text{ 20\% down payment}) * .0411 \text{ interest rate on loan amount}) + (\$50,887.50 \text{ price of new light truck} - \$10,177.50 \text{ 20\% down payment}) * .0411 \text{ interest rate on loan amount}) / 2] / [(4 \text{ years (loan time for 48 months)})] = \text{average annual interest paid on new cars purchased}$
 - v. $\$76.19 [(\$396.75 \text{ savings in gasoline on average for all new passenger vehicles} - \$320.56 \text{ average interest paid on all new passenger vehicles})] = \text{annual savings from new CAFE standard vehicle purchases}$
 - vi. $10001-10009--\$14,229,509.28 [(186,759 \text{ total new registrations on all light vehicles annually} * \$76.19 \text{ average annual savings from new CAFE standard vehicle purchases})] = \text{average annual savings for new vehicle purchases overall in the state of Maryland}$

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

5. Input savings by sector into IMPLAN model and run impacts.
 - a. Household savings inputs were distributed among household income ranges using household income distribution percentages taken from the Census' 2005-2009 American Community Survey 5-Year estimates for Maryland. (Note: In some cases, totals do not add up to 100.0 percent due to margin of error.)
6. Export impacts and analyze.

3.2.2 National Fuel Efficiency and Emission Standards for Medium- and Heavy-Duty Trucks

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **National Fuel Efficiency and Emission Standards for Medium- and Heavy-Duty Trucks**
 - i. 277—Light truck and utility vehicle manufacturing
 - ii. 278—Heavy duty truck manufacturing
 - iii. 279—Motor vehicle body manufacturing
 - iv. 283—Motor vehicle parts manufacturing
 - v. 282—Travel trailer and camper manufacturing
 - vi. 319—Wholesale trade business
 - vii. 320—Retail stores—Motor vehicle and parts
 - viii. 335—Transport by truck
 - ix. 375—Environmental and other technical consulting services
 - x. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **National Fuel Efficiency and Emission Standards for Medium- and Heavy-Duty Trucks**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. **National Fuel Efficiency and Emission Standards for Medium- and Heavy-Duty Trucks**
 - i. Vehicle Manufacturers pay into program to comply and continue producing
 1. 100% paid out by truck manufacturers—\$500,000 each
 - ii. Parts, and industries associated with the production and retrofitting of motor vehicles will benefit:
 1. 10% spread to government--\$100,000
 2. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$150,000 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. **National Fuel Efficiency and Emission Standards for Medium- and Heavy-Duty Trucks**
 - i. 10001-10009—Households – All Income Levels
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **National Fuel Efficiency and Emission Standards for Medium- and Heavy-Duty Trucks**
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **National Fuel Efficiency and Emission Standards for Medium- and Heavy-Duty Trucks**
 - i. New standards proposed for MPG⁶⁴
 1. Medium Heavy Trucks – 20 miles/1000 gallons
 2. Heavy Trucks – 10.5 miles/1000 gallons
 - ii. Average fuel price per gallon (diesel)⁶⁵—\$3.405 per gallon
 - iii. Average Annual Sales New Medium & Heavy Vehicles in Maryland⁶⁶—2,700 per year
 - iv. Average Annual Miles Driven By Medium to Heavy Truck Operators—13,476 miles
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **National Fuel Efficiency and Emission Standards for Medium- and Heavy-Duty Trucks**
 - i. \$443.22 per year [(13,041 miles in one year / 27.5 miles per gallon)] * [(\$3.43 per gallon of regular unleaded)] – [(13,041 miles in one year / 37.8 miles per gallon)] * [(\$3.43 per gallon of regular unleaded)]=savings in gasoline by consumer (Light Vehicles)
 - ii. \$350.28 per year [(13,041 miles in one year / 23.5 miles per gallon)] * [(\$3.43 per gallon of regular unleaded)] – [(13,041 miles in one year / 28.8 miles per gallon)] * [(\$3.43 per gallon of regular unleaded)]=savings in gasoline by consumer (Light Trucks)
 - iii. \$396.75 [(\$443.22 savings in gasoline by consumer for light vehicles + \$350.28 savings in gasoline per year by consumer for light trucks)] / [(2)]=average savings in gasoline yearly for all new vehicle purchases

⁶⁴ "EPA and NHTSA Propose First-Ever Program to Reduce Greenhouse Gas Emissions and Improve Fuel Efficiency of Medium- and Heavy-Duty Vehicles | US EPA." Transportation and Climate. Oct. 2010. US Environmental Protection Agency (EPA). 14 Nov. 2011 <<http://www.epa.gov/oms/climate/regulations/420f10901.htm>>.

⁶⁵ Lowest Diesel Fuel Prices in the Last 24 Hours. Maryland Gas Prices - Find Cheap Gas Prices in Maryland. 2011. Web. 14 Nov. 2011. <<http://www.marylandgasprices.com/index.aspx?fuel=D>>.

⁶⁶ 2002 Economic Census: Vehicle Inventory and Use Survey; Geographic Area Series. Sept. 2004. US Census Bureau. 14 Nov. 2011 <<http://www.census.gov/prod/ec02/ec02tv-md.pdf>>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- iv. $\$320.56 [((\$27,107.50 \text{ price of new light vehicle} - \$5,421.50 \text{ 20\% down payment}) * .0411 \text{ interest rate on loan amount}) + (\$50,887.50 \text{ price of new light truck} - \$10,177.50 \text{ 20\% down payment}) * .0411 \text{ interest rate on loan amount}) / 2] / [(4 \text{ years (loan time for 48 months)})]=\text{average annual interest paid on new cars purchased}$
 - v. $\$76.19 [(\$396.75 \text{ savings in gasoline on average for all new passenger vehicles} - \$320.56 \text{ average interest paid on all new passenger vehicles})]=\text{annual savings from new CAFE standard vehicle purchases}$
 - vi. $10001-10009--\$14,229,509.28 [(186,759 \text{ total new registrations on all light vehicles annually} * \$76.19 \text{ average annual savings from new CAFE standard vehicle purchases})]=\text{average annual savings for new vehicle purchases overall in the state of Maryland}$
5. Input savings by sector into IMPLAN model and run impacts.
 6. Export impacts and analyze.

3.2.3 Clean Fuel Standard

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **Clean Fuel Standard**
 - i. 20—Automobile manufacturing
 - ii. 28—Light truck and utility manufacturing
 - iii. 29—Motor vehicle body manufacturing
 - iv. 326—Motor home manufacturing
 - v. 375—Environmental and other technical consulting services
 - vi. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **Clean Fuel Standard**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. **Clean Fuel Standard**
 - i. Fuel Distributers pay into program to comply and continue producing
 1. 100% paid out by fuel distributors—\$250,000 each
 - ii. Parts, and industries associated with the production and retrofitting of motor vehicles will benefit:
 1. 10% spread to government--\$100,000
 2. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$900,000
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. **Clean Fuel Standard**
 - i. 10001-10009—Households-all income levels
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **Clean Fuel Standard**
 - i. Average annual reduction – 2.05% in fuel use
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Clean Fuel Standard**
 - i. Average fuel price per gallon (regular unleaded)⁶⁷—\$3.43 per gallon
 - ii. Average Annual Miles Driven By Population⁶⁸—13,041 miles
 - iii. Annual New Vehicle Registration in Maryland (2010)⁶⁹—186,759 (total for cars and light trucks)
 - iv. Current CAFE standards for MPG(Light Vehicles)⁷⁰—25.5 mpg (average)
 - v. *Note: RESI will assume that new CAFE standards have not been implemented with year one of the policy and thus use current CAFE standards for policy analysis.*
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **Clean Fuel Standard**
 - i. $511.41 [(13,401 \text{ average miles driven annually by MD drivers} / 25.5 \text{ average miles per gallon}) = \text{average gas consumed annually by Maryland drivers}]$
 - ii. $\$1,754.14 \text{ per year} [(13,041 \text{ miles in one year} / 25.5 \text{ miles per gallon}) * [(\$3.43 \text{ per gallon of regular unleaded}) = \text{average cost to new car owners in Maryland for gasoline}]$
 - iii. $10.48 [(13,041 \text{ miles in one year} / 25.5 \text{ miles per gallon}) - [(13,041 \text{ miles in one year} / 25.5 \text{ miles per gallon}) * [(2.05\% \text{ reduction in gallons per year of fuel due to policy})] = \text{savings in gasoline by consumer in gallons}]$

⁶⁷ Daily Fuel Gauge Report--national, state and local average prices for gasoline, diesel and E-85. 11 Nov. 2011. Oil Price Information Service (OPIS). 11 Nov. 2011

<http://fuelgaugereport.aaa.com/?redirectto=http://fuelgaugereport.opisnet.com/index.asp>.

⁶⁸ Average Annual Miles per Driver by Age Group. 4 April 2011. U.S. Department of Transportation (USDOT), Federal Highway Administration (FHWA), Office of Highway Policy Information (OHPI). Web. 11 Nov. 2011. <http://www.fhwa.dot.gov/ohim/onh00/bar8.htm>.

⁶⁹ "Maryland Auto Outlook." Wwww.mdauto.org. 9 Aug. 2011. Maryland Automobile Dealers Association. 11 Nov. 2011 <http://www.mdauto.org/admin/publications/AutoOutlookQuarter22011.pdf>.

⁷⁰ Csere, Csaba. "How Automakers Will Meet 2016 CAFE Standards - Feature - Car and Driver." Car Reviews - 2011 Car Reviews and 2012 New Cars at Car and Driver. May 2011. Car and Driver. 11 Nov. 2011 <http://www.caranddriver.com/features/how-automakers-will-meet-2016-cafe-standards>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- iv. $500.93 [(511.41 \text{ gallons used on average a year} - 10.48 \text{ gallons reduced from clean fuel policy})]=\text{average gallons used in Maryland annually under new policy}$
 - v. $\$1,718.18 [(500.91 \text{ gallons used annually under new policy} * \$3.43 \text{ average per gallon of regular unleaded fuel})]=\text{average annual cost to new car owners in Maryland for gasoline}$
 - vi. $\$35.96 [(\$1,754.14 \text{ per year on gas for new car owners in Maryland without policy} - \$1,718.18 \text{ per year on gas for new car owners in Maryland with policy})]=\text{annual savings from on gas from implementation of new policy annually}$
 - vii. $10001-10009--\$6,715,838.37 [(186,759 \text{ total new registrations on all light vehicles annually} * \$35.96 \text{ average annual savings in gas from new policy implementation})]=\text{total average annual savings for new vehicle purchases in gas in the state of Maryland from policy}$
5. Input savings by sector into IMPLAN model and run impacts.
 6. Export impacts and analyze.

3.2.4 Transportation and Climate Initiative

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **Transportation and Climate Initiative**
 - i. 332—Transportation by air
 - ii. 333—Transportation by rail
 - iii. 334— Transportation by water
 - iv. 335— Transportation by truck
 - v. 336—Transit and ground passenger transportation
 - vi. 338—Scenic and sightseeing transportation and support activities
 - vii. 339—Couriers and messengers
 - viii. 375—Environment and other technical consulting services
 - ix. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **Transportation and Climate Initiative**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. **Transportation and Climate Initiative**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$112,500 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. Transportation and Climate Initiative**
 - i. 10001-10009—Households – All income levels
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. Transportation and Climate Initiative**
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. Transportation and Climate Initiative**
 - i. Average Weekly Wage State Government⁷¹ - \$1,172
 - ii. Number of those hired⁷²—5 full-time registered staff
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. Transportation and Climate Initiative**
 - i. \$60,944.00 [(52 weeks * \$1,172 weekly wage)]=total yearly wage
 - ii. \$304,720.00 [(5 full-time registered staff * \$60,944.00 total yearly wage)]=total paid to TCI
 - iii. 10001 – 10009 Households – All income levels - \$304,720.00
5. Input savings by sector into IMPLAN model and run impacts
6. Export impacts and analyze.

3.2.5 Public Transportation Initiatives

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. Charm City Circulator and Hampden Neighborhood Shuttle**
 - i. 319—Wholesale trade businesses
 - ii. 336—Transit and ground passenger transportation
 - iii. 375—Environmental and other technical consulting services
 - iv. 432—Other state and local government enterprises
 - b. Locally Operated Transit Systems**
 - i. 336—Transit and ground passenger transportation
 - ii. 432—Other state and local government enterprises
 - c. Smart Card Implementation**
 - i. 294—All other transportation equipment manufacturing
 - ii. 432—Other state and local government enterprises

⁷¹ Employment and Payrolls - Industry Series - Maryland 2009 - Employment and Payrolls - Division of Workforce Development and Adult Learning. Maryland Department of Labor, Licensing and Regulation. Maryland Department of Labor, Licensing and Regulation, 1 June 2011. Web. 11 Nov. 2011. <<http://www.dllr.state.md.us/lmi/emppay/md2010ep.shtml>>.

⁷² Staff Bios | Georgetown Climate Center. Georgetown Climate Center | Georgetown Climate Center. Web. 14 Nov. 2011. <<http://www.georgetownclimate.org/about-us/staff-bios>>.



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- d. Transit Oriented Development**
 - i. 34—Construction of new nonresidential commercial and healthcare structures
 - ii. 36—Construction of other new nonresidential structures
 - iii. 38—Construction of other new residential structures
 - iv. 369—Architectural, engineering, and related services
 - v. 375—Environmental and other technical consulting services
 - vi. 432—Other state and local government enterprises
 - e. Maryland Commuter Tax Credit**
 - i. 377—Advertising and related services
 - ii. 432—Other state and local government enterprises
 - f. Guaranteed Ride Home**
 - i. 336—Transit and ground passenger transportation
 - ii. 432—Other state and local government enterprises
 - g. College Pass**
 - i. 392—Private junior colleges, colleges, universities
 - ii. 432—Other state and local government enterprises
 - h. Ride Share**
 - i. 377—Advertising and related services
 - ii. 432—Other state and local government enterprises
 - i. Commuter Connections – Washington, D.C. Region**
 - i. 377—Advertising and related services
 - ii. 432—Other state and local government enterprises
 - j. Baltimore Collegetown Network**
 - i. 392—Private junior colleges, colleges, universities
 - ii. 432—Other state and local government enterprises
 - k. Hunt Valley Shuttle**
 - i. 432—Other state and local government enterprises
 - l. Kent Street Transit Plaza**
 - i. 36—Construction of other new nonresidential structures
 - ii. 369—Architectural, engineering, and related services
 - iii. 432—Other state and local government enterprises
 - m. University of Maryland College Park Carpool Program and Shuttle Bus Service**
 - i. 377—Advertising and related services
 - ii. 392—Private junior colleges, colleges, universities
 - iii. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
- a. Charm City Circulator and Hampden Neighborhood Shuttle**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - b. Locally Operated Transit Systems**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- c. **Smart Card Implementation**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - d. **Transit Oriented Development**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - e. **Maryland Commuter Tax Credit**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - f. **Guaranteed Ride Home**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - g. **College Pass**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - h. **Ride Share**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - i. **Commuter Connections – Washington, D.C. Region**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - j. **Baltimore Collegetown Network**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - k. **Hunt Valley Shuttle**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - l. **Kent Street Transit Plaza**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - m. **University of Maryland College Park Carpool Program and Shuttle Bus Service**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
- a. **Charm City Circulator and Hampden Neighborhood Shuttle**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$300,000 each
 - b. **Locally Operated Transit Systems**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$900,000
 - c. **Smart Card Implementation**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$900,000
 - d. **Transit Oriented Development**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$180,000 each
 - e. **Maryland Commuter Tax Credit**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$900,000

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- f. Guaranteed Ride Home**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$900,000
 - g. College Pass**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$900,000
 - h. Ride Share**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$900,000
 - i. Commuter Connections – Washington, D.C. Region**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$900,000
 - j. Baltimore Collegetown Network**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$900,000
 - k. Hunt Valley Shuttle**
 - i. 100% for government administrative costs/responsibilities—\$1,000,000
 - l. Kent Street Transit Plaza**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$450,000 each
 - m. University of Maryland College Park Carpool Program and Shuttle Bus Service**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$450,000 each
4. Input sales by sector into IMPLAN model and run impacts.
 5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file). (Note: IMPLAN code 336 (Transit and ground passenger transportation) has been changed to 432 (Other state and local government enterprises) in all instances due to the state/local government overseeing MARC operations via MTA.)
 - a. Charm City Circulator and Hampden Neighborhood Shuttle**
 - i. 10001-10009—Households – All income levels
 - b. Locally Operated Transit Systems**
 - i. 432—Other state and local government enterprises

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- c. Smart Card Implementation**
 - i. 10001-10009—Households – All income levels
 - d. Transit Oriented Development**
 - i. 10001-10009—Households – All income levels
 - e. Maryland Commuter Tax Credit**
 - i. 10001-10009—Households – All income levels
 - f. Guaranteed Ride Home**
 - i. 10001-10009—Households – All income levels
 - g. College Pass**
 - i. 10001-10009—Households – All income levels
 - h. Ride Share**
 - i. 10001-10009—Households – All income levels
 - i. Commuter Connections – Washington, D.C. Region**
 - i. 10001-10009—Households – All income levels
 - j. Baltimore Collegetown Network**
 - i. 10001-10009—Households – All income levels
 - k. Hunt Valley Shuttle**
 - i. 10001-10009—Households – All income levels
 - l. Kent Street Transit Plaza**
 - i. 10001-10009—Households – All income levels
 - m. University of Maryland College Park Carpool Program and Shuttle Bus Service**
 - i. 10001-10009—Households – All income levels
2. Determine part of program to be affected by savings (from strategy write-up).
- a. Charm City Circulator and Hampden Neighborhood Shuttle**
 - b. Locally Operated Transit Systems**
 - c. Smart Card Implementation**
 - d. Transit Oriented Development**
 - e. Maryland Commuter Tax Credit**
 - f. Guaranteed Ride Home**
 - g. College Pass**
 - h. Ride Share**
 - i. Commuter Connections – Washington, D.C. Region**
 - i. Number using the commuter Connections Page⁷³—20,000
 - ii. Total Commuting to Work—20,000
 - j. Baltimore Collegetown Network**
 - k. Hunt Valley Shuttle**
 - l. Kent Street Transit Plaza**

⁷³ Civilian Labor Force, Employment & Unemployment by Place of Residence (LAUS) - Maryland - Division of Workforce Development and Adult Learning. Welcome to the Maryland Department of Labor, Licensing and Regulation. Maryland Department of Labor, Licensing and Regulation, 21 Oct. 2011. Web. 14 Nov. 2011. <<http://www.dllr.state.md.us/lmi/laus/maryland.shtml>>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

m. University of Maryland College Park Carpool Program and Shuttle Bus Service

3. Research savings data for each policy according to part of program to be affected by savings.

a. Charm City Circulator and Hampden Neighborhood Shuttle

- i. Passenger Trips—69,315,249
- ii. Number of Buses—698
- iii. Bus Fare—\$1.06
- iv. Miles Traveled Annually by all Buses—22,414,441
- v. Average Annual Passengers—2,633,760

b. Locally Operated Transit Systems

- i. Passenger Trips—69,315,249
- ii. Number of Buses—698
- iii. Bus Fare—\$1.06

c. Smart Card Implementation

- i. Number of Boardings (Rail)—71,311
- ii. Number of Boardings (Bus)—231,795
- iii. Percentage Rail—75%
- iv. Percentage Bus—60%
- v. Average ATM fee—\$2.40
- vi. Average Fare—\$1.60

d. Transit Oriented Development

- i. Number of Properties—6
- ii. Potential Savings per Person—\$9,087
- iii. Potential Parking—1,245.33

e. Maryland Commuter Tax Credit

- i. Number of Firms—18
- ii. Number of Employees—950
- iii. Average Tax Credit per Employee—\$52.50

f. Guaranteed Ride Home

- i. Mean Cost Per Claim⁷⁴—\$36.95
- ii. Cost of Cab⁷⁵—\$161.80
- iii. Number of Commuters in Baltimore—8,650.71

g. College Pass

- i. Cost of Monthly Pass—\$64.00
- ii. Cost to College Students—\$39.00
- iii. Number of College Students in Collegetown Network—120,000

⁷⁴ Menczer, William B. Journal of Public Transportation. 4th ed. Vol. 10. Ser. 2007. Guaranteed Ride Home Programs. Federal Transportation Administration. Web. 14 Nov. 2011. <<http://www.nctr.usf.edu/jpt/pdf/JPT%2010-4%20Menczer.pdf>>.

⁷⁵ Taxi Fares in Major U.S. Cities. Schaller Consulting Home Page. Schaller Consulting, Jan. 2006. Web. 14 Nov. 2011. <<http://www.schallerconsult.com/taxi/fares1.htm>>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

h. Ride Share

- i. Average Daily Miles VMT⁷⁶—\$28.97
- ii. Cost of Gas—\$3.43
- iii. Avg. MPG—27 mpg
- iv. Number of those employed in MD⁷⁷—2,771,833

i. Commuter Connections – Washington, D.C. Region

- i. Average Daily Miles VMT⁷⁸—\$28.97
- ii. Cost of Gas—\$3.43
- iii. Avg. MPG—27

j. Baltimore Collegetown Network

- i. Total Students—74,000
- ii. Number of Buses—698
- iii. Bus Fare—\$1.06
- iv. Miles traveled annually by All Buses⁷⁹—14
- v. Average Annual Passengers—74,000

k. Hunt Valley Shuttle

- i. Insurance Premium—\$922
- ii. Travel Distance from York to Hunt Valley—37.1
- iii. Avg. MPG—27
- iv. Cost of Gas—\$3.43
- v. Time—1
- vi. One Month Pass⁸⁰—\$136.00
- vii. Time—2
- viii. Total One Way Ridership⁸¹—17,333

⁷⁶ 2009 National Household Travel. National Household Travel Survey. U.S. Department of Transportation, 2009. Web. 14 Nov. 2011. <<http://nhts.ornl.gov/2009/pub/stt.pdf>>.

⁷⁷ Civilian Labor Force, Employment & Unemployment by Place of Residence (LAUS) - Maryland - Division of Workforce Development and Adult Learning. Welcome to the Maryland Department of Labor, Licensing and Regulation. Maryland Department of Labor, Licensing and Regulation, 21 Oct. 2011. Web. 14 Nov. 2011. <<http://www.dllr.state.md.us/lmi/laus/maryland.shtml>>.

⁷⁸ 2009 National Household Travel. National Household Travel Survey. U.S. Department of Transportation, 2009. Web. 14 Nov. 2011. <<http://nhts.ornl.gov/2009/pub/stt.pdf>>.

⁷⁹ Colleges - Miles and Minutes. 2011. Baltimore Collegetown Network. 14 Nov. 2011 <<http://www.baltimorecollegetown.org/colleges/miles-and-minutes/>>.

⁸⁰ RabbitEXPRESS – Fares and Accommodations. Rabbitransit - Welcome! York County Transportation Authority, 2011. Web. 14 Nov. 2011. <<http://www.rabbitransit.org/express/pages/cashfarechart.html>>.

⁸¹ 2010 Annual Report. Rabbitransit-Welcome. Rabbitransit, 2011. Web. 14 Nov. 2011. <http://www.rabbitransit.org/docs/2010_Annual_Report.pdf>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- I. Kent Street Transit Plaza**
 - i. Cost of Monthly Pass⁸²—\$64
 - ii. Cost of Gas—\$3.43
 - iii. Length of Track—15.5 miles
 - iv. Average Annual Ridership—8,650.71
 - v. Average Cost of Gas—\$3.43
 - vi. Average MPG—27
 - vii. Annual Congestion Cost—\$713
 - viii. Average Cost of Insurance⁸³—\$922
 - m. University of Maryland College Park Carpool Program and Shuttle Bus Service**
 - i. Number of Annual Riders⁸⁴—2,967,164
 - ii. Cost of Shuttle—\$0.00
 - iii. Parking Spots⁸⁵—19,270
 - iv. Number of Permits⁸⁶—17,906
 - v. Revenue from Permit Sales⁸⁷—\$8,030,897.00
 - vi. Annual Citations⁸⁸—72,546
 - vii. Annual Revenue from Citations—\$1,862,333.00
 - viii. Total Enrollment—37,631
 - ix. Total Employment—13,081
 - x. Total Residing On Campus⁸⁹—8,363
 - xi. Commuter Student Permit Price—\$217.00
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
- a. Charm City Circulator and Hampden Neighborhood Shuttle**
 - i. 99,306 [(69,315,249 Passenger Trips / 698 Number of Buses)]=Total Average Trips per Bus
 - ii. 32,112 [(22,414,441 Miles Traveled Annually by all Buses / 698 Number of Buses)]=Average Miles Traveled per Bus
 - iii. 3,773 [(2,633,760 Average Annual Passengers / 698 Number of Buses)]=Average Annual Passengers per Bus

⁸² Regular Fares | Maryland Transit Administration. Home | Maryland Transit Administration. Maryland Transit Administration, 14 Nov. 2011. Web. 14 Nov. 2011. <<http://mta.maryland.gov/regular-fares>>.

⁸³ Auto Insurance. Insurance Information Institute. U.S. Department of Labor, Bureau of Labor Statistics; National Association of Realtors, 2011. Web. 11 Nov. 2011. <<http://www.iii.org/media/facts/statsbyissue/auto/>>.

⁸⁴ Departmental Mission Statement. Department of Transportation. University of Maryland, 2011. Web. 14 Nov. 2011. <<http://www.transportation.umd.edu/images/about/pdfs/ANNUAL%20REPORT%20FY%2011.pdf>>.

⁸⁵ Departmental Mission Statement. Department of Transportation. University of Maryland, 2011. Web. 14 Nov. 2011. <<http://www.transportation.umd.edu/images/about/pdfs/ANNUAL%20REPORT%20FY%2011.pdf>>.

⁸⁶ Ibid.

⁸⁷ Ibid.

⁸⁸ Ibid.

⁸⁹ Residence Halls at a Glance. Department of Resident Life | University of Maryland, College Park. Department of Resident Life | University of Maryland, College Park, 2011. Web. 14 Nov. 2011. <<http://www.resnet.umd.edu/hallsatglance/>>.



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

- iv. $96,337 [(32,112 \text{ Average Miles Traveled per Bus} * 3)] = \text{Average Miles Traveled by all Buses}$
 - v. $27.34 [(2,633,760 \text{ Average Annual Passengers} / 96,337 \text{ Average Miles Traveled by all Buses})] = \text{Passengers per mile}$
 - vi. $\$330,436.39 [(96,337 \text{ Average Miles Traveled by all Buses} * \$3.43)] = \text{Average Cost in Sedan}$
 - vii. $88 [(32,112 \text{ Average Miles Traveled per Bus} / 365)] = \text{Miles Traveled per Day}$
 - viii. 10001 – 10009 – Households – All income levels— $\$330,436.39 [(96,337 \text{ Average Miles Traveled by all Buses} * \$3.43)] = \text{Average Cost in Sedan}$
- b. Locally Operated Transit Systems**
- i. $99,306 [(69,315,249 \text{ Passenger Trips} / 698 \text{ Number of Buses})] = \text{Total Average per Bus}$
 - ii. $\$5,157,928.41 [(99,306 \text{ Total Average per Bus} * \$1.06 \text{ Bus Fare} * 49)] =$
 - iii. $432 - \$5,157,928.41 [(99,306 \text{ Total Average per Bus} * \$1.06 \text{ Bus Fare} * 49)]$
- c. Smart Card Implementation**
- i. $\$171,146.40 [((71,311 \text{ Number of Rail Boardings} * 0.75) * (\$1.60 \text{ Average Fare} * 2))] = \text{Total Annual Boards (Rail/Smart Card)}$
 - ii. $\$445,046.40 [((231,795 \text{ Number of Bus Boardings} * 0.60) * (\$1.60 \text{ Average Fare} * 2))] = \text{Total Annual Boards (Bus/Smart Card)}$
 - iii. $\$410,751.36 [((71,311 \text{ Number of Rail Boardings} * 0.75) * (\$1.60 \text{ Average Fare} * 2) * \$2.40 \text{ Average ATM fee})] = \text{Total Annual Boards (Rail)}$
 - iv. $\$1,068,111.36 [((231,795 \text{ Number of Bus Boardings} * 0.60) * (\$1.60 \text{ Average Fare} * 2) * \$2.40 \text{ Average ATM fee})] = \text{Total Annual Boards (Bus)}$
 - v. $\$239,604.96 [(\$410,751.36 \text{ Total Annual Boards (Rail)} - \$171,146.40 \text{ Total Annual Boards (Rail/Smart Card)})] = \text{Annual Savings for Rail}$
 - vi. $\$623,064.96 [(\$1,068,111.36 \text{ Total Annual Boards (Bus)} - \$445,046.40 \text{ Total Annual Boards (Bus/Smart Card)})] = \text{Annual Savings for Bus}$
 - vii. $\$862,669.92 [(\$239,604.96 \text{ Annual Savings for Rail} + \$623,064.96 \text{ Annual Savings for Bus})] = \text{Total Annual Savings}$
 - viii. 10001 – 10009— $\$862,669.92 [(\$239,604.96 \text{ Annual Savings for Rail} + \$623,064.96 \text{ Annual Savings for Bus})] = \text{Total Annual Savings}$
- d. Transit Oriented Development**
- i. $\$11,316,344.00 [(\$9,087 \text{ Potential Savings per Person} * 1,245.33 \text{ Potential Parking})] = \text{Total Potential Savings}$
 - ii. 10001 – 10009— $\$11,316,344.00 [(\$9,087 \text{ Potential Savings per Person} * 1,245.33 \text{ Potential Parking})] = \text{Total Potential Savings}$
- e. Maryland Commuter Tax Credit**
- i. $\$598,500.00 [(950 \text{ Number of Employees} * 52.5 \text{ Average Tax per Employee} * 12)] = \text{Total of tax credits}$

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- ii. $10001 - 10009 - \$598,500.00 [(950 \text{ Number of Employees} * 52.5 \text{ Average Tax per Employee} * 12)] = \text{Total of tax credits}$

f. Guaranteed Ride Home

- i. $\$124.85 [(\%161.80 \text{ Cost of Cab} - \$36.95 \text{ Mean Cost Per Claim})] = \text{Savings}$
- ii. $\$1,080,041.06 [(8650.71 \text{ Number of Commuters in Baltimore} * \$124.85 \text{ Savings})] = \text{Savings to Commuters}$
- iii. $10001 - 10009 - \$1,080,041.06 [(8650.71 \text{ Number of Commuters in Baltimore} * \$124.85 \text{ Savings})] = \text{Savings to Commuters}$

g. College Pass

- i. $\$7,680,000.00 [(120,000 \text{ Number of College Students in Collegetown Network} * \$64.00 \text{ Cost of a Monthly Pass})] =$
- ii. $\$4,468,000.00 [(120,000 \text{ Number of College Students in Collegetown Network} * \$39.00 \text{ Cost of a College Students})] =$
- iii. $\$3,000,000.00 [(\$7,680,000.00 - \$4,468,000.00)] =$
- iv. $10001 - 10009 - \$3,000,000.00 [(\$7,680,000.00 - \$4,468,000.00)] =$

h. Ride Share

- i. $1.073 [(28.97 \text{ Average Daily Miles VMT} / 27 \text{ Avg. MPG})] = \text{Gallons Used Daily}$
- ii. $\$3.68 [(1.073 \text{ Gallons Used Daily} * \$3.43 \text{ Cost of Gas})] = \text{Price to Travel Daily}$
- iii. $683,282 [(674631 \text{ MARC riders} + 8651 \text{ Metro riders})] = \text{Average Annual Ridership}$
- iv. $2,088,551 [(2,771,833 \text{ Number of those employed in MD} - 683,282 \text{ Average Annual Ridership})] = \text{Total Commuting to Work}$
- v. $\$7,686,416.89 [(2,088,551 \text{ Total Commuting to Work} * \$3.68 \text{ Price to Travel Daily})] = \text{Total Cost to Those Commuting by Car}$
- vi. $\$1.84 [(\$3.68 \text{ Price to Travel Daily} / 2)] = \text{Price of Gas per Car, if carpooling 2 to a car}$
- vii. $\$3,843,208.45 [(\$1.84 \text{ Price of Gas per Car, if carpooling 2 to a car} * 2,088,551 \text{ Total Commuting to Work})] = \text{Total Cost to Consumers Carpooling}$
- viii. $\$3,843,208.45 [(\$3,843,208.45 \text{ Total Cost to Consumers Carpooling} - \$7,686,416.89 \text{ Total Cost to Those Commuting by Car})] = \text{Savings}$
- ix. $10001 - 10009 - \$3,843,208.45 [(\$3,843,208.45 \text{ Total Cost to Consumers Carpooling} - \$7,686,416.89 \text{ Total Cost to Those Commuting by Car})] = \text{Savings}$

i. Commuter Connections – Washington, D.C. Region

- i. $1.07 [(28.97 \text{ Average Daily Miles VMT} / 27 \text{ Avg. MPG})] = \text{Gallons Used Daily}$
- ii. $\$3.68 [(1.07 \text{ Gallons Used Daily} * \$3.43 \text{ Cost of Gas})] = \text{Price to Travel Daily}$
- iii. $\$73,605.26 [(20,000 \text{ Total Commuting to Work} * \$3.68 \text{ Price to Travel Daily})] = \text{Total Cost to Those Commuting by Car}$

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- iv. $\$36,802.63 [(\$73,605.26 \text{ Total Cost to Those Commuting by Car} / 2) = \text{Price of Gas per Car, if carpooling 2 to a car}]$
- v. $\$36,802.63 [(\$73,605.26 \text{ Total Cost to Those Commuting by Car} - \$36,802.63 \text{ Price of Gas per Car, if carpooling 2 to a car}) = \text{Savings}]$
- vi. $10001 - 10009 - \$36,802.63 [(\$73,605.26 \text{ Total Cost to Those Commuting by Car} - \$36,802.63 \text{ Price of Gas per Car, if carpooling 2 to a car}) = \text{Savings}]$

j. Baltimore Collegetown Network

- i. $106 [(74,000 \text{ Total Students} / 698 \text{ Number of Buses}) = \text{Total Average per Bus}]$
- ii. $\$5,506.53 [(106 \text{ Total Average per Bus} * \$1.06 \text{ Bus Fare} * 49) = \text{Total Average Bus Fare}]$
- iii. $4,140 [((14 \text{ Miles traveled annually by All Buses} * 2) * 150) = \text{Average Miles Traveled by all Buses}]$
- iv. $153 [(4,140 \text{ Average Miles Traveled by all Buses} / 27) = \text{Average Gallons Used}]$
- v. $526 [(153 \text{ Average Gallons Used} * \$3.43) = \text{Average Cost of Sedan}]$
- vi. $\$38,919,066.67 [(74,000 \text{ Average Annual Passengers} * 526 \text{ Average Cost of Sedan}) = \text{Average Savings to College Students}]$
- vii. $10001 - 10009 - \$38,919,066.67 [(74,000 \text{ Average Annual Passengers} * 526 \text{ Average Cost of Sedan}) = \text{Average Savings to College Students}]$

k. Hunt Valley Shuttle

- i. $\$2.75 [((37.1 \text{ Travel Distance from York to Hunt Valley} * 2) / 27 \text{ Avg. MPG}) = \text{Total Cost on Trip Up and Back}]$
- ii. $\$9.43 [(\$2.75 \text{ Total Cost on Trip Up and Back} * \$3.43 \text{ Cost of Gas}) = \text{Total Cost on Trip}]$
- iii. $\$4,296.56 [((\$9.43 \text{ Total Cost on Trip} * (365 - 7)) + \$922 \text{ Insurance Premium}) = \text{Annual Cost to Travel by Car}]$
- iv. $7.25 [((2 - 1) * 7.25) = \text{Time Value}]$
- v. $\$4,227.50 [((136 * 12 \text{ months}) + (7.25 \text{ Time Value} * (365 - 7))) = \text{Annual Cost to Travel by Bus}]$
- vi. $\$69.06 [(\$4,296.56 \text{ Annual Cost to Travel by Car} - \$4,227.50 \text{ Annual Cost to Travel by Bus}) = \text{Savings}]$
- vii. $34,666 [(17,333 \text{ Total One Way Ridership} * 2) = \text{Both Way Assumption}]$
- viii. $11,555.33 [(34,666 \text{ Both Way Assumption} / 3) = \text{Three Routes}]$
- ix. $11,555.33 [(34,666 \text{ Both Way Assumption} / 3) = \text{Avg. Rider for 83S Route}]$
- x. $\$798,023.30 [(11,555.33 \text{ Avg. Rider for 83S Route} * \$69.06 \text{ Savings}) = \text{Total Savings}]$
- xi. $10001 - 10009 - \$798,023.30 [(11,555.33 \text{ Avg. Rider for 83S Route} * \$69.06 \text{ Savings}) = \text{Total Savings}]$

l. Kent Street Transit Plaza

- i. $\$768 [(\$64 \text{ Cost of a Monthly Pass} * 12) = \text{Cost of a Pass for a Year}]$
- ii. $617.91 [(8,650.71 \text{ Average Annual Ridership} / 14) = \text{Per Station}]$



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- iii. $0.57 [(15.5 \text{ Length of Track} / 27 \text{ Average MPG})]=\text{Average Gallons Needed to Travel per Day}$
- iv. $\$718.71 [((0.57 \text{ Average Gallons Needed to Travel per Day} * \$3.43 \text{ Average Cost of Gas}) * 365)]=\text{Average Cost of Gas a Year}$
- v. $\$2,353.71 [(\$718.71 \text{ Average Cost of Gas a Year} + \$713 \text{ Annual Congestion Cost} + \$922 \text{ Average Cost of Insurance})]=\text{Cost to Travel Annual}$
- vi. $\$1,585.71 [(\$2,353.71 \text{ Cost to Travel Annual} - \$768 \text{ Cost of a Pass for a Year})]=\text{Total Cost to Travel}$
- vii. $\$979,823.85 [(\$1,585.71 \text{ Total Cost to Travel} * 617.91 \text{ Per Station})]=\text{Total Savings for all Consumers}$
- viii. $10001 - 10009 - \$979,823.85 [(\$1,585.71 \text{ Total Cost to Travel} * 617.91 \text{ Per Station})]=\text{Total Savings for all Consumers}$

m. University of Maryland College Park Carpool Program and Shuttle Bus Service

- i. $\$448.50 [(\$8,030,897.00 \text{ Revenue from Permit Sales} / 17,906 \text{ Number of Permits})]=\text{Avg. Cost of Permit}$
- ii. $\$25.67 [(\$1,862,333.00 \text{ Annual Revenue from Citations} / 72,546 \text{ Annual Citations})]=\text{Avg. Cost of Citation}$
- iii. $\$474.17 [(\$448.50 \text{ Avg. Cost of Permit} + \$25.67 \text{ Avg. Cost of Citation})]=\text{Avg. Cost to Drive to Campus}$
- iv. $50,712 [(37,631 \text{ Total Enrollment} + 13,081 \text{ Total Employment})]=\text{Total Population}$
- v. $30,907.96 [(((2,967,164 / 12 \text{ months}) / 4 \text{ weeks}) / 2 \text{ times a day})]=\text{Total Riding Shuttle}$
- vi. $19,804.04 [(50,712 \text{ Total Population} - 30,907.96 \text{ Total Riding Shuttle})]=\text{Total Not Riding Shuttle}$
- vii. $29,268 [(8,363 \text{ Total Residing On Campus} - 37,631 \text{ Total Enrollment})]=\text{Total Not On Campus}$
- viii. $42,349 [(29,268 \text{ Total Not On Campus} + 13,081 \text{ Total Employment})]=\text{People Commuting}$
- ix. $24,443 [(42,349 \text{ People Commuting} - 17,906 \text{ Total Permit Holders})]=\text{Non Permit Holders}$
- x. $\$5.42 [(132,455 / 24,443 \text{ Non Permit Holders})]=\text{Total Meter Costs Per Non Holder}$
- xi. $\$76.19 [(\$1,862,333 \text{ Annual Revenue from Citations} / 24,443 \text{ Non Permit Holders})]=\text{Citation Costs Per Non Holder}$
- xii. $\$32.27 [(\$788,824 / 24,443 \text{ Non Permit Holders})]=\text{Affiliate Costs for Non Permit}$
- xiii. $\$113.88 [(\$5.42 \text{ Total Meter Costs Per Non Holder} + \$76.19 \text{ Citation Costs Per Non Holder} + \$32.27 \text{ Affiliate Costs for Non Permit})]=\text{Total Possible Cost to Non Permit Holder}$
- xiv. $\$6,351,156.00 [(\$217 \text{ Commuter Student Permit Price} * 29,268 \text{ Total Not on Campus})]=\text{Total Cost to Commute}$



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- xv. \$3,175,578.00 [(\$6,351,156.00 Total Cost to Commute / 2)]=If Commuter Students Carpool, 2 to each car
 - xvi. \$3,175,578.00 [(\$6,351,156.00 Total Cost to Commute - \$3,175,578.00 If Commuter Students Carpool, 2 to each car)]=Savings
 - xvii. 10001 – 10009—\$3,175,578.00 [(\$6,351,156.00 Total Cost to Commute - \$3,175,578.00 If Commuter Students Carpool, 2 to each car)]=Savings
5. Input savings by sector into IMPLAN model and run impacts.
 - a. Household savings inputs were distributed among household income ranges using household income distribution percentages taken from the Census' 2005-2009 American Community Survey 5-Year estimates for Maryland. (Note: In some cases, totals do not add up to 100.0 percent due to margin of error.)
 6. Export impacts and analyze.

3.2.6 Initiatives to Double Ridership by 2020

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. MARC East Baltimore Station**
 - i. 36—Construction of other new nonresidential structures
 - ii. 369—Architectural, engineering, and related services
 - iii. 432—Other state and local government enterprises
 - b. Expanded Transit (Purple Line, Corridor Cities Transitway, Red Line)**
 - i. 36— Construction of other new nonresidential structures
 - ii. 283—Motor vehicle parts manufacturing
 - iii. 319—Wholesale trade businesses
 - iv. 369— Architectural, engineering, and related services
 - v. 375—Environmental and other technical consulting services
 - vi. 432—Other state and local government enterprises
 - c. MARC Growth and Investment Plan**
 - i. 36— Construction of other new nonresidential structures
 - ii. 369— Architectural, engineering, and related services
 - iii. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. MARC East Baltimore Station**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - b. Expanded Transit (Purple Line, Corridor Cities Transitway, Red Line)**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - c. MARC Growth and Investment Plan**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3. Distribute inputs among identified IMPLAN sectors.
 - a. **MARC East Baltimore Station**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$450,000 each
 - b. **Expanded Transit (Purple Line, Corridor Cities Transitway, Red Line)**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$180,000 each
 - c. **MARC Growth and Investment Plan**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$450,000 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file). (Note: IMPLAN code 336 (Transit and ground passenger transportation) has been changed to 432 (Other state and local government enterprises) in all instances due to the state/local government overseeing MARC operations via MTA.)
 - a. **MARC East Baltimore Station**
 - i. 10001-10009—Households – All income levels
 - b. **Expanded Transit (Purple Line, Corridor Cities Transitway, Red Line)**
 - i. 10001-10009—Households – All income levels
 - c. **MARC Growth and Investment Plan**
 - i. 10001-10009—Households – All income levels
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **MARC East Baltimore Station**
 - b. **Expanded Transit (Purple Line, Corridor Cities Transitway, Red Line)**
 - c. **MARC Growth and Investment Plan**
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **MARC East Baltimore Station**
 - i. Number of Annual Passengers on Metro⁹⁰—8,095,577
 - ii. Number of Stations⁹¹—40
 - iii. Average Cost of Gas—\$3.43
 - iv. Average Annual Miles Traveled—774,575,600

⁹⁰ National Transit Information. National Transit Database. National Transit Database, 2011. Web. 14 Nov. 2011. <<http://www.ntdprogram.gov/ntdprogram/cs?action=showRegionAgencies®ion=3>>.

⁹¹ MARC Station Information | Maryland Transit Administration. Home | Maryland Transit Administration. Maryland Transit Administration, 14 Nov. 2011. Web. 14 Nov. 2011. <<http://mta.maryland.gov/marc-station-information>>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- v. Average Miles Per Gallon of Sedan—27
- vi. Average Cost of Monthly MARC Pass—\$349.00
- b. Expanded Transit (Purple Line, Corridor Cities Transitway, Red Line)**
 - i. Cost of Daily Pass⁹²—\$3.50
 - ii. Cost of gas—\$3.43
 - iii. Length of Track—15.5
 - iv. Average Annual Ridership—8,650.71
 - v. Average cost of gas—\$3.43
 - vi. Average MPG—27
 - vii. Annual Congestion Cost—713
 - viii. Average Cost of Insurance⁹³—922
- c. MARC Growth and Investment Plan**
 - i. Number of Annual Passengers—8,095,577
 - ii. Number of Stations—40
 - iii. Added by 2035⁹⁴—130,000
 - iv. Current Seats⁹⁵—27,000
 - v. Miles Travel Annually—774,575,600
 - vi. Cost of Gas—\$3.43
 - vii. Average Per MPG—27
 - viii. Cost of Monthly Pass—\$349.00
 - ix. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
- d. MARC East Baltimore Station**
 - i. 202,389.43 [(8,095,577 Number of Annual Passengers on Metro / 40 Number of Stations)]=Average Ridership per Station
 - ii. 19,364,390 [(774,575,600 Average Annual Miles Traveled / 40 Number of Stations)]=Miles Traveled Annual per Station
 - iii. 717,199.63 [(19,364,390 Miles Traveled Annual per Station / 27 Average Miles Per Gallon of Sedan)]=Average Gallons to Travel Annually
 - iv. \$2,459,994.73 [(717,199.63 Average Gallons to Travel Annually * \$3.43 Average Cost of Gas)]=Cost to Travel Annually
 - v. \$12.15 [(\$2,459,994.73 Cost to Travel Annually / 202,389.43 Average Ridership per Station)]=Cost per Person
 - vi. 64,547,966.67 [(774,575,600 Average Annual Miles Traveled / 12)]=Average Miles Traveled per Month

⁹² Regular Fares | Maryland Transit Administration. Home | Maryland Transit Administration. Maryland Transit Administration, 14 Nov. 2011. Web. 14 Nov. 2011. <<http://mta.maryland.gov/regular-fares>>.

⁹³ Auto Insurance. Insurance Information Institute. U.S. Department of Labor, Bureau of Labor Statistics; National Association of Realtors, 2011. Web. 11 Nov. 2011. <<http://www.iii.org/media/facts/statsbyissue/auto/>>.

⁹⁴ MARC Growth and Investment Plan. Maryland Transit Administration. Maryland Transit Administration, Sept. 2007. Web. 14 Nov. 2011. <<http://mta.maryland.gov/sites/default/files/marcplanfull.pdf>>.

⁹⁵ Ibid.



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- vii. $\$70,633,909.33 [(\$349.00 \text{ Average Cost of Monthly MARC Pass} * 202,389.43 \text{ Average Ridership per Station})]=\text{Total Paid to Travel in a Month}$
- viii. $0.91 [(64,547,966.67 \text{ Average Miles Traveled per Month} / \$70,633,909.33 \text{ Total Paid to Travel in a Month})]=\text{Total per Person to Travel a Month}$
- ix. $\$10.97 [(0.91 \text{ Total per Person to Travel a Month} * 12)]=\text{Annual Cost to Travel}$
- x. $\$1.19 [(\$12.15 \text{ Cost per Person} - \$10.97 \text{ Annual Cost to Travel})]=\text{Savings}$
- xi. $\$240,580.40 [(\$1.19 \text{ Savings} * 202,389.43 \text{ Average Ridership per Station})]=\text{Savings per Year to Residents}$
- xii. 10001 – 10009 – Households – All income levels - $\$240,580.40 [(\$1.19 \text{ Savings} * 202,389.43 \text{ Average Ridership per Station})]=\text{Savings per Year to Residents}$
- e. Expanded Transit (Purple Line, Corridor Cities Transitway, Red Line)**
 - i. $\$1,277.50 [(\$3.50 \text{ Cost of a Daily Pass} * 365)]=\text{Cost of a Pass for a Year}$
 - ii. $5,657.50 [(15.1 \text{ Length of Track} * 365)]=\text{Average Gallons Needed to Travel per Day}$
 - iii. $209.54 [(5,657.50 \text{ Average Gallons Needed to Travel per Day} / 27 \text{ Average MPG})]=\text{Gallons Used a Year}$
 - iv. $\$24,894.00 [(\$922 \text{ Average Cost of Insurance} * 27 \text{ Average MPG})]=\text{Cost to Travel Annually}$
 - v. $\$19,405.23 [(\$3.43 \text{ Average Cost of Gas} * 5,657.50 \text{ Average Gallons Needed to Travel per Day})]=\text{Cost of Gas per Day}$
 - vi. $\$718.71 [(209.54 \text{ Gallons Used a Year} * [\$3.43 \text{ Average Cost of Gas}])]=\text{Average Cost of Gas a Year}$
 - vii. $\$1,431.71 [(\$718.71 \text{ Average Cost of Gas a Year} + 713 \text{ Annual Congestion Rate})]=\text{Total Cost to Travel}$
 - viii. $\$154.21 [(\$1,431.71 \text{ Total Cost to Travel} - \$1,277.50 \text{ Cost of a Pass for a Year})]=\text{Total Savings per Person}$
 - ix. $\$1,334,043.50 [(\$154.21 \text{ Total Savings per Person} * 8,650.71 \text{ Average Annual Ridership})]=\text{Total Savings for All Consumers}$
 - x. 10001 – 10009 – Households – All income levels - $\$154.21 \text{ Total Savings per Person} * 8,650.71 \text{ Average Annual Ridership})]=\text{Total Savings for All Consumers}$
- f. MARC Growth and Investment Plan**
 - i. $299.84 [(8,095,577 \text{ Number of Annual Passengers} / 27,000)]=\text{With Old Seats}$
 - ii. $30,888,127.07 [(299.84 \text{ With Old Seats} * 103,000)]=\text{New Riders}$
 - iii. $3,729,438,074.07 [((774,575,600 \text{ Miles Traveled Annually} / 8,095,577 \text{ Number of Annual Passengers}) * (8,095,577 \text{ Number of Annual Passengers} + 30,883,127.07 \text{ New Riders}))]=\text{Miles Traveled Annually With New Riders}$
 - iv. $138,127,336.08 [(3,729,438,074.07 \text{ Miles Traveled Annually With New Riders} / 27 \text{ Average per MPG})]=\text{Gas Used}$



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- v. $\$473,776,762.74 [(138,127,336.08 \text{ Gas Used} * \$3.43 \text{ Cost of Gas})]=\text{Cost of Gas}$
 - vi. $\$12.15 [(\$473,776,762.74 \text{ Cost of Gas} / (8,095,577 \text{ Number of Annual Passengers} + 30,888,127.07 \text{ New Riders})]=\text{Cost Per Person}$
 - vii. $\$4,188.00 [(349 * 12)]=\text{Cost to Travel a Year}$
 - viii. $\$473,776,718.97 [(\$12.15 \text{ Cost Per Person} * (8,095,577 \text{ Number of Annual Passengers} + 30,888,127.07 \text{ New Riders}))]=\text{Savings in 2035}$
 - ix. $\$19,740,696.62 [(\$473,776,718.97 \text{ Savings in 2035} / 24)]=\text{Annual Savings}$
 - x. $\$19,740,696.62 [(\$473,776,718.97 \text{ Savings in 2035} / 24)]=\text{Savings per Year to Residents}$
 - xi. $10001 - 10009 - \$473,776,718.97 \text{ Savings in 2035} / 24]=\text{Savings per Year to Residents}$
4. Input savings by sector into IMPLAN model and run impacts.
 - a. Household savings inputs were distributed among household income ranges using household income distribution percentages taken from the Census' 2005-2009 American Community Survey 5-Year estimates for Maryland. (Note: In some cases, totals do not add up to 100.0 percent due to margin of error.)
 5. Export impacts and analyze.

3.2.7 Intercity Transportation Initiatives

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **MARC Station Parking Enhancements**
 - i. 36—Construction of other new nonresidential structures
 - ii. 39—Maintenance and repair construction of nonresidential structures
 - iii. 369—Architectural, engineering, and related services
 - iv. 432—Other state and local government enterprises
 - b. **Refurbishing MARC and Other Rail Vehicles**
 - i. 283—Motor vehicle parts manufacturing
 - ii. 336—Transit and ground passenger transportation
 - iii. 375—Environmental and other technical consulting services
 - iv. 414—Automotive repair and maintenance, except car washes
 - v. 432—Other state and local government enterprises
 - c. **Update on Maryland High Speed Rail**
 - i. 36—Construction of other new nonresidential structures
 - ii. 225—Other engine equipment manufacturing
 - iii. 289—Railroad and rolling stock manufacturing
 - iv. 294—All other transportation equipment manufacturing
 - v. 319—Wholesale trade businesses
 - vi. 336—Transit and ground passenger transportation
 - vii. 369—Architectural, engineering, and related services
 - viii. 432—Other state and local government enterprises



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. MARC Station Parking Enhancements**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - b. Refurbishing MARC and Other Rail Vehicles**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - c. Update on Maryland High Speed Rail**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. MARC Station Parking Enhancements**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$300,000 each
 - b. Refurbishing MARC and Other Rail Vehicles**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$225,000 each
 - c. Update on Maryland High Speed Rail**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—approx. \$128,571.43 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file). (Note: IMPLAN code 336 (Transit and ground passenger transportation) has been changed to 432 (Other state and local government enterprises) in all instances due to the state/local government overseeing MARC operations via MTA.)
 - a. MARC Station Parking Enhancements**
 - i. 432—Other state and local government enterprises
 - ii. 10001-10009—Households – All income levels
 - b. Refurbishing MARC and Other Rail Vehicles**
 - i. 432—Other state and local government enterprises
 - c. Update on Maryland High Speed Rail**
 - i. 432—Other state and local government enterprises
 - ii. 10001-10009—Households – All income levels
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. MARC Station Parking Enhancements**
 - i. Phase I—428 new parking spaces
 - ii. Odenton station feasibility study—2,500 additional parking spaces
 - b. Refurbishing MARC and Other Rail Vehicles**
 - i. 23 cars scheduled to be overhauled between FY 2005 and FY 2012



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

c. Update on Maryland High Speed Rail

- i. \$9.4 million allocation to MDOT for high-speed stimulus to complete environmental and engineering work to replace BWI Station as of Sept. 2010
- 3. Research savings data for each policy according to part of program to be affected by savings.

a. MARC Station Parking Enhancements

- i. Average cost of monthly MARC pass⁹⁶—\$349/month (Transit Link Card)
- ii. Average cost savings of using public transit⁹⁷—\$9,383/year for Baltimore City
- iii. Average cost of MARC station parking⁹⁸—\$6.39/day average (between 7 stations and not including outliers)
- iv. Note about Transit Link Card data use: A Monthly Transit Link pass is used in the calculations of all rail passes. Often users of the MARC system traveling in and around the metropolitan region of Maryland/Washington, D.C. will wish to visit areas within the city which are accessible through walking or easy-to-navigate light rail systems. Instead of purchasing separate fares for each point of travel, most individuals prefer having one card designated for travel within the region. The cost benefit ranges from easy parking to less time spent searching for dollars to pay for extra fare cards or to add value to existing fare cards. The average cost of monthly fares for MARC has been calculated using the transit link pass over a span of stations from Aberdeen to Washington, D.C.

b. Refurbishing MARC and Other Rail Vehicles

- i. Average cost of monthly MARC pass⁹⁹—\$349/month (Transit Link Card)
- ii. Capacity of MARC train cars (single-level and bi-level)¹⁰⁰—121 seats (average)

⁹⁶ MARC Train Service Order Form. CommuterDirect.com®. 2011. MARC. 14 Nov. 2011

<https://www.commuterpage.com/orderforms/transitorders_v3.cfm?sysid=12>.

⁹⁷ "Riding Public Transit Saves Individuals \$9,242 Annually." APTA Homepage. 1 Dec. 2010. American Public Transportation Association (APTA). 14 Nov. 2011

<http://www.apta.com/mediacenter/pressreleases/2010/Pages/100112_Transit_Savings.aspx>.

⁹⁸ MARC Parking Details | Maryland Transit Administration. Home | Maryland Transit Administration. Nov. 2011. Maryland Transit Administration (MTA). 14 Nov. 2011 <<http://mta.maryland.gov/marc-parking-details>>.

⁹⁹ MARC Train Service Order Form. CommuterDirect.com®. 2011. MARC. 14 Nov. 2011

<https://www.commuterpage.com/orderforms/transitorders_v3.cfm?sysid=12>.

¹⁰⁰ Dresser, Michael. "New cars may ease MARC crowding - Baltimore Sun." Featured Articles From The Baltimore Sun. 20 Aug. 2008. The Baltimore Sun. 14 Nov. 2011 <http://articles.baltimoresun.com/2008-08-20/news/0808190131_1_marc-new-cars-passenger-cars>.



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

- iii. Note about Transit Link Card data use: A Monthly Transit Link pass is used in the calculations of all rail passes. Often users of the MARC system traveling in and around the metropolitan region of Maryland/Washington, D.C. will wish to visit areas within the city which are accessible through walking or easy-to-navigate light rail systems. Instead of purchasing separate fares for each point of travel, most individuals prefer having one card designated for travel within the region. The cost benefit ranges from easy parking to less time spent searching for dollars to pay for extra fare cards or to add value to existing fare cards. The average cost of monthly fares for MARC has been calculated using the transit link pass over a span of stations from Aberdeen to Washington, D.C.
- c. Update on Maryland High Speed Rail**
- i. Average cost of monthly MARC pass for BWI Rail Station between stations for Baltimore City and Washington, D.C.¹⁰¹.—\$227/month (Transit Link Card)
 - ii. Number of parking spots at BWI Rail Station¹⁰²—3,187 spots
 - iii. Cost of MARC station parking at BWI Rail Station¹⁰³—\$9/day
 - iv. Cost of BWI Garage (daily)¹⁰⁴—\$12/day
 - v. Note about Transit Link Card data use: A Monthly Transit Link pass is used in the calculations of all rail passes. Often users of the MARC system traveling in and around the metropolitan region of Maryland/Washington, D.C. will wish to visit areas within the city which are accessible through walking or easy-to-navigate light rail systems. Instead of purchasing separate fares for each point of travel, most individuals prefer having one card designated for travel within the region. The cost benefit ranges from easy parking to less time spent searching for dollars to pay for extra fare cards or to add value to existing fare cards. The average cost of fare for the BWI Rail Station has been calculated under the assumption that most tourists will travel from BWI to Baltimore and BWI to Washington, D.C.
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
- a. MARC Station Parking Enhancements**
- i. $432 \text{—} \$16,415,964 [(428 \text{ new Phase I parking spots} + 2,500 \text{ new Odenton parking spots (assume 1 vehicle parked per day)} * \$349/\text{month (assume all buy monthly pass)} * 12 \text{ months})] + [(2,500 \text{ new Odenton parking spots (assume 1 vehicle parked per day)} * \$6.39/\text{day on average (assume all park at station garage)} * 260 \text{ business days})] = \text{annual increase in revenue}$

¹⁰¹ MARC Train Service Order Form. CommuterDirect.com®. 2011. MARC. 14 Nov. 2011 <https://www.commuterpage.com/orderforms/transitorders_v3.cfm?sysid=12>.

¹⁰² MARC Parking Details | Maryland Transit Administration. Home | Maryland Transit Administration. Nov. 2011. Maryland Transit Administration (MTA). 14 Nov. 2011 <<http://mta.maryland.gov/marc-parking-details>>.

¹⁰³ Ibid.

¹⁰⁴ Parking. Baltimore Washington International Thurgood Marshall Airport. 11 Nov. 2011. <<http://www.bwiairport.com/en/parking/information-rates/daily-garage>>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- ii. 10001-10009—\$23,319,924 [(428 new Phase I riders + 2,500 new Odenton riders (assume 1 new rider per spot per day) * \$9,383 in savings] - [2,500 new Odenton riders (assume 1 new rider per spot per day) * \$6.39/day on average (assume all park at station garage) * 260 business days] = annual savings for riders
- b. Refurbishing MARC and Other Rail Vehicles**
 - i. 432—\$11,655,204 (23 cars refurbished (assume still in use in addition to newer cars) * 121 seats per car on average * \$349/month (assume all buy monthly pass) * 12 months=annual increase in revenue)
- c. Update on Maryland High Speed Rail**
 - i. 432—\$16,138,968 [(3,187 spots at BWI Rail Station (assume 1 vehicle parked per day) * \$227/month (assume all buy monthly pass) * 12 months)] + [(3,187 spots at BWI Rail Station (assume 1 vehicle parked per day) * \$9/day (assume all park at station) * 260 days)] = annual increase in revenue
 - ii. 10001-10009—\$2,485,860 (3,187 spots at BWI Rail Station (assume 1 vehicle parked per day) * \$3/day savings (comparing \$12/day and \$9/day parking fees) * 260 days = annual savings for riders)
- 5. Input savings by sector into IMPLAN model and run impacts.
 - a. Household savings inputs were distributed among household income ranges using household income distribution percentages taken from the Census' 2005-2009 American Community Survey 5-Year estimates for Maryland. (Note: In some cases, totals do not add up to 100.0 percent due to margin of error.)
- 6. Export impacts and analyze.

3.2.8 Bike and Pedestrian Initiatives

Investment Phase

- 1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. Bicycle/Pedestrian Enhancements**
 - i. 36—Construction of other new nonresidential structures
 - ii. 369—Architectural, engineering, and related services
 - iii. 375—Environmental and other technical consulting services
 - iv. 377—Advertising and related services
 - v. 432—Other state and local government enterprises
 - b. Bike Racks on Buses, MARC, Subway, Light Rail**
 - i. 292—Motorcycle, bicycle, and parts manufacturing
 - ii. 432—Other state and local government enterprises
 - c. Construction of Bike Lanes and Bike Paths**
 - i. 36—Construction of other new nonresidential structures
 - ii. 369—Architectural, engineering, and related services
 - iii. 375—Environmental and other technical consulting services
 - iv. 432—Other state and local government enterprises



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- d. East Coast Greenway**
 - i. 36—Construction of other new nonresidential structures
 - ii. 369—Architectural, engineering, and related services
 - iii. 375—Environmental and other technical consulting services
 - iv. 432—Other state and local government enterprises
 - e. Bike Stations**
 - i. 432—Other state and local government enterprises
 - f. Bike Rentals**
 - i. 292—Motorcycle, bicycle, and parts manufacturing
 - ii. 319—Wholesale trade businesses
 - iii. 432—Other state and local government enterprises
 - g. Bike Racks**
 - i. 292—Motorcycle, bicycle, and parts manufacturing
 - ii. 319—Wholesale trade businesses
 - iii. 363—General and consumer goods rental except video tape and disc rental
 - iv. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
- a. Bicycle/Pedestrian Enhancements**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - b. Bike Racks on Buses, MARC, Subway, Light Rail**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - c. Construction of Bike Lanes and Bike Paths**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - d. East Coast Greenway**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - e. Bike Stations**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - f. Bike Rentals**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - g. Bike Racks**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
- a. Bicycle/Pedestrian Enhancements**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$225,000 each
 - b. Bike Racks on Buses, MARC, Subway, Light Rail**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$900,000

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- c. Construction of Bike Lanes and Bike Paths**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$300,000 each
 - d. East Coast Greenway**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$300,000 each
 - e. Bike Stations**
 - i. 100% for government administrative costs/responsibilities—\$1,000,000
 - f. Bike Rentals**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$450,000 each
 - g. Bike Racks**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$300,000 each
4. Input sales by sector into IMPLAN model and run impacts.
 5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. Bicycle/Pedestrian Enhancements**
 - i. 10001-10009—Households – All income levels
 - b. Bike Racks on Buses, MARC, Subway, Light Rail**
 - i. 10001-10009—Households – All income levels
 - c. Construction of Bike Lanes and Bike Paths**
 - i. 10001-10009—Households – All income levels
 - d. East Coast Greenway**
 - i. 10001-10009—Households – All income levels
 - e. Bike Stations**
 - i. 10001-10009—Households – All income levels
 - f. Bike Rentals**
 - i. 10001-10009—Households – All income levels
 - g. Bike Racks**
 - i. 10001-10009—Households – All income levels
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. Bicycle/Pedestrian Enhancements**
 - i. Total reduction achieved by 2020—410,000 metric tons of Co2
 - ii. Annual reduction over 8 years (2012 – 2020)—51,250 metric tons of Co2
 - b. Bike Racks on Buses, MARC, Subway, Light Rail**
 - i. Total reduction achieved by 2020—410,000 metric tons of Co2
 - ii. Annual reduction over 8 years (2012 – 2020)—51,250 metric tons of Co2



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- c. Construction of Bike Lanes and Bike Paths**
 - i. Total reduction achieved by 2020—410,000 metric tons of Co2
 - ii. Annual reduction over 8 years (2012 – 2020)—51,250 metric tons of Co2
 - d. East Coast Greenway**
 - i. Total reduction achieved by 2020—410,000 metric tons of Co2
 - ii. Annual reduction over 8 years (2012 – 2020)—51,250 metric tons of Co2
 - e. Bike Stations**
 - i. Total reduction achieved by 2020—410,000 metric tons of Co2
 - ii. Annual reduction over 8 years (2012 – 2020)—51,250 metric tons of Co2
 - f. Bike Rentals**
 - i. Total reduction achieved by 2020—410,000 metric tons of Co2
 - ii. Annual reduction over 8 years (2012 – 2020)—51,250 metric tons of Co2
 - g. Bike Racks**
 - i. Total reduction achieved by 2020—410,000 metric tons of Co2
 - ii. Annual reduction over 8 years (2012 – 2020)—51,250 metric tons of Co2
3. Research savings data for each policy according to part of program to be affected by savings.
- a. Bicycle/Pedestrian Enhancements**
 - i. Change to kilograms¹⁰⁵—51,250,000
 - ii. Convert from kg of carbon to gallons of fuel¹⁰⁶—5,751,964.09
 - iii. Avg. Price of Gas in MD—\$3.43
 - iv. Note – For this policy analysis we will quantify the total savings in Carbon Million Metric tons into gallons of gas saved. The assumption rests that many of those that will utilize these new programs will potentially use other programs included within this policy. Therefore, RESI will assume that the reduction annually of carbon emissions will be from the group of individuals most likely to partake of these programs. We split the final outcome over all the programs and IMPLAN codes.
 - b. Bike Racks on Buses, MARC, Subway, Light Rail**
 - i. Change to kilograms¹⁰⁷—51,250,000
 - ii. Convert from kg of carbon to gallons of fuel¹⁰⁸—5,751,964.09
 - iii. Avg. Price of Gas in MD—\$3.43

¹⁰⁵ "How We Calculate Your Carbon Footprint." Carbon offsets for your carbon footprint & fighting global warming. 2011. CarbonFund.org. 14 Nov. 2011
<http://www.carbonfund.org/site/pages/carbon_calculators/category/Assumptions#Transportation>.

¹⁰⁶ Ibid.

¹⁰⁷ "How We Calculate Your Carbon Footprint." Carbon offsets for your carbon footprint & fighting global warming. 2011. CarbonFund.org. 14 Nov. 2011
<http://www.carbonfund.org/site/pages/carbon_calculators/category/Assumptions#Transportation>.

¹⁰⁸ Ibid.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

- iv. Note – For this policy analysis we will quantify the total savings in Carbon Million Metric tons into gallons of gas saved. The assumption rests that many of those that will utilize these new programs will potentially use other programs included within this policy. Therefore, RESI will assume that the reduction annually of carbon emissions will be from the group of individuals most likely to partake of these programs. We split the final outcome over all the programs and IMPLAN codes.
- c. Construction of Bike Lanes and Bike Paths**
- i. Change to kilograms¹⁰⁹—51,250,000
 - ii. Convert from kg of carbon to gallons of fuel¹¹⁰—5,751,964.09
 - iii. Avg. Price of Gas in MD—\$3.43
 - iv. Note – For this policy analysis we will quantify the total savings in Carbon Million Metric tons into gallons of gas saved. The assumption rests that many of those that will utilize these new programs will potentially use other programs included within this policy. Therefore, RESI will assume that the reduction annually of carbon emissions will be from the group of individuals most likely to partake of these programs. We split the final outcome over all the programs and IMPLAN codes.
- d. East Coast Greenway**
- i. Change to kilograms¹¹¹—51,250,000
 - ii. Convert from kg of carbon to gallons of fuel¹¹²—5,751,964.09
 - iii. Avg. Price of Gas in MD—\$3.43
 - iv. Note – For this policy analysis we will quantify the total savings in Carbon Million Metric tons into gallons of gas saved. The assumption rests that many of those that will utilize these new programs will potentially use other programs included within this policy. Therefore, RESI will assume that the reduction annually of carbon emissions will be from the group of individuals most likely to partake of these programs. We split the final outcome over all the programs and IMPLAN codes.
- e. Bike Stations**
- i. Change to kilograms¹¹³—51,250,000
 - ii. Convert from kg of carbon to gallons of fuel¹¹⁴—5,751,964.09
 - iii. Avg. Price of Gas in MD—\$3.43

¹⁰⁹ Ibid.¹¹⁰ Ibid.¹¹¹ Ibid.¹¹² Ibid.¹¹³ Ibid.¹¹⁴ Ibid.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- iv. Note – For this policy analysis we will quantify the total savings in Carbon Million Metric tons into gallons of gas saved. The assumption rests that many of those that will utilize these new programs will potentially use other programs included within this policy. Therefore, RESI will assume that the reduction annually of carbon emissions will be from the group of individuals most likely to partake of these programs. We split the final outcome over all the programs and IMPLAN codes.

f. Bike Rentals

- i. Change to kilograms¹¹⁵—51,250,000
- ii. Convert from kg of carbon to gallons of fuel¹¹⁶—5,751,964.09
- iii. Avg. Price of Gas in MD—\$3.43
- iv. Note – For this policy analysis we will quantify the total savings in Carbon Million Metric tons into gallons of gas saved. The assumption rests that many of those that will utilize these new programs will potentially use other programs included within this policy. Therefore, RESI will assume that the reduction annually of carbon emissions will be from the group of individuals most likely to partake of these programs. We split the final outcome over all the programs and IMPLAN codes.

g. Bike Racks

- i. Change to kilograms¹¹⁷—51,250,000
- ii. Convert from kg of carbon to gallons of fuel¹¹⁸—5,751,964.09
- iii. Avg. Price of Gas in MD—\$3.43
- iv. Note – For this policy analysis we will quantify the total savings in Carbon Million Metric tons into gallons of gas saved. The assumption rests that many of those that will utilize these new programs will potentially use other programs included within this policy. Therefore, RESI will assume that the reduction annually of carbon emissions will be from the group of individuals most likely to partake of these programs. We split the final outcome over all the programs and IMPLAN codes.

- 4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).

a. Bicycle/Pedestrian Enhancements

- i. \$19,729,236.81 [(5,751,964.09 Convert from kg of carbon to gallons of fuel * \$3.43 Avg. Price of Gas in MD)]=Total Savings Annually to MD residents taking advantage of initiatives
- ii. \$2,818,462.40 [(\$19,729,236.81 Total Savings Annually to MD residents taking advantage of initiatives / 7)]=Over 7 programs

¹¹⁵ "How We Calculate Your Carbon Footprint." Carbon offsets for your carbon footprint & fighting global warming. 2011. CarbonFund.org. 14 Nov. 2011
<http://www.carbonfund.org/site/pages/carbon_calculators/category/Assumptions#Transportation>.

¹¹⁶ Ibid.

¹¹⁷ Ibid.

¹¹⁸ Ibid.



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- iii. \$2,818,462.40 [(\$19,729,236.81 Total Savings Annually to MD residents taking advantage of initiatives / 7)]=Each program on average will save MD residents
 - iv. 10001 – 10009—\$2,818,462.40 [(\$19,729,236.81 Total Savings Annually to MD residents taking advantage of initiatives / 7)]=Each program on average will save MD residents
- b. Bike Racks on Buses, MARC, Subway, Light Rail**
- i. \$19,729,236.81 [(5,751,964.09 Convert from kg of carbon to gallons of fuel * \$3.43 Avg. Price of Gas in MD)]=Total Savings Annually to MD residents taking advantage of initiatives
 - ii. \$2,818,462.40 [(\$19,729,236.81 Total Savings Annually to MD residents taking advantage of initiatives / 7)]=Over 7 programs
 - iii. \$2,818,462.40 [(\$19,729,236.81 Total Savings Annually to MD residents taking advantage of initiatives / 7)]=Each program on average will save MD residents
 - iv. 10001 – 10009 Households – All income levels—\$2,818,462.40 [(\$19,729,236.81 Total Savings Annually to MD residents taking advantage of initiatives / 7)]=Each program on average will save MD resident
- c. Construction of Bike Lanes and Bike Paths**
- i. \$19,729,236.81 [(5,751,964.09 Convert from kg of carbon to gallons of fuel * \$3.43 Avg. Price of Gas in MD)]=Total Savings Annually to MD residents taking advantage of initiatives
 - ii. \$2,818,462.40 [(\$19,729,236.81 Total Savings Annually to MD residents taking advantage of initiatives / 7)]=Over 7 programs
 - iii. \$2,818,462.40 [(\$19,729,236.81 Total Savings Annually to MD residents taking advantage of initiatives / 7)]=Each program on average will save MD residents
 - iv. 10001 – 10009 Households – All income levels—\$2,818,462.40 [(\$19,729,236.81 Total Savings Annually to MD residents taking advantage of initiatives / 7)]=Each program on average will save MD residents
- d. East Coast Greenway**
- i. \$19,729,236.81 [(5,751,964.09 Convert from kg of carbon to gallons of fuel * \$3.43 Avg. Price of Gas in MD)]=Total Savings Annually to MD residents taking advantage of initiatives
 - ii. \$2,818,462.40 [(\$19,729,236.81 Total Savings Annually to MD residents taking advantage of initiatives / 7)]=Over 7 programs
 - iii. \$2,818,462.40 [(\$19,729,236.81 Total Savings Annually to MD residents taking advantage of initiatives / 7)]=Each program on average will save MD residents

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- iv. 10001 – 10009 Households – All income levels—\$2,818,462.40 [(19,729,236.81 Total Savings Annually to MD residents taking advantage of initiatives / 7)]=Each program on average will save MD residents
- e. Bike Stations**
 - i. \$19,729,236.81 [(5,751,964.09 Convert from kg of carbon to gallons of fuel * \$3.43 Avg. Price of Gas in MD)]=Total Savings Annually to MD residents taking advantage of initiatives
 - ii. \$2,818,462.40 [(19,729,236.81 Total Savings Annually to MD residents taking advantage of initiatives / 7)]=Over 7 programs
 - iii. \$2,818,462.40 [(19,729,236.81 Total Savings Annually to MD residents taking advantage of initiatives / 7)]=Each program on average will save MD residents
 - iv. 10001 – 10009 Households – All income levels—\$2,818,462.40 [(19,729,236.81 Total Savings Annually to MD residents taking advantage of initiatives / 7)]=Each program on average will save MD residents
- f. Bike Rentals**
 - i. \$19,729,236.81 [(5,751,964.09 Convert from kg of carbon to gallons of fuel * \$3.43 Avg. Price of Gas in MD)]=Total Savings Annually to MD residents taking advantage of initiatives
 - ii. \$2,818,462.40 [(19,729,236.81 Total Savings Annually to MD residents taking advantage of initiatives / 7)]=Over 7 programs
 - iii. \$2,818,462.40 [(19,729,236.81 Total Savings Annually to MD residents taking advantage of initiatives / 7)]=Each program on average will save MD residents
 - iv. 10001 – 10009 Households – All income levels—\$2,818,462.40 [(19,729,236.81 Total Savings Annually to MD residents taking advantage of initiatives / 7)]=Each program on average will save MD residents
- g. Bike Racks**
 - i. \$19,729,236.81 [(5,751,964.09 Convert from kg of carbon to gallons of fuel * \$3.43 Avg. Price of Gas in MD)]=Total Savings Annually to MD residents taking advantage of initiatives
 - ii. \$2,818,462.40 [(19,729,236.81 Total Savings Annually to MD residents taking advantage of initiatives / 7)]=Over 7 programs
 - iii. \$2,818,462.40 [(19,729,236.81 Total Savings Annually to MD residents taking advantage of initiatives / 7)]=Each program on average will save MD residents
 - iv. 10001 – 10009 Households – All income levels—\$2,818,462.40 [(19,729,236.81 Total Savings Annually to MD residents taking advantage of initiatives / 7)]=Each program on average will save MD residents



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

5. Input savings by sector into IMPLAN model and run impacts.
 - a. Household savings inputs were distributed among household income ranges using household income distribution percentages taken from the Census' 2005-2009 American Community Survey 5-Year estimates for Maryland. (Note: In some cases, totals do not add up to 100.0 percent due to margin of error.)
6. Export impacts and analyze.

3.2.9 Pricing Initiatives

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. Electronic Toll Collection**
 - i. 239—Other communications equipment manufacturing
 - ii. 369—Architectural, engineering, and related services
 - iii. 432—Other state and local government enterprises
 - b. High Occupancy Toll Lanes**
 - i. 369—Architectural, engineering, and related services
 - ii. 432—Other state and local government enterprises
 - c. VMT Fees**
 - i. 432—Other state and local government enterprises
 - d. Congestion Pricing and Managed Lanes**
 - i. 36—Construction of other new nonresidential structures
 - ii. 39—Maintenance & repair construction of nonresidential structures
 - iii. 369—Architectural, engineering, and related services
 - iv. 432—Other state and local government enterprises
 - e. Parking Impact Fees**
 - i. 336—Transit and ground passenger transportation
 - ii. 422—Other personal services
 - iii. 375—Environmental and other technical consulting services
 - iv. 432—Other state and local government enterprises
 - f. Employer Commute Incentives**
 - i. 377—Advertising and related services
 - ii. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. Electronic Toll Collection**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - b. High Occupancy Toll Lanes**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - c. VMT Fees**
 - i. 1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - d. Congestion Pricing and Managed Lanes**
 - i. 1,000,000 (per \$1m basis due to no actual investment dollar figures)

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- e. **Parking Impact Fees**
 - i. 1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - f. **Employer Commute Incentives**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
- a. **Electronic Toll Collection**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$450,000 each
 - b. **High Occupancy Toll Lanes**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$900,000 each
 - c. **VMT Fees**
 - i. 100% for government administrative costs/responsibilities—\$1,000,000
 - d. **Congestion Pricing and Managed Lanes**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$300,000 each
 - e. **Parking Impact Fees**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$300,000 each
 - f. **Employer Commute Incentives**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$900,000 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file). (Note: IMPLAN code 336 (Transit and ground passenger transportation) has been changed to 432 (Other state and local government enterprises) in all instances due to the state/local government overseeing MARC operations via MTA.)
- a. **Electronic Toll Collection**
 - i. 10001-10009—Households – All income levels
 - b. **High Occupancy Toll Lanes**
 - i. 10001-10009—Households – All income levels
 - c. **VMT Fees**
 - i. 432—Other state and local government enterprises
 - d. **Congestion Pricing and Managed Lanes**
 - i. 10001-10009—Households – All income levels

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- e. **Parking Impact Fees**
 - i. 432—Other state and local government enterprises
- f. **Employer Commute Incentives**
 - i. 10001-10009—Households – All income levels
2. Determine part of program to be affected by savings (strategy write-up).
 - a. **Electronic Toll Collection**
 - b. **High Occupancy Toll Lanes**
 - c. **VMT Fees**
 - d. **Congestion Pricing and Managed Lanes**
 - e. **Parking Impact Fees**
 - f. **Employer Commute Incentives**
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Electronic Toll Collection**
 - i. Avg. Wait Time at Toll Booth Reduction¹¹⁹=2.5 minutes
 - ii. Avg. Annual Commuters Passing Through Tolls¹²⁰=153,800,000
 - iii. Number of hours a year=8,765
 - iv. Number of Tolls Booths in MD¹²¹=10
 - v. Gas wasted in idle¹²²=5,528,176.045
 - vi. Assumed Price per Gallon of Gas=3.43
 - b. **High Occupancy Toll Lanes**
 - i. Avg. Reduction in Time from HOT Lane¹²³=2%
 - ii. Current Congestion Time In MD (Total by Commuter Annually)¹²⁴=34
 - iii. Number of those employed in MD¹²⁵=2,771,833
 - iv. Assumed Price per Gallon of Gas =3.43
 - v. Gas wasted in idle per minute Idle¹²⁶=0.014377571

¹¹⁹ Saka, Anthony A., Dennis K. Agboh, Simon Ndiritu, and Richard A. Glassco. "An Estimation of Mobile Emissions Reduction." RITA | National Transportation Library. National Transportation Centre, Mar. 2000. Web. 14 Nov. 2011. <<http://ntl.bts.gov/lib/16000/16800/16888/PB2000105915.pdf>>.

¹²⁰ MdTA Toll Facilities. MdTA Index. Maryland Transportation Authority, 2011. Web. 14 Nov. 2011. <<http://www.mdtamaryland.gov/TollFacilities/facilities.html>>.

¹²¹ Ibid.

¹²² ISDH: ISDH Home. IN.gov: Home. IN.gov. Web. 14 Nov. 2011.

<http://www.in.gov/isdh/files/Idling_Brochure.>.

¹²³ Baker, Michael, and Cambridge Systematics. "Maryland Climate Action Plan Draft 2012." Maryland Department of Transportation. Maryland Department of Transportation, 11 Apr. 2011. Web. 16 Nov. 2011.

<http://www.mdot.maryland.gov/Planning/Plans_Programs_Reports/Documents/Climate_Change_2011_Appendix.pdf>.

¹²⁴ Ibid.

¹²⁵ Civilian Labor Force, Employment & Unemployment by Place of Residence (LAUS) - Maryland - Division of Workforce Development and Adult Learning. Welcome to the Maryland Department of Labor, Licensing and Regulation. Maryland Department of Labor, Licensing and Regulation, 21 Oct. 2011. Web. 14 Nov. 2011.

<<http://www.dlfr.state.md.us/lmi/laus/maryland.shtml>>.

¹²⁶ ISDH: ISDH Home. IN.gov: Home. IN.gov. Web. 14 Nov. 2011.

<http://www.in.gov/isdh/files/Idling_Brochure.>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

c. VMT Fees

- i. Net Annual Revenue Projections¹²⁷=644.1 millions

d. Congestion Pricing and Managed Lanes

- i. Toll Lane Miles in MD¹²⁸=3,140
- ii. Total that are congested¹²⁹=30.40%
- iii. Gas wasted in idle per minute Idle¹³⁰=0.014377571
- iv. Current Congestion Time In MD (Total by Commuter Annually)¹³¹=2,040 in min
- v. Number of those that pass through a MD Toll Annually¹³²= 207,530
- vi. Avg. Price of Gas=\$3.43 (assumed)

e. Parking Impact Fees

- i. Daily Parking¹³³=\$0.75 average per hour
- ii. Assume 8 Hours=\$6.00 (cost per day) (daily parking*8)
- iii. Number of those that work in the city of Baltimore¹³⁴=1,289,169

f. Employer Commute Incentives

- i. Assume 15% of Employers in Metro Area provide Passes or something to employees¹³⁵
- ii. Reduction in Annual VMT¹³⁶=1,094,381
- iii. Avg. MPG=27 mpg

¹²⁷ Baker, Michael, and Cambridge Systematics. "Maryland Climate Action Plan Draft 2012." Maryland Department of Transportation. Maryland Department of Transportation, 11 Apr. 2011. Web. 16 Nov. 2011. <http://www.mdot.maryland.gov/Planning/Plans_Programs_Reports/Documents/Climate_Change_2011_Appendix.pdf>.

¹²⁸ Baker, Michael, and Cambridge Systematics. "Maryland Climate Action Plan Draft 2012." Maryland Department of Transportation. Maryland Department of Transportation, 11 Apr. 2011. Web. 16 Nov. 2011.

¹²⁹ Ibid.

¹³⁰ ISDH: ISDH Home. IN.gov: Home. IN.gov. Web. 14 Nov. 2011.

<http://www.in.gov/isdh/files/Idling_Brochure>.

¹³¹ Baker, Michael, and Cambridge Systematics. "Maryland Climate Action Plan Draft 2012." Maryland Department of Transportation. Maryland Department of Transportation, 11 Apr. 2011. Web. 16 Nov. 2011.

<http://www.mdot.maryland.gov/Planning/Plans_Programs_Reports/Documents/Climate_Change_2011_Appendix.pdf>.

¹³² Civilian Labor Force, Employment & Unemployment by Place of Residence (LAUS) - Maryland - Division of Workforce Development and Adult Learning. Welcome to the Maryland Department of Labor, Licensing and Regulation. Maryland Department of Labor, Licensing and Regulation, 21 Oct. 2011. Web. 14 Nov. 2011.

<<http://www.dllr.state.md.us/lmi/laus/maryland.shtml>>.

¹³³ Documents – Resource Types – SFpark. SFpark. Municipal Transportation Agency, 2011. Web. 16 Nov. 2011.

<<http://sfpark.org/resource-type/documents/>>

¹³⁴ Civilian Labor Force, Employment & Unemployment by Place of Residence (LAUS) - Maryland - Division of Workforce Development and Adult Learning. Welcome to the Maryland Department of Labor, Licensing and Regulation. Maryland Department of Labor, Licensing and Regulation, 21 Oct. 2011. Web. 14 Nov. 2011.

<<http://www.dllr.state.md.us/lmi/laus/maryland.shtml>>.

¹³⁵ Baker, Michael, and Cambridge Systematics. "Maryland Climate Action Plan Draft 2012." Maryland Department of Transportation. Maryland Department of Transportation, 11 Apr. 2011. Web. 16 Nov. 2011.

<http://www.mdot.maryland.gov/Planning/Plans_Programs_Reports/Documents/Climate_Change_2011_Appendix.pdf>.

¹³⁶ Ibid.



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- iv. Avg. Assumed Price Per Gallon=\$3.43 per gallon
- 4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **Electronic Toll Collection**
 - i. $525,900 [(8,760 \text{ Number of Hours a Year} * 60)] = \text{Number of Minutes in a Year}$
 - ii. $384,500,000 \text{ minutes} [(2.5 \text{ minutes Average Wait Time at Toll Booth Reduction} * 207,530 \text{ Average Annual Commuters Passing Through a single Toll}) = \text{Average Minutes Saved Annually for Toll Booth Customers}$
 - iii. $7,459 \text{ gallons} [(384,500,000 \text{ minutes Average Minutes Saved Annually for Toll Booth Customers} * 0.014377571 \text{ gallons of gas wasted per minute idle}) = \text{Average Annual Amount of Gas Saved by Drivers Passing through Toll Booth}$
 - iv. $\$25,585.89 [(7,459 \text{ Saved by Customers Traveling Through Toll Booth} * \$3.43 \text{ Average Price Per Gallon of Gas}) = \text{Average Annual Savings for One Toll Booth}$
 - v. $10001 - 10009 - \$25,585.89$
 - b. **High Occupancy Toll Lanes**
 - i. $2,040 \text{ minutes} [(34 \text{ Hours Current Congestion Time In MD (Total by Commuter Annually} * 60 \text{ minutes}) = \text{Average Annual Minutes Wasted by a MD Driver from Congestion}$
 - ii. $5,654,539,320 \text{ mins} [(2,040 \text{ Average Annual Minutes Wasted by an MD Driver from Congestion} * 2,771,833 \text{ Number of those employed in MD}) = \text{Total Yearly Congestion For those Passing Through MD tolls}$
 - iii. $106,022,612.3 \text{ mins} [(2\% \text{ Average Reduction in Time from HOT Lane} * 5,654,539,320 \text{ minutes Total Yearly Congestion for those Passing Through MD Tolls}) = \text{If HOT Lanes Enforced, Avg. Annual Time Reduced}$
 - iv. $5,548,516,708 \text{ minutes} [(5,654,539,320 \text{ minutes Total Yearly Congestion For those Passing Through MD tolls} - 106,022,612.3 \text{ If HOT Lanes Enforced, Avg. Annual Time Reduced}) = \text{New Total Congestion Time in MD if HOT Lanes Enforced}$
 - v. $81,298,540.48 \text{ gallons} [(5,654,539,320 \text{ Amount Wasted on Time a Year (mins)} * 0.014377571 \text{ Gas wasted in idle per minute Idle}) = \text{Average Annual Gallons of Gas Wasted from Being Idle In MD from Congestion}$
 - vi. $79,774,192.85 \text{ gallons} [(5,548,516,708 \text{ New Total Congestion Time in MD if HOT Lanes Enforced} * 0.014377571 \text{ Gas wasted in idle per minute Idle}) = \text{Average Annual Gallons of Gas Wasted from Being Idle in MD from Congestion with HOT Lanes}$
 - vii. $\$278,853,993.86 [(\$3.43 \text{ Assumed Price per Gallon of Gas} * 81,298,540.48 \text{ Average Annual Gallons of Gas Wasted from Being Idle In MD from Congestion}) = \text{Average Amount Spent in Gas from Being Idle in MD from Congestion without HOT Lanes}$

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- viii. $\$273,625,481.48 [(\$3.43 \text{ Assumed Price per Gallon of Gas} * 79,774,192.85 \text{ Average Annual Gallons of Gas Wasted from Being Idle in MD from Congestion with HOT Lanes}) = \text{Average Amount Spent in Gas from Being Idle in MD from Congestion with HOT Lanes}]$
- ix. $10001-10009 - \$5,228,512.38 [(\$278,853,993.86 \text{ Average Amount Spent in Gas from Being Idle in MD from Congestion without HOT Lanes} - \$273,625,481.48 \text{ Average Amount Spent in Gas from Being Idle in MD from Congestion with HOT Lanes}) = \text{Average Annual Savings From Use of HOT Lanes in MD}]$
- c. VMT Fees**
 - i. $432 - \$644,100,000 [(\text{Annual Net Revenue Projection from MDOT MD Climate Action Plan 2012 Draft})]$
- d. Congestion Pricing and Managed Lanes**
 - i. $29.33 [(0.014377571 \text{ Gas wasted in idle per minute Idle} * 2,040 \text{ Current Congestion Time In MD (Total by Commuter Annually)}) = \text{Average Annual Loss in Fuel from Sitting Idle}]$
 - ii. $\$100.60 [(0.014377571 \text{ Total Gallons of Gas Wasted Annually} * \$3.43 \text{ Average Price of Gas per Gallon}) = \text{Average Cost of Congestion to MD Consumer Annually}]$
 - iii. If Congestion is reduced by 30.4%
 - 1. $620.16 \text{ minutes} [(2,040 \text{ Current Congestion Time in MD Annually in Minutes} * 30.4\% \text{ Reduction}) = \text{Average Annual Savings in Time of Congestion}]$
 - 2. $1,419.84 \text{ minutes} [(2,040 \text{ Current Congestion Time In MD (Total by Commuter Annually)} - 620.16 \text{ Total Congestion Time Reduced Annually (in mins)}) = \text{New Congestion Time Under Pricing Strategy}]$
 - 3. $20.41 [(0.014377571 \text{ Gas wasted in idle per minute Idle} * 1,419.84 \text{ Total Minutes in Congestion Under Pricing Strategy}) = \text{New Loss of Gas Associated with Congestion Pricing Strategy}]$
 - 4. $\$70.02 [(\$3.43 \text{ Average Price of Gas per Gallon} * 20.41 \text{ New Loss of Gas Associated with Congestion Pricing Strategy}) = \text{New Cost to Consumer under Congestion Pricing Strategy}]$
 - iv. $\$30.58 [(\$100.60 \text{ Average Cost to Consumer Due to Congestion} - \$70.02 \text{ New Cost to Consumer under Congestion Pricing Strategy}) = \text{Savings to Consumer under new Congestion Pricing Strategy}]$
 - v. $10001-10009 - \$6,346,112.57 [(\$30.58 \text{ Savings to Consumer under new Congestion Pricing Strategy} * 207,530 \text{ Average Annual Commuters Passing Through a Toll}) = \text{Savings to Those on MD Roads from Congestion Pricing Strategy}]$

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- e. Parking Impact Fees**
 - i. \$30.00 [(8 Hours in a Typical Workday * 5 Work Days in a Week)]=Average Cost to Those Working in Baltimore but Live Outside City
 - ii. \$1,560.00 [(\$30.00 Average Cost to Those Working in Baltimore but Live Outside the City * 52 Weeks a Year)]=Average Cost Annually to Park in Baltimore
 - iii. 432 – \$100,555,182.00 [(1,289,169 Number of Those That Work in the City of Baltimore * 5% Assumed to Commute to Areas without Parking Lots) * (\$1,560.00 Annual Cost to Consumer to Park in Baltimore City)]=Total Possible Revenue Recouped from City if 5% Employed in the City Commute to Areas without Parking Lots
- f. Employer Commute Incentives**
 - i. 40,532.63 gallons [(1,094,381 Reduction in Annual VMT / 27.7 Avg. MPG)]=Average Gallons Saved Annually
 - ii. 10001-10009 – \$139,026.92 [(40,532.63 Average Gallons Saved Annually * \$3.43 Average Assumed Price Per Gallon)]=Average Savings Associated with Employer Commuter Incentives
- 5. Input savings by sector into IMPLAN model and run impacts.
 - a. Household savings inputs were distributed among household income ranges using household income distribution percentages taken from the Census' 2005-2009 American Community Survey 5-Year estimates for Maryland. (Note: In some cases, totals do not add up to 100.0 percent due to margin of error.)
- 6. Export impacts and analyze.

3.2.10 Transportation Technology Initiatives

Investment Phase

- 1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. Traffic Flow Improvements**
 - i. 239—Other communications equipment manufacturing
 - ii. 294—All other transportation equipment manufacturing
 - iii. 369—Architectural, engineering, and related services
 - iv. 432—Other state and local government enterprises
 - b. Truck Stop Electrification**
 - i. 226—Pump and pumping equipment manufacturing
 - ii. 294—All other transportation equipment manufacturing
 - iii. 319—Wholesale trade businesses
 - iv. 326—Retail store – Gasoline Stations
 - v. 398—Other support services
 - vi. 432—Other state and local government enterprises
 - c. Timing of Highway Construction Schedules**
 - i. 375—Environmental and other technical consulting services
 - ii. 432—Other state and local government enterprises



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- d. Electronic Toll Collection**
 - i. 239—Other communications equipment manufacturing
 - ii. 369—Architectural, engineering, and related services
 - iii. 432—Other state and local government enterprises
 - e. Traffic Signal Synchronization**
 - i. 369—Architectural, engineering, and related services
 - ii. 432—Other state and local government enterprises
 - f. Variable Message Signs**
 - i. 239—Other communications equipment manufacturing
 - ii. 369—Architectural, engineering, and related services
 - iii. 432—Other state and local government enterprises
 - g. Telework Partnership with Employers**
 - i. 377—Advertising and related services
 - ii. 432—Other state and local government enterprises
 - h. Smart Card Implementation**
 - i. 294—All other transportation equipment manufacturing
 - ii. 432—Other state and local government enterprises
 - i. Light-Emitting Diode Traffic Signals**
 - i. 239—Other communications equipment manufacturing
 - ii. 260—Lighting fixture manufacturing
 - iii. 294—All other transportation equipment manufacturing
 - iv. 369—Architectural, engineering, and related services
 - v. 432—Other state and local government enterprises
 - j. Vehicle Technologies**
 - i. 20—Extraction of oil and natural gas
 - ii. 28—Drilling oil and gas wells
 - iii. 29—Support activities for oil and gas operations
 - iv. 31—Electric power generation, transmission, and distribution
 - v. 276—Automobile manufacturing
 - vi. 283—Motor vehicle parts manufacturing
 - vii. 326—Retail stores – Gasoline Stations
 - viii. 375—Environmental and other technical services consulting
 - ix. 432—Other state and local government enterprises
 - k. Transportation Fuels**
 - i. 20—Extraction of oil and natural gas
 - ii. 28—Drilling oil and gas wells
 - iii. 29—Support activities for oil and gas operations
 - iv. 31—Electric power generation, transmission, and distribution
 - v. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
- a. Traffic Flow Improvements**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- b. Truck Stop Electrification**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - c. Timing of Highway Construction Schedules**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - d. Electronic Toll Collection**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - e. Traffic Signal Synchronization**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - f. Variable Message Signs**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - g. Telework Partnership with Employers**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - h. Smart Card Implementation**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - i. Light-Emitting Diode Traffic Signals**
 - i. \$21,000,000
 - j. Vehicle Technologies**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - k. Transportation Fuels**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
- a. Traffic Flow Improvements**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$300,000 each
 - b. Truck Stop Electrification**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$180,000 each
 - c. Timing of Highway Construction Schedules**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$900,000
 - d. Electronic Toll Collection**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$450,000 each
 - e. Traffic Signal Synchronization**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$900,000

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- f. Variable Message Signs**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$450,000 each
 - g. Telework Partnership with Employers**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$900,000
 - h. Smart Card Implementation**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$900,000
 - i. Light-Emitting Diode Traffic Signals**
 - i. 10% for government administrative costs/responsibilities—\$2,100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$4,725,000 each
 - j. Vehicle Technologies**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$112,500 each
 - iii. 100% for compliance by fuel production companies--\$250,000 each
 - k. Transportation Fuels**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$180,000
 - iii. 100% spread evenly across fuel distributors and producers--\$250,000 each
- 4. Input sales by sector into IMPLAN model and run impacts.
 - 5. Export impacts and analyze.

Operation Phase

- 1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file). (Note: IMPLAN code 336 (Transit and ground passenger transportation) has been changed to 432 (Other state and local government enterprises) in all instances due to the state/local government overseeing MARC operations via MTA.)
 - a. Traffic Flow Improvements**
 - i. 335—Transport by truck
 - ii. 10001-10009—Households – All income levels
 - b. Truck Stop Electrification**
 - i. 335—Transport by truck
 - c. Timing of Highway Construction Schedules**
 - i. 335—Transport by truck
 - ii. 10001-10009 Households – All income levels

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- d. **Electronic Toll Collection**
 - i. 10001-10009 Households – All income levels
 - e. **Traffic Signal Synchronization**
 - i. 335—Transport by truck
 - ii. 10001-10009 Households – All income levels
 - f. **Variable Message Signs**
 - i. 335—Transport by truck
 - ii. 10001-10009 Households – All income levels
 - g. **Telework Partnership with Employers**
 - i. 10001-10009 Households – All income levels
 - h. **Smart Card Implementation**
 - i. 10001-10009 Households – All income levels
 - i. **Light-Emitting Diode Traffic Signals**
 - i. 432—Other state and local government enterprises
 - j. **Vehicle Technologies**
 - i. 335—Transport by truck
 - ii. 10001-10009 Households – All income levels
 - k. **Transportation Fuels**
 - i. 432—Other state and local government enterprises
2. Determine part of program to be affected by savings (from strategy write-up).
- a. **Traffic Flow Improvements**
 - i. Annual Reduction in Diesel Fuel=2,520,000 gallons (assume 40% of vehicles traveling are trucks) ($6,300,000*0.4$)
 - ii. Annual Reduction in Fuel=3,780,000 (assumer 60% of vehicles traveling are cars) ($6,300,000*0.6$)
 - b. **Truck Stop Electrification**
 - i. 23 cars scheduled to be overhauled between FY 2005 and FY 2012
 - c. **Timing of Highway Construction Schedules**
 - d. **Electronic Toll Collection**
 - e. **Traffic Signal Synchronization**
 - f. **Variable Message Signs**
 - g. **Telework Partnership with Employers**
 - i. Total Employers=35
 - ii. Savings for 50 people working from home=\$789,810
 - h. **Smart Card Implementation**
 - i. **Light-Emitting Diode Traffic Signals**
 - i. 39,000 traffic signals in Baltimore City (From write-up)
 - j. **Vehicle Technologies**
 - k. **Transportation Fuels**
3. Research savings data for each policy according to part of program to be affected by savings.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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a. Traffic Flow Improvements

- i. Cost of Diesel Fuel¹³⁷= \$3.89 per gallon
- ii. Assumed Price of Gas= \$3.43 per gallon

b. Truck Stop Electrification

- i. Number of Parking Spaces at Station¹³⁸=63
- ii. Avg. Fuel Saved per hour of Operation¹³⁹=0.8 (gallons of fuel saved an hour)
- iii. Rest Period of 8 Hours (sleep)=8
- iv. Cost of Diesel Fuel¹⁴⁰= \$3.89 per gallon
- v. Hours in a Day=24

c. Timing of Highway Construction Schedules

- i. Example of overnight(non peak) lane closure for I-95/I-495 near Branch Ave (Capitol Beltway)
- ii. Average Delay from Construction=55.5mins (Example of I-95 in Howard County from SHA Work Zone Analysis Guide: Appendix C)
- iii. On Peak Assume 50%=83.25 mins
- iv. Gas wasted in idle per minute Idle¹⁴¹=0.014377571
- v. Assumed Price of Gas=\$3.43 per gallon
- vi. Avg. Cars Overnight=8,812 (Example of I-95 in Howard County from SHA Work Zone Analysis Guide: Appendix C)
- vii. Cost of Diesel Fuel¹⁴²= \$3.89 per gallon

d. Electronic Toll Collection

- i. Avg. Wait Time at Toll Booth Reduction¹⁴³=2.5 mins
- ii. Avg. Annual Commuters Passing Through Tolls¹⁴⁴=153,800,000
- iii. Number of Tolls Booths in MD¹⁴⁵=10
- iv. Gas wasted in idle¹⁴⁶=5,528,176 gallons

¹³⁷ Lowest Diesel Fuel Prices in the Last 24 Hours. Maryland Gas Prices - Find Cheap Gas Prices in Maryland. 2011. Web. 14 Nov. 2011. <<http://www.marylandgasprices.com/index.aspx?fuel=D>>.

¹³⁸ Maryland Moves. Baltimore Metropolitan Council. Baltimore Metropolitan Council for the Regional Transportation Board May 2006. Web. 16 Nov. 2011. <<http://www.baltometro.org/eNews/MM-5-06.pdf>>.

¹³⁹ Truck Stop Electrification. California Energy Commission. California Energy Commission, June 2006. Web. 16 Nov. 2011. <<http://www.energy.ca.gov/2006publications/CEC-600-2006-001/CEC-600-2006-001-FS.PDF>>.

¹⁴⁰ Lowest Diesel Fuel Prices in the Last 24 Hours. Maryland Gas Prices - Find Cheap Gas Prices in Maryland. 2011. Web. 14 Nov. 2011. <<http://www.marylandgasprices.com/index.aspx?fuel=D>>.

¹⁴¹ ISDH: ISDH Home. IN.gov: Home. IN.gov. Web. 14 Nov. 2011.

<http://www.in.gov/isdh/files/Idling_Brochure.>.

¹⁴² Lowest Diesel Fuel Prices in the Last 24 Hours. Maryland Gas Prices - Find Cheap Gas Prices in Maryland. 2011. Web. 14 Nov. 2011. <<http://www.marylandgasprices.com/index.aspx?fuel=D>>.

¹⁴³ Saka, Anthony A., Dennis K. Agboh, Simon Ndiritu, and Richard A. Glassco. "An Estimation of Mobile Emissions Reduction." RITA | National Transportation Library. National Transportation Centre, Mar. 2000. Web. 14 Nov. 2011. <<http://ntl.bts.gov/lib/16000/16800/16888/PB2000105915.pdf>>.

¹⁴⁴ MdTA Toll Facilities. MdTA Index. Maryland Transportation Authority, 2011. Web. 14 Nov. 2011.

<<http://www.mdtatollfacilities.com/facilities.html>>.

¹⁴⁵ Ibid.

¹⁴⁶ ISDH: ISDH Home. IN.gov: Home. IN.gov. Web. 14 Nov. 2011.

<http://www.in.gov/isdh/files/Idling_Brochure.>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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- v. Number of hours a year=8,765
- vi. Assumed Price per Gallon of Gas=\$3.43 per gallon
- e. Traffic Signal Synchronization**
 - i. Min delay in time¹⁴⁷=13%
 - ii. Gas wasted in idle per minute Idle¹⁴⁸=0.014377571
 - iii. Current Congestion Time In MD (Total by Commuter Annually)¹⁴⁹=2,040 in minutes
 - iv. Number of Registered Vehicles=3,382,451 (provided by MDE courtesy of MVA)
- f. Variable Message Signs**
 - i. Avg. Reduction with VMS=17%
 - ii. Gas wasted in idle per minute Idle¹⁵⁰=0.014377571
 - iii. Number of Registered Vehicles=3,382,451 (provided by MDE courtesy of MVA)
 - iv. Current Congestion Time In MD (Total by Commuter Annually)¹⁵¹=2,040 in mins
- g. Telework Partnership with Employers**
- h. Smart Card Implementation**
 - i. Number of Boardings (Rail)—71,311
 - ii. Number of Boardings (Bus)—231,795
 - iii. Percentage Rail—75%
 - iv. Percentage Bus—60%
 - v. Average ATM fee—\$2.40
 - vi. Average Fare—\$1.60
- i. Light-Emitting Diode Traffic Signals**
 - i. 20,500 Traffic Signals replaced with LED Traffic Signals
 - ii. \$276,000 – Savings a year in energy costs from switch
 - iii. \$154,000 – Savings in labor and maintenance
 - iv. \$430,000 – Total Yearly Savings

¹⁴⁷ "RITA | ITS | Benefits: The Texas Traffic Light Synchronization program reduced delays by 24.6 percent by updating traffic signal control equipment and optimizing signal timing." RITA | ITS | Welcome to the Costs Database. 10 Aug. 2005. U.S. Department of Transportation (USDOT). 11 Nov. 2011

<<http://www.itscosts.its.dot.gov/its/benecost.nsf/ID/D0DCC197DC7382BE852573D8006F7EDA?OpenDocument>>.

¹⁴⁸ ISDH: ISDH Home. IN.gov: Home. IN.gov. Web. 14 Nov. 2011.

<http://www.in.gov/isdh/files/Idling_Brochure.>.

¹⁴⁹ Baker, Michael, and Cambridge Systematics. "Maryland Climate Action Plan Draft 2012." Maryland Department of Transportation. Maryland Department of Transportation, 11 Apr. 2011. Web. 16 Nov. 2011.

<http://www.mdot.maryland.gov/Planning/Plans_Programs_Reports/Documents/Climate_Change_2011_Appendix.pdf>.

¹⁵⁰ ISDH: ISDH Home. IN.gov: Home. IN.gov. Web. 14 Nov. 2011.

<http://www.in.gov/isdh/files/Idling_Brochure.>.

¹⁵¹ Baker, Michael, and Cambridge Systematics. "Maryland Climate Action Plan Draft 2012." Maryland Department of Transportation. Maryland Department of Transportation, 11 Apr. 2011. Web. 16 Nov. 2011.

<http://www.mdot.maryland.gov/Planning/Plans_Programs_Reports/Documents/Climate_Change_2011_Appendix.pdf>.



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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- v. Total Yearly Savings/Number of Traffic Signals=\$20.98 per signal in savings
- j. Vehicle Technologies**
 - i. Goal in 2016=35mpg
 - ii. Current Average miles per gallon=27 mpg
 - iii. Difference=8 mpg
 - iv. Annual growth in mpg to reach goal=2 mpg
 - v. Average Annual Miles Driven By Population¹⁵²=13,041
 - vi. New Vehicle Registrations in MD=2,700 (courtesy of MVA)
- k. Transportation Fuels**
 - i. Annual increase in renewable fuels¹⁵³=8,750,000
 - ii. Reduction that can come about from Biofuels¹⁵⁴=0.29
- 4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. Traffic Flow Improvements**
 - i. \$9,802,800 [(2,520,000 Annual Reduction in Diesel Fuel * \$3.89 Cost of Diesel Fuel)]=Average Annual Savings from Reduction in Diesel Fuel Used
 - ii. \$8,643,600 [(3,780,000 Annual Reduction in Fuel * \$3.43 Assumed Price of Regular Gas)] = Average Annual Savings from Reduction in Regular Fuel Used
 - iii. 335--\$9,802,800
 - iv. 10001 – 10009 – \$8,643,600
 - b. Truck Stop Electrification**
 - i. 6.4 gallons [(0.8 Average. Fuel Saved per hour of Operation *8 hours Rest Period of 8 Hours (sleep))] = Average Gallons of Fuel Saved During Rest Period
 - ii. \$24.90 [(6.4 Gallons Saved Per Rest Period * \$3.89 Cost of Diesel Fuel)]= Average Savings per Rest Period
 - iii. Assume one truck every 8 hours=3 trucks a day (24 hours in a day/8 hours for rest)
 - iv. \$74.69 [(\$24.90 Savings of Fuel Per Truck Rest * 3 trucks (Assume one truck every 8 hours))] = Average Annual Savings in Diesel Fuel a Day
 - v. \$27,261.12 [(\$74.69 Total Fuel Saved a Day * 365 days in a year)] = Total Savings in Fuel Annually for Trucks visiting truck stop

¹⁵² "State & Urbanized Area Statistics - Our Nation's Highways - 2000." Home | Federal Highway Administration. 4 Apr. 2011. Federal Highway Administration (FHWA). 11 Nov. 2011 <<http://www.fhwa.dot.gov/ohim/onh00/onh2p11.htm>>.

¹⁵³ Task Force on Renewable Alternative Fuels. State of Maryland. 31 Dec. 2007. Web. 14 Nov. 2011. <<http://www.mda.state.md.us/pdf/altfuelsreport.pdf>>.

¹⁵⁴ Task Force on Renewable Alternative Fuels. State of Maryland. 31 Dec. 2007. Web. 14 Nov. 2011. <<http://www.mda.state.md.us/pdf/altfuelsreport.pdf>>.



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

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- vi. $335 - \$1,717,450.56 [(\$27,261.12 \text{ Annual Fuel Saved} * 63 \text{ Number of Parking Spaces at Station})] = \text{Average Annual Fuel Savings from Truck Stop Total}$

c. Timing of Highway Construction Schedules

- i. $1.20 [(83.25 \text{ mins On Peak Assume } 50\% \text{ Idle Time} * 0.014377571 \text{ Gas wasted in idle per minute Idle})] = \text{Average Gas Wasted During Peak Hours of Travel}$
- ii. $0.80 [(55.5 \text{ mins Average Delay from Construction} * 0.014377571 \text{ Gas wasted in idle per minute Idle})] = \text{Avg. Gas Wasted Idle Non-Peak Hours}$
- iii. $\$4.11 [(1.20 \text{ Avg. Gas Wasted Idle Peak Hours} * \$3.43 \text{ Assumed Price of Gas})] = \text{Cost of Peak Hours}$
- iv. $\$2.74 [(0.80 \text{ Avg. Gas Wasted Idle Non-Peak Hours} * \$3.43 \text{ Assumed Price of Gas})] = \text{Cost of Gas Lost during Off Peak Hours}$
- v. $\$1.37 [(\$4.11 \text{ Cost of Peak Hours} - \$2.74 \text{ Cost of Off Peak Hours})] = \text{Savings to Night time Construction}$
- vi. $3,525 [(8,812 \text{ Avg. Cars Overnight} * 0.4)] = \text{Number of Potential Trucks Passing through Construction zone in the evening hours}$
- vii. $5,287 [(8,812 \text{ Avg. Cars Overnight} * 0.6)] = \text{Number of Potential Cars Passing by during Evening Hours}$
- viii. $4,218.95 [(3,525 \text{ Number of Potential Trucks Passing through Construction zone in the evening hours} * 1.20 \text{ Avg. Gas Wasted Idle Peak Hours})] = \text{Average Gallons of Gas Lost from Idle Traffic during Peak Hours}$
- ix. $\$16,411.71 [(4,218.95 \text{ Average Gallons of Gas Lost from Idle Traffic during Peak Hours} * \$3.89 \text{ Cost of Diesel Fuel})] = \text{Average Cost to Trucks Traveling during peak hours}$
- x. $2,812.63 [(3,525 \text{ Number of Potential Trucks Traveling during Evening Hours} * 0.80 \text{ Avg. Gas Wasted Idle Non-Peak Hours})] = \text{Average Gallons of Gas Lost to Trucks during Off-Peak Hours from Idle Traffic}$
- xi. $\$10,941.14 [(2,812.63 \text{ Average Gallons of Gas Lost to Trucks during Off-Peak Hours from Idle Traffic} * \$3.89 \text{ Cost of Diesel Fuel})] = \text{Average Cost of Gallons of Fuel Lost during Off-Peak Idle Traffic}$
- xii. $335 - \$5,470.57 [(\$16,411.71 \text{ Cost to Truck on Peak} - \$5,470.57 \text{ Cost to Truck Off-Peak})] = \text{Savings if Construction is switched to Evening Hours for Trucks}$
- xiii. $6,328.42 [(5,287 \text{ Assume } 60\% \text{ Cars} * 1.20 \text{ Avg. Gas Wasted Idle Peak Hours})] = \text{Average Gallons of Gas Lost to Passenger Vehicles during Peak Hours}$
- xiv. $\$21,706.49 [(6,328.42 \text{ Average Gallons of Gas Lost to Passenger Vehicles during Peak Hours} * \$3.43 \text{ Assumed Price of Gas})] = \text{Average Cost to Passenger Vehicles from Idle Traffic During Peak Hours}$
- xv. $2,812.63 [(5,287 \text{ Assume } 60\% \text{ Cars} * 0.80 \text{ Avg. Gas Wasted Idle Non-Peak Hours})] = \text{Average Gallons of Gas Lost to Passenger Vehicles during Off-Peak Hours}$

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- xvi. $\$9,647.33 [(2,812.63 \text{ Average Gallons of Gas Lost to Passenger Vehicles during Off-Peak Hours} * \$3.43 \text{ Assumed Price of Gas})] = \text{Average Cost to Passenger Vehicles from Idle Traffic During Off-Peak Hours}$
- xvii. $10001-10009 - \$12,059.16164 [(21,706.49 \text{ Cost to Cars on Peak} - \$9,647.33 \text{ Cost to Cars Off Peak})] = \text{Average Savings to Cars Annually from Switch to Overnight Construction}$
- d. Electronic Toll Collection**
 - i. $525,900 [(8,765 \text{ Number of hours a year} * 60 \text{ minutes in an hour})] = \text{Number of Minutes in a Year}$
 - ii. $384,500,000 \text{ minutes} [(2.5 \text{ Avg. Wait Time at Toll Booth Reduction} * 153,800,000 \text{ Avg. Annual Commuters Passing Through Tolls})] = \text{Average Annual Minutes Saved from Electronic Toll Booths}$
 - iii. $10001-10009 - \$18,961,643.84 [(0.014377571 \text{ Gas wasted in idle} * 384,500,000 \text{ minutes saved from Electronic toll booths} * \$3.43 \text{ Assumed Price per Gallon of Gas})] = \text{Average Annual Savings in Gas from Electronic Toll booths}$
- e. Traffic Signal Synchronization**
 - i. $265.2 [(2,040 \text{ minutes Current Congestion Time In MD (Total by Commuter Annually)) * (13\% \text{ Min delay in time})] = \text{Potential Reduction in Time Annually in Minutes}$
 - ii. $3.81 [(0.014377571 \text{ gallons Gas wasted in idle per minute Idle} * 265.2 \text{ Potential Reduction in Time Annually in Minutes})] = \text{Savings in Fuel (in Gallons) for Typical Consumer Annually}$
 - iii. $\$13.08 [(3.81 \text{ Savings in Fuel (in Gallons) for Typical Consumer Annually} * \$3.43 \text{ average gas price for regular unleaded fuel})] = \text{Savings in Dollar Amounts}$
 - iv. $\$44,236,898.89 [(3,382,451 \text{ Number of Registered Vehicles in MD} * \$13.08 \text{ Savings in Dollar Amounts})] = \text{Annual Savings to All Registered Vehicles in MD}$
 - v. We will assume the number of trucks on the roadways are approx. 50%
 - 1. $\text{SPLIT FOR 2 SECTORS} = \$22,118,449.44 \text{ (Annual Savings to All Registered Vehicles in MD/2)}$
 - vi. $335 - \$22,118,449.44$
 - vii. $10001 - 10009 - \$22,118,449.44$
- f. Variable Message Signs**
 - i. $1,691,225 [(\text{Number of Registered Vehicles} * 0.50)] = \text{Assume Only 50\% of vehicles registered see sign}$
 - ii. $35.57 \text{ gallons} [(2,040 \text{ Current Congestion Time} * 0.0174377571 \text{ gallons Gas wasted in idle per minute Idle})] = \text{Gallons of Gas Wasted while sitting Idle in Traffic without new VMS signs}$
 - iii. $\$122.01 [(35.57 \text{ gallons Total Gallons of Gas Wasted without VMS signs} * \$3.43 \text{ average gas price per gallon})] = \text{Average Cost Annually to Drivers without VMS signs}$

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- iv. $346.8 \text{ minutes} [(2,040 \text{ Current Congestion Time In MD (Total by Commuter Annually)}) * (17\% \text{ Avg. Reduction with VMS})] = \text{VMS Sign Reduction to Congestion in Minutes}$
- v. $1,693.2 \text{ minutes} [(2,040 \text{ Current Congestion Time In MD (Total by Commuter Annually)}) - (346.8 \text{ VMS Sign Reduction})] = \text{New Congestion Time Due to Reduction of VMS}$
- vi. $24.34 \text{ gallons} (1,693.2 \text{ New Congestion Time Due to Reduction of VMS} * 0.0174377571 \text{ gallons Gas wasted in idle per minute Idle}) = \text{Gallons of Gas Wasted while sitting Idle in Traffic with new VMS signs}$
- vii. $\$83.50 [(24.34 \text{ gallons Total Gallons of Gas Wasted} * \$3.43 \text{ average gas price per gallon})] = \text{Average Cost Annually to Drivers with VMS signs}$
- viii. $\$65,129,075 [(\$122.01 \text{ Cost to Drivers Without VMS Signs for Congestion Annually} - \$83.50 \text{ Cost to Drivers with VMS Signs for Congestion Annually}) * 1,691,225 \text{ Assumed 50\% of Vehicles Registered will see the Sign}] = \text{Average Annually Savings Associated with VMS Signs}$
- ix. $\$32,564,537.38 [(\$65,129,075 \text{ Total Savings to MD Drivers}/2)] = \text{Savings Split Across 2 Sectors Assuming Half Vehicles that are Registered and See the Sign are Trucks}$
- x. $335 - \$32,564,537.38$
- xi. $10001 - 10009 - \$32,564,537.38$
- g. Telework Partnership with Employers**
 - i. $\$15,796 [(\$789,810 \text{ Savings for 50 people working from home} / 50 \text{ people}) = \text{Savings per person for a person working from home}$
 - ii. $10001 - 10009 - \$552,867 [(35 \text{ Total Employers} * \text{Savings per person}) = \text{Total Savings Possible if 1 Person from Each Company works at home Annually}$
- h. Smart Card Implementation**
 - i. $\$171,146.40 [((71,311 \text{ Number of Rail Boardings} * 0.75) * (\$1.60 \text{ Average Fare} * 2))] = \text{Total Annual Boards (Rail/Smart Card)}$
 - ii. $\$445,046.40 [((231,795 \text{ Number of Bus Boardings} * 0.60) * (\$1.60 \text{ Average Fare} * 2))] = \text{Total Annual Boards (Bus/Smart Card)}$
 - iii. $\$410,751.36 [((71,311 \text{ Number of Rail Boardings} * 0.75) * (\$1.60 \text{ Average Fare} * 2) * \$2.40 \text{ Average ATM fee})] = \text{Total Annual Boards (Rail)}$
 - iv. $\$1,068,111.36 [((231,795 \text{ Number of Bus Boardings} * 0.60) * (\$1.60 \text{ Average Fare} * 2) * \$2.40 \text{ Average ATM fee})] = \text{Total Annual Boards (Bus)}$
 - v. $\$239,604.96 [(\$410,751.36 \text{ Total Annual Boards (Rail)} - \$171,146.40 \text{ Total Annual Boards (Rail/Smart Card)})] = \text{Annual Savings for Rail}$
 - vi. $\$623,064.96 [(\$1,068,111.36 \text{ Total Annual Boards (Bus)} - \$445,046.40 \text{ Total Annual Boards (Bus/Smart Card)})] = \text{Annual Savings for Bus}$
 - vii. $\$862,669.92 [(\$239,604.96 \text{ Annual Savings for Rail} + \$623,064.96 \text{ Annual Savings for Bus})] = \text{Total Annual Savings}$



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

viii. 10001 – 10009 – Households – All income levels—\$862,669.92
 [(\$239,604.96 Annual Savings for Rail + \$623,064.96 Annual Savings for Bus)]=Total Annual Savings

i. Light-Emitting Diode Traffic Signals

i. \$818,220 [(39,000 Number of Traffic Signals to be Replaced * \$20.98 per Signal Savings)]=Average Estimated Savings Annually for 39,000 Signals Replaced

j. Vehicle Technologies

- i. 483 gallons [(13,041 Average Annual Miles Driven By Population / 27 Current Average Miles per Gallon)]=Current Amount of Fuel Used Annually by a Driver (in Gallons)
- ii. \$1,656.69 [(483 gallons Current Amount of Fuel Used Annually by a Driver (in Gallons) * \$3.43 Average Price per Gallon of Gas)]=Average Cost to Driver Annually
- iii. 449.69 [(13,041 Average Annual Miles Driven By Population / 29 miles per gallon)]=New Amount of Fuel Used Annually by Driver (in Gallons)
- iv. 33.31 [(483 Current Gas Used by a driver Annually (in Gallons) – 449.69 New Amount of Fuel Used Annually by Driver (in Gallons))]=Gallons Saved Annually from 2 mpg average change
- v. \$114.25 [(33.31 Gallons Saved Annually from 2 mpg average change * \$3.43 Average Price per Gallon of Fuel)]=Average Annual Savings per Driver
- vi. \$308,475 [(\$114.25 Average Annual Savings per Driver * 2,700 New Vehicle Registrations Annually)=Average Annually Savings for New Vehicle Owners
- vii. 335 – \$154,243.55 [(\$308,475 Average Annual Savings for New Vehicle Owners *.50)]=Split of Savings in Half
- viii. 10001-10009 – \$154,243.55

k. Transportation Fuels

- i. 77,962,500 [(8,750,000 Average Proposed Reduction in Regular Fuel * 8.91)] = Average Annual Reduction in Fuel Converted to Kilograms
- ii. 77,962.50 [(77,962,500 CO2 emissions from Regular Fuel in kilograms / 1000)] = Conversion to CO2 in metric tons
- iii. 22,609.125 [(0.29 Reduction that can come about from Biofuels * 77,962.50 Conversion to CO2 in metric tons)] = Average Annual Reduction from Biofuels in CO2 metric tons
- iv. 55,353.375 [(77,962.50 GHG Conversion to CO2 in metric tons – 22,609.13 Reduction to account for Biofuels)] = Average Reductions from Strategy not a part of biofuels
- v. 55,353,375 [(55,353.375 Average Reduction from Strategy not a part of biofuels * 1,000)] = Average Reduction from Strategy not a part of biofuels in kilograms



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- vi. $6,212,500 (55,353,375 \text{ Average Reduction from Strategy not a part of biofuels in kg} / 8.91) = \text{Average Reduction from Strategy not a part of biofuels converted to gallons of gas}$
 - vii. $\$30,012,500 [(8,750,000 \text{ Annual increase in renewable fuels} * \$3.43 \text{ Average Cost of a Gallon of Gas})] = \text{Average Annual Cost if no Reduction Occurs}$
 - viii. $\$21,308,875 (6,212,500 \text{ Reductions in Current Fuels not associated with biofuels} * \$3.43 \text{ average gallon of gas})] = \text{Average Annual Savings from Conversion of Renewable Fuels not associated with biofuels}$
 - ix. $432--\$8,703,625.00 (\$30,012,500 \text{ Cost if no reduction occurred in regular gas} - \$21,308,875 \text{ Savings from reduction in gas})] = \text{Average Annual Savings Associated with Reduction}$
5. Input savings by sector into IMPLAN model and run impacts.
 - a. Household savings inputs were distributed among household income ranges using household income distribution percentages taken from the Census' 2005-2009 American Community Survey 5-Year estimates for Maryland. (Note: In some cases, totals do not add up to 100.0 percent due to margin of error.)
 6. Export impacts and analyze.

3.2.11 Electric Vehicles Initiatives

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **Vehicle-to-Grid (V2G)**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 36—Construction of other new nonresidential structures
 - iii. 294—All other transportation equipment manufacturing
 - iv. 369—Architectural, engineering, and related services
 - v. 375—Environmental and other technical consulting services
 - vi. 432—Other state and local government enterprises
 - b. **Electric Vehicles**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 36—Construction of other new nonresidential structures
 - iii. 294—All other transportation equipment manufacturing
 - iv. 369—Architectural, engineering, and related services
 - v. 375—Environmental and other technical consulting services
 - vi. 432—Other state and local government enterprises
 - c. **Maryland Electric Vehicles Initiatives**
 - i. 36—Construction of other new nonresidential structures
 - ii. 226—Pump and pumping equipment manufacturing
 - iii. 283—Motor vehicle parts manufacturing
 - iv. 294—All other transportation equipment manufacturing
 - v. 319—Wholesale trade business
 - vi. 326—Retail stores – Gasoline Stations



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- vii. 369—Architectural, engineering, and related services
 - viii. 375—Environmental and other technical consulting services
 - ix. 389—Other support services
 - x. 414—Automotive repair and maintenance, except car washes
 - xi. 432—Other state and local government enterprises
 - d. Maryland Transit Administration Support for Howard County Bus Project**
 - i. 283—Motor vehicle parts manufacturing
 - ii. 294—All other transportation equipment manufacturing
 - iii. 319—Wholesale trade businesses
 - iv. 377—Advertising and related services
 - v. 432—Other state and local government enterprises
 - e. Clean and Efficient Strategies**
 - i. 36—Construction of other new nonresidential structures
 - ii. 283—Motor vehicle parts manufacturing
 - iii. 294—All other transportation equipment manufacturing
 - iv. 369—Architectural, engineering, and related services
 - v. 414—Automotive repair and maintenance, except car washes
 - vi. 432—Other state and local government enterprises
 - f. Baltimore City Electric Vehicles Infrastructure**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 36—Construction of other new nonresidential structures
 - iii. 294—All other transportation equipment manufacturing
 - iv. 369—Architectural, engineering, and related services
 - v. 375—Environmental and other technical consulting services
 - vi. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
- a. Vehicle-to-Grid (V2G)**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - b. Electric Vehicles**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - c. Maryland Electric Vehicles Initiatives**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - d. Maryland Transit Administration Support for Howard County Bus Project**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - e. Clean and Efficient Strategies**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - f. Baltimore City Electric Vehicles Infrastructure**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
- a. Vehicle-to-Grid (V2G)**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$180,000 each

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- b. Electric Vehicles**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$180,000 each
 - c. Maryland Electric Vehicles Initiatives**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$90,000 each
 - d. Maryland Transit Administration Support for Howard County Bus Project**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$225,000 each
 - e. Clean and Efficient Strategies**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$180,000 each
 - f. Baltimore City Electric Vehicles Infrastructure**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$180,000 each
4. Input sales by sector into IMPLAN model and run impacts.
 5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file). (Note: IMPLAN code 336 (Transit and ground passenger transportation) has been changed to 432 (Other state and local government enterprises) in all instances due to the state/local government overseeing MARC operations via MTA.)
 - a. Vehicle-to-Grid (V2G)**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 10001-10009—Households – All income levels
 - b. Electric Vehicles**
 - i. 10001-10009—Households – All income levels
 - c. Maryland Electric Vehicles Initiatives**
 - i. 10001-10009—Households – All income levels
 - d. Maryland Transit Administration Support for Howard County Bus Project**
 - i. 432—Other state and local government enterprises
 - e. Clean and Efficient Strategies**
 - i. 432—Other state and local government enterprises
 - f. Baltimore City Electric Vehicles Infrastructure**
 - i. 10001-10009—Households – All income levels
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. Vehicle-to-Grid (V2G)**
 - i. \$30 per megawatt in Maryland's regulated energy market



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- b. Electric Vehicles**
 - i. Currently 10,874 cars are registered in the state of Maryland as Hybrids
 - ii. 65 new recharging stations to be installed
 - iii. Proposed 20% tax credit for charging station infrastructure
 - c. Maryland Electric Vehicles Initiatives**
 - i. Currently 10,874 cars are registered in the state of Maryland as Hybrids
 - ii. 65 new recharging stations to be installed
 - d. Maryland Transit Administration Support for Howard County Bus Project**
 - i. Replace 3 diesel buses with new Electric Buses
 - ii. Add 2 quick charge stations
 - e. Clean and Efficient Strategies**
 - i. Two (2) quick charge stations to be installed for Baltimore Fleet
 - f. Baltimore City Electric Vehicles Infrastructure**
 - i. Plans to install 8 new charge stations in Baltimore City garages
3. Research savings data for each policy according to part of program to be affected by savings.
- a. Vehicle-to-Grid (V2G)**
 - i. Maryland Electricity cost (in KWh)¹⁵⁵ --\$0.133 per kW/h
 - ii. Average kilowatt introduced into grid by electric vehicle¹⁵⁶—6 kilowatts
 - iii. Annual New Vehicle Registration in Maryland (2010)¹⁵⁷—186,759 (total for cars and light trucks)
 - iv. Energy consumed per capita in the state of Maryland¹⁵⁸—1,429 trillion Btu
 - v. Annual Energy Generation for the state of Maryland¹⁵⁹—248 trillion Btu
 - vi. *Note: External research was conducted to construct an average price for Electric Vehicles in the US. RESI constructed this average price across the top 5 reported prices for new 2012 models of Electric Vehicles. Ford's Focus EV has yet to report an official price for their 2012 model and thus was not included in the average. Instead the Honda Fit EV was included in the top five and used to create the average price of Electric Vehicles.*

¹⁵⁵ "Average Energy Prices in the Washington-Baltimore Area." U.S. Bureau of Labor Statistics. 27 Sept. 2011. 11 Nov. 2011 <http://www.bls.gov/ro3/apwb.htm#wb_energy_table1>.

¹⁵⁶ Motavalli, Jim. "In a Blackout, Nissan, Mitsubishi and Toyota E.V.'s Could Function as Generators - NYTimes.com." Automobiles - Wheels Blog - NYTimes.com 1 Sept. 2011. 22 Nov. 2011 <<http://wheels.blogs.nytimes.com/2011/09/01/in-a-blackout-nissan-mitsubishi-and-toyota-e-v-s-could-function-as-generators/>>.

¹⁵⁷ "Maryland Auto Outlook." Wwww.mdauto.org. 9 Aug. 2011. Maryland Automobile Dealers Association. 11 Nov. 2011 <<http://www.mdauto.org/admin/publications/AutoOutlookQuarter22011.pdf>>.

¹⁵⁸ Data - Prices. Maryland. Nov. 2011. U.S. Energy Information Administration (EIA). 14 Nov. 2011 <<http://www.eia.gov/state/state-energy-profiles-data.cfm?sid=MD#Prices>>.

¹⁵⁹ Ibid.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

b. Electric Vehicles

- i. Average Cost for One Recharge Station¹⁶⁰--\$7,872.00 annual maintenance
- ii. Maryland Electricity cost (in KWh)¹⁶¹--\$0.133 per kW/h
- iii. Average fuel price per gallon (regular unleaded)¹⁶²—\$3.43 per gallon
- iv. Average Annual Miles Driven By Population¹⁶³—13,041 miles
- v. Annual New Vehicle Registration in Maryland (2010)¹⁶⁴—186,759 (total for cars and light trucks)
- vi. Average Cost per Mile for Electric Vehicles--\$0.02 per mile
- vii. Average mile per kilowatt-hour—95.88 miles/KWh
- viii. Average Cost to MD driver annually (in gasoline)--\$1,764.99
- ix. Average Battery Size charge time—5.1 hours
- x. *Note: External research was conducted to construct an average price for Electric Vehicles in the US. RESI constructed this average price across the top 5 reported prices for new 2012 models of Electric Vehicles. Ford's Focus EV has yet to report an official price for their 2012 model and thus was not included in the average. Instead the Honda Fit EV was included in the top five and used to create the average price of Electric Vehicles.*

c. Maryland Electric Vehicles Initiatives

- i. Average Cost for One Recharge Station¹⁶⁵--\$7,872.00 annual maintenance
- ii. Maryland Electricity cost (in KWh)¹⁶⁶--\$0.133 per kW/h
- iii. Average fuel price per gallon (regular unleaded)¹⁶⁷—\$3.43 per gallon
- iv. Average Annual Miles Driven By Population¹⁶⁸—13,041 miles
- v. Annual New Vehicle Registration in Maryland (2010)¹⁶⁹—186,759 (total for cars and light trucks)

¹⁶⁰ "Electric Vehicle Charging Stations." 2010. EVsRoll.com. 14 Nov. 2011
<http://www.evscroll.com/Electric_Vehicle_Charging_Stations.html>.

¹⁶¹ "Average Energy Prices in the Washington-Baltimore Area." U.S. Bureau of Labor Statistics. 27 Sept. 2011. 11 Nov. 2011 <http://www.bls.gov/ro3/apwb.htm#wb_energy_table1>.

¹⁶² Daily Fuel Gauge Report--national, state and local average prices for gasoline, diesel and E-85. 11 Nov. 2011. Oil Price Information Service (OPIS). 11 Nov. 2011

<<http://fuelgaugereport.aaa.com/?redirectto=http://fuelgaugereport.opisnet.com/index.asp>

¹⁶³ "State & Urbanized Area Statistics - Our Nation's Highways - 2000." Home | Federal Highway Administration. 4 Apr. 2011. Federal Highway Administration (FHWA). 11 Nov. 2011

<<http://www.fhwa.dot.gov/ohim/onh00/onh2p11.htm>>.

¹⁶⁴ "Maryland Auto Outlook." Www mdauto.org. 9 Aug. 2011. Maryland Automobile Dealers Association. 11 Nov. 2011 <<http://www.mdauto.org/admin/publications/AutoOutlookQuarter22011.pdf>>.

¹⁶⁵ "Electric Vehicle Charging Stations." 2010. EVsRoll.com. 14 Nov. 2011
<http://www.evscroll.com/Electric_Vehicle_Charging_Stations.html>.

¹⁶⁶ "Average Energy Prices in the Washington-Baltimore Area." U.S. Bureau of Labor Statistics. 27 Sept. 2011. 11 Nov. 2011 <http://www.bls.gov/ro3/apwb.htm#wb_energy_table1>.

¹⁶⁷ Daily Fuel Gauge Report--national, state and local average prices for gasoline, diesel and E-85. 11 Nov. 2011. Oil Price Information Service (OPIS). 11 Nov. 2011

<<http://fuelgaugereport.aaa.com/?redirectto=http://fuelgaugereport.opisnet.com/index.asp>

¹⁶⁸ "State & Urbanized Area Statistics - Our Nation's Highways - 2000." Home | Federal Highway Administration. 4 Apr. 2011. Federal Highway Administration (FHWA). 11 Nov. 2011

<<http://www.fhwa.dot.gov/ohim/onh00/onh2p11.htm>>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

- vi. Average Cost per Mile for Electric Vehicles--\$0.02 per mile
 - vii. Average mile per kilowatt-hour—95.88 miles/KWh
 - viii. Average Cost to MD driver annually (in gasoline)--\$1,764.99
 - ix. Average Battery Size charge time—5.1 hours
 - x. *Note: External research was conducted to construct an average price for Electric Vehicles in the US. RESI constructed this average price across the top 5 reported prices for new 2012 models of Electric Vehicles. Ford's Focus EV has yet to report an official price for their 2012 model and thus was not included in the average. Instead the Honda Fit EV was included in the top five and used to create the average price of Electric Vehicles.*
- d. Maryland Transit Administration Support for Howard County Bus Project**
- i. Maryland Electricity cost (in KWh)¹⁷⁰--\$0.133 per kW/h
 - ii. Total Miles of Routes 1 and 2 (Annual)¹⁷¹—779,928 annual miles
 - iii. Average Cost of Diesel Fuel¹⁷²—\$3.76 per gallon
 - iv. Average Miles per gallon of Hybrid Bus¹⁷³— 5.4 miles per gallon
 - v. Average miles per gallon of transit buses¹⁷⁴—6.4 miles per gallon
 - vi. Average Cost for One Recharge Station¹⁷⁵--\$7,872.00 annual maintenance
 - vii. *Note –RESI will take into consideration that Hybrid Transit Buses have a diesel hybrid. Partial energy is derived from the ion-battery cells and partial from the diesel counterpart. RESI assumes that this energy distribution is equal for all intents and purposes.*
- e. Clean and Efficient Strategies**
- i. Average Cost for One Recharge Station¹⁷⁶--\$7,872.00 annual maintenance
 - ii. Maryland Electricity cost (in KWh)¹⁷⁷--\$0.133 per kW/h
 - iii. Average fuel price per gallon (regular unleaded)¹⁷⁸—\$3.43 per gallon

¹⁶⁹ "Maryland Auto Outlook." Www mdauto.org. 9 Aug. 2011. Maryland Automobile Dealers Association. 11 Nov. 2011 <<http://www.mdauto.org/admin/publications/AutoOutlookQuarter22011.pdf>>.

¹⁷⁰ "Average Energy Prices in the Washington-Baltimore Area." U.S. Bureau of Labor Statistics. 27 Sept. 2011. 11 Nov. 2011 <http://www.bls.gov/ro3/apwb.htm#wb_energy_table1>.

¹⁷¹ KFH Group, Inc. "Harford County Transportation Development Plan." Harford County. June 2007. Office of Planning, Maryland Transit Administration (MTA). 14 Nov. 2011 <<http://www.harfordcountymd.gov/services/community/doc/985.pdf>>.

¹⁷² Ibid.

¹⁷³ Allison Hybrid H 40 EP | H 50 EP. Allisontransmission.com. 2011. Allison Transmission. 14 Nov. 2011 <<http://www.allisontransmission.com/servlet/DownloadFile?Dir=publications/pubs&FileToGet=SA5983EN.pdf>>

¹⁷⁴ RITA | BTS | Table 4-15: Bus Fuel Consumption and Travel. RITA | Bureau of Transportation Statistics (BTS). Bureau of Transportation, 26 Apr. 2010. Web. 14 Nov. 2011.

<http://www.bts.gov/publications/national_transportation_statistics/html/table_04_15.html>.

¹⁷⁵ "Electric Vehicle Charging Stations." 2010. EVsRoll.com. 14 Nov. 2011

<http://www.evscroll.com/Electric_Vehicle_Charging_Stations.html>.

¹⁷⁶ Ibid.

¹⁷⁷ "Average Energy Prices in the Washington-Baltimore Area." U.S. Bureau of Labor Statistics. 27 Sept. 2011. 11 Nov. 2011 <http://www.bls.gov/ro3/apwb.htm#wb_energy_table1>.

¹⁷⁸ Daily Fuel Gauge Report--national, state and local average prices for gasoline, diesel and E-85. 11 Nov. 2011. Oil Price Information Service (OPIS). 11 Nov. 2011

<<http://fuelgaugereport.aaa.com/?redirectto=http://fuelgaugereport.opisnet.com/index.asp>>.

**Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft**

RESI of Towson University

- iv. Average number of vehicles in downtown fleet¹⁷⁹—5,800 vehicles
 - v. Percentage of downtown fleet that are fuel efficient¹⁸⁰—35%
 - vi. Average Annual Miles Driven By Population¹⁸¹—13,041 miles
 - vii. Average Cost per Mile for Electric Vehicles--\$0.02 per mile
 - viii. Average mile per kilowatt-hour—95.88 miles/KWh
 - ix. Average Cost to MD driver annually (in gasoline)--\$1,764.99
 - x. Average Battery Size charge time—5.1 hours
 - xi. *Note: External research was conducted to construct an average price for Electric Vehicles in the US. RESI constructed this average price across the top 5 reported prices for new 2012 models of Electric Vehicles. Ford's Focus EV has yet to report an official price for their 2012 model and thus was not included in the average. Instead the Honda Fit EV was included in the top five and used to create the average price of Electric Vehicles.*
- f. Baltimore City Electric Vehicles Infrastructure**
- i. Average Cost for One Recharge Station¹⁸²--\$7,872.00 annual maintenance
 - ii. Maryland Electricity cost (in KWh)¹⁸³--\$0.133 per kW/h
 - iii. Average fuel price per gallon (regular unleaded)¹⁸⁴—\$3.43 per gallon
 - iv. Average Annual Miles Driven By Population¹⁸⁵—13,041 miles
 - v. Annual New Vehicle Registration in Maryland (2010)¹⁸⁶—186,759 (total for cars and light trucks)
 - vi. Average Cost per Mile for Electric Vehicles--\$0.02 per mile
 - vii. Average mile per kilowatt-hour—95.88 miles/KWh
 - viii. Average Cost to MD driver annually (in gasoline)--\$1,764.99
 - ix. Average Battery Size charge time—5.1 hours

¹⁷⁹ "Baltimore Ready to Install 9 Electric Vehicle Charging Stations." General Services / Press Releases. 2010. City of Baltimore, Maryland - Official Website. 14 Nov. 2011
<<http://baltimorecity.gov/Government/AgenciesDepartments/GeneralServices/PressReleases/tabid/1028/articleType/ArticleView/articleId/1143/Baltimore-Ready-to-Install-9-Electric-Vehicle-Charging-Stations.aspx>>.

¹⁸⁰ Ibid.

¹⁸¹ "State & Urbanized Area Statistics - Our Nation's Highways - 2000." Home | Federal Highway Administration. 4 Apr. 2011. Federal Highway Administration (FHWA). 11 Nov. 2011
<<http://www.fhwa.dot.gov/ohim/onh00/onh2p11.htm>>.

¹⁸² "Electric Vehicle Charging Stations." 2010. EVsRoll.com. 14 Nov. 2011
<http://www.evscroll.com/Electric_Vehicle_Charging_Stations.html>.

¹⁸³ "Average Energy Prices in the Washington-Baltimore Area." U.S. Bureau of Labor Statistics. 27 Sept. 2011. 11 Nov. 2011 <http://www.bls.gov/ro3/apwb.htm#wb_energy_table1>.

¹⁸⁴ Daily Fuel Gauge Report--national, state and local average prices for gasoline, diesel and E-85. 11 Nov. 2011. Oil Price Information Service (OPIS). 11 Nov. 2011
<<http://fuelgaugereport.aaa.com/?redirectto=http://fuelgaugereport.opisnet.com/index.asp>>.

¹⁸⁵ "State & Urbanized Area Statistics - Our Nation's Highways - 2000." Home | Federal Highway Administration. 4 Apr. 2011. Federal Highway Administration (FHWA). 11 Nov. 2011
<<http://www.fhwa.dot.gov/ohim/onh00/onh2p11.htm>>.

¹⁸⁶ "Maryland Auto Outlook." Www mdauto.org. 9 Aug. 2011. Maryland Automobile Dealers Association. 11 Nov. 2011 <<http://www.mdauto.org/admin/publications/AutoOutlookQuarter22011.pdf>>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

- x. *Note: External research was conducted to construct an average price for Electric Vehicles in the US. RESI constructed this average price across the top 5 reported prices for new 2012 models of Electric Vehicles. Ford's Focus EV has yet to report an official price for their 2012 model and thus was not included in the average. Instead the Honda Fit EV was included in the top five and used to create the average price of Electric Vehicles.*
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).

a. Vehicle-to-Grid (V2G)

- i. $600 [(10,874 \text{ hybrids registered in the state of Maryland} / 186,759 \text{ new vehicle registrations (light vehicles) annually in Maryland}) * ((186,759 \text{ new vehicle registrations (light vehicles) annually in Maryland}) = \text{average possible purchases of electric vehicles in the state of Maryland})]$
- ii. $1,314,872 [(6 \text{ kilowatts produced by an electric vehicle} * 600 \text{ average possible purchase of electric vehicles} * 365 \text{ days a year}) = \text{average possible kilowatts introduced into grid by electric vehicles}]$
- iii. $418,798,559,276 [(1,469 \text{ trillion BTUs} * 0.000293071 \text{ kilowatt hours for 1 BTU}) = \text{average consumption of kilowatts in Maryland annually}]$
- iv. $\$55,700,208,383.72 [(\$0.133 \text{ average cost per kilowatt hour} * 418,798,559 \text{ average consumption of kilowatt hours in Maryland annually}) = \text{average annual cost of consumption of kilowatt hours in Maryland}]$
- v. $418,797,244,404 [(418,798,559 \text{ average consumption of kilowatts in Maryland} - 1,314,872 \text{ contribution of kilowatts from electric vehicles annually}) = \text{annual consumption of kilowatt hours less contribution from EVs}]$
- vi. $\$55,700,033,505.75 [(417,483,687 \text{ annual consumption of kilowatt hours less contribution from EVs} * \$0.133 \text{ average cost per kilowatt hour}) = \text{average cost of kilowatt consumption annually in Maryland less the kilowatt contribution of EVs}]$
- vii. $10001-10009 - \$174,877.97 [(\$55,700,208.38 \text{ annual consumption costs of kilowatts in Maryland} - \$55,525,330.41 \text{ annual consumption costs of kilowatts in Maryland less the EV contribution}) = \text{annual savings from EVs in V2G}]$
- viii. $31 - \$39,446.16 [(1,314,872 \text{ contribution of kilowatts from electric vehicles annually} / 1000 \text{ kilowatts per one megawatt}) * [(\$30.00 \text{ per megawatt hour}) = \text{average annual savings to electric companies}]$

b. Electric Vehicles

- i. $600 [(10,874 \text{ hybrids registered in the state of Maryland} / 186,759 \text{ new vehicle registrations (light vehicles) annually in Maryland}) * ((186,759 \text{ new vehicle registrations (light vehicles) annually in Maryland}) = \text{average possible purchases of electric vehicles in the state of Maryland})]$

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- ii. $\$1.80 [(5.1 \text{ average battery charge time} * \$0.133 \text{ per KW/h average price per kilowatt-hour in Maryland})]=\text{average cost to fill a tank to electric vehicle consumer}$
- iii. $\$0.02 [(\$1.80 \text{ average cost to fill tank of EV} / 95.88 \text{ average miles per tank})]=\text{average cost per mile of electric vehicle}$
- iv. $\$244.28 [(\$0.02 \text{ average cost per mile of EV} * 13,041 \text{ miles driven annually by Maryland residents})]=\text{average annual cost to drive an EV in Maryland}$
- v. $\$1,520.00 [(\$1,769.99 \text{ cost to drive annually with gasoline powered vehicles} - \$244.28 \text{ cost to drive an EV annually in MD})]=\text{annual savings to those that purchase EV}$
- vi. $\$913,040.39 [(\$1520.00 \text{ annual savings to EV owners} * 600 \text{ average annual possible purchase of EVs in Maryland})]=\text{average annual savings to EV car owners in Maryland}$
- vii. $\$409,344.00 [(\$7,872.00 \text{ average cost of maintenance for one recharge station annually} * 65 \text{ charge stations in Maryland} - 20\% \text{ tax credit})]=\text{annual cost to maintain new charge stations}$
- viii. $10001-10009 -- \$503,696.39 [(\$913,040.39 \text{ average annual fuel savings to EV car owners} - \$409,344.00 \text{ annual maintenance fees of 65 new recharge stations})]=\text{average annual savings to Maryland EV owners net convenience fees of recharge stations}$

c. Maryland Electric Vehicles Initiatives

- i. $600 [(10,874 \text{ hybrids registered in the state of Maryland} / 186,759 \text{ new vehicle registrations (light vehicles) annually in Maryland}) * [(186,759 \text{ new vehicle registrations (light vehicles) annually in Maryland})]=\text{average possible purchases of electric vehicles in the state of Maryland}$
- ii. $\$1.80 [(5.1 \text{ average battery charge time} * \$0.133 \text{ per KW/h average price per kilowatt-hour in Maryland})]=\text{average cost to fill a tank to electric vehicle consumer}$
- iii. $\$0.02 [(\$1.80 \text{ average cost to fill tank of EV} / 95.88 \text{ average miles per KW/h})]=\text{average cost per mile of electric vehicle}$
- iv. $\$244.28 [(\$0.02 \text{ average cost per mile of EV} * 13,041 \text{ miles driven annually by Maryland residents})]=\text{average annual cost to drive an EV in Maryland}$
- v. $\$1,520.00 [(\$1,769.99 \text{ cost to drive annually with gasoline powered vehicles} - \$244.28 \text{ cost to drive an EV annually in MD})]=\text{annual savings to those that purchase EV}$
- vi. $\$913,040.39 [(\$1520.00 \text{ annual savings to EV owners} * 600 \text{ average annual possible purchase of EVs in Maryland})]=\text{average annual savings to EV car owners in Maryland}$
- vii. $\$511,680.00 [(\$7,872.00 \text{ average cost of maintenance for one recharge station annually} * 65 \text{ charge stations in Maryland})]=\text{annual cost to maintain new charge stations}$

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

- viii. 10001-10009 -- \$401,360.39 [(\$913,040.39 average annual fuel savings to EV car owners - \$511,680.00 annual maintenance fees of 65 new recharge stations)] = average annual savings to Maryland EV owners net convenience fees of recharge stations

d. Maryland Transit Administration Support for Howard County Bus Project

- i. \$458,695 [(779,928 average annual miles of Routes 1 and 2 / 6.4 average miles per gallon of transit buses)] * [(\$3.76 per gallon of diesel fuel)] = average cost annually of one diesel bus for Routes 1 and 2
- ii. \$1,376,085.47 [(\$458,695.00 average annual cost of one diesel bus for Routes 1 and 2 * 3 buses to be replaced)] = average cost annually of three diesel bus for Routes 1 and 2
- iii. \$9,604.67 [(779,928 average annual miles of Routes 1 and 2 / 5.4 average miles per gallon of transit bus * .50 energy distribution)] * [(\$0.133 Maryland energy cost per kilowatt hour)] = average annual cost of new hybrid bus for Routes 1 and 2 (Electricity)
- iv. \$271,819.35 [(779,928 average annual miles of Routes 1 and 2 / 5.4 average miles per gallon of transit bus * .50 energy distribution)] * [(\$3.76 per gallon of diesel fuel)] = average annual cost of new hybrid bus for Routes 1 and 2 (Diesel)
- v. \$860,016.06 [((\$9,604.67 average cost in electric + \$271,819.35 average cost in diesel fuel for Routes 1 and 2 for a single bus) * 3 new buses)] + [(\$7,872.00 average cost of maintenance for one recharge station annually * 2)] = average annual costs of 3 new hybrid bus and 2 recharge stations
- vi. 432 -- \$516,069.41 [(\$1,376,085.47 average annual cost for three diesel buses on Routes 1 and 2 - \$860,016.06 annual costs for 3 new hybrid buses and 2 recharge stations for Routes 1 and 2)] = Overall Average Annual Savings from replacing three diesel buses and adding two recharge stations

e. Clean and Efficient Strategies

- i. 2,030 [(5,8000 total vehicles registered with the downtown fleet * 35% are fuel efficient vehicles)] = average possible purchases of electric vehicles for downtown fleet
- ii. \$1.80 [(5.1 average battery charge time * \$0.133 per KW/h average price per kilowatt-hour in Maryland)] = average cost to fill a tank to electric vehicle
- iii. \$0.02 [(\$1.80 average cost to fill tank of EV / 95.88 average miles per KW/h)] = average cost per mile of electric vehicle
- iv. \$244.28 [(\$0.02 average cost per mile of EV * 13,041 miles driven annually by Maryland residents)] = average annual cost to drive an EV in Maryland
- v. \$1,520.00 [(\$1,769.99 cost to drive annually with gasoline powered vehicles - \$244.28 cost to drive an EV annually in MD)] = annual savings attributed to purchase of an Electric Vehicles

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- vi. \$3,087,071.40 [(\$1520.00 annual savings to EV owners * 2,030 possible purchase of EVs for downtown fleet)]=average annual savings in gas for EV fleet
- vii. \$15,744.00 [(\$7,872.00 average cost of maintenance for one recharge station annually * 2 charge stations in Maryland)]=annual cost to maintain new charge stations
- viii. 432 -- \$3,071,327.40 [(\$3,087,071.40 average annual fuel savings to EV cars - \$15,744.00 annual maintenance fees of 2 new recharge stations)]=average annual savings to Downtown Fleet

f. Baltimore City Electric Vehicles Infrastructure

- i. 600 [(10,874 hybrids registered in the state of Maryland / 186,759 new vehicle registrations (light vehicles) annually in Maryland)] * [(186,759 new vehicle registrations (light vehicles) annually in Maryland)]=average possible purchases of electric vehicles in the state of Maryland
- ii. \$1.80 [(5.1 average battery charge time * \$0.133 per KW/h average price per kilowatt-hour in Maryland)]=average cost to fill a tank to electric vehicle consumer
- iii. \$0.02 [(\$1.80 average cost to fill tank of EV / 95.88 average miles per KW/h)]=average cost per mile of electric vehicle
- iv. \$244.28 [(\$0.02 average cost per mile of EV * 13,041 miles driven annually by Maryland residents)]=average annual cost to drive an EV in Maryland
- v. \$1,520.00 [(\$1,769.99 cost to drive annually with gasoline powered vehicles - \$244.28 cost to drive an EV annually in MD)]=annual savings to those that purchase EV
- vi. \$913,040.39 [(\$1520.00 annual savings to EV owners * 600 average annual possible purchase of EVs in Maryland)]=average annual savings to EV car owners in Maryland
- vii. \$62,976.00 [(\$7,872.00 average cost of maintenance for one recharge station annually * 8 charge stations in Maryland)]=annual cost to maintain new charge stations
- viii. 10001-10009 -- \$850,064.39 [(\$1,059,702.59 average annual fuel savings to EV car owners - \$62,976.00 annual maintenance fees of 8 new recharge stations)]=average annual savings to Maryland EV owners net convenience fees of recharge stations

5. Input savings by sector into IMPLAN model and run impacts.

- a. Household savings inputs were distributed among household income ranges using household income distribution percentages taken from the Census' 2005-2009 American Community Survey 5-Year estimates for Maryland. (Note: In some cases, totals do not add up to 100.0 percent due to margin of error.)

6. Export impacts and analyze.



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.12 Low-Emitting Vehicles Initiatives

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. Howard Transit Paratransit Fleet Replacement Vehicles**
 - i. 283—Motor vehicle parts and manufacturing
 - ii. 294—All other transportation equipment manufacturing
 - iii. 319—Wholesale trade businesses
 - iv. 432—Other state and local government enterprises
 - b. Clean and Efficient Strategies**
 - i. 277—Light truck and utility vehicle manufacturing
 - ii. 278—Heavy duty truck manufacturing
 - iii. 279—Motor vehicle body manufacturing
 - iv. 283—Motor vehicle parts and manufacturing
 - v. 294—All other transportation equipment manufacturing
 - vi. 369—Architectural, engineering, and related services
 - vii. 414—Automotive repair and maintenance, except car washes
 - viii. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. Howard Transit Paratransit Fleet Replacement Vehicles**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - b. Clean and Efficient Strategies**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. Howard Transit Paratransit Fleet Replacement Vehicles**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$300,000 each
 - b. Clean and Efficient Strategies**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$128,571.43 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file). (Note: IMPLAN code 336 (Transit and ground passenger transportation) has been changed to 432 (Other state and local government enterprises) in all instances due to the state/local government overseeing MARC operations via MTA.)
 - a. Howard Transit Paratransit Fleet Replacement Vehicles**
 - i. 432—Other state and local government enterprises

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- b. Clean and Efficient Strategies**
 - i. 432—Other state and local government enterprises
- 2. Determine part of program to be affected by savings (from strategy write-up).
 - a. Howard Transit Paratransit Fleet Replacement Vehicles**
 - i. Number of Sedans=4
 - ii. Number of Buses=1
 - b. Clean and Efficient Strategies**
- 3. Research savings data for each policy according to part of program to be affected by savings.
 - a. Howard Transit Paratransit Fleet Replacement Vehicles - *We have calculated the savings in dollars for Howard County Transportation***
 - i. Average Savings for EV=\$1,520
 - ii. Vehicles Miles for ADA=1,545
 - iii. Cost of Diesel Fuel=3.76
 - iv. Average Miles per gallon of Diesel Sedan=25.5 mpg
 - v. Average cost of EV per miles=\$0.02
 - vi. Average MPG of Hybrid Buses=5.4 mpg
 - vii. Average MPG of Diesel Buses = 6.1 mpg
 - viii. Cost for Diesel Bus to Travel ADA Route Annually - \$907.54
 - b. Clean and Efficient Strategies**
 - i. Clean and Efficient Strategies (all reductions)¹⁸⁷**
 - 1. Baltimore City 18.9 tons
 - 2. Howard County 4.98 tons
 - 3. JHU 1.992 tons
 - 4. Anne Arundel Schools 15.22 tons
 - ii. Avg. price per gallon of fuel =3.43
- 4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. Howard Transit Paratransit Fleet Replacement Vehicles**
 - i. $60.58 [(1,545 \text{ Vehicle Miles for ADA Route} / 25.5 \text{ Average Miles per gallon of Diesel Sedan})] = \text{Average Gallons to go ADA Route for a Diesel Sedan}$
 - ii. $\$227.77 [(60.58 \text{ Average Gallons to travel ADA Route} * \$3.76 \text{ Cost of Diesel Fuel})] = \text{Average Cost in Diesel Fuel for Sedan to Travel ADA route}$
 - iii. $\$30.90 [(\$0.02 \text{ Average cost of EV per miles} * 1,545 \text{ Vehicles Miles for ADA route})] = \text{Average Cost for EV to Travel ADA Route}$

¹⁸⁷ "U.S. EPA Sensitive Population Grant for the City of Baltimore and the City of Annapolis (Fire Trucks and Ambulances)." Maryland Department of the Environment (MDE). 14 Nov. 2011
<http://www.mde.state.md.us/programs/Air/MobileSources/DieselVehicleInformation/DieselRetrofitProjects/Pages/balto_annapcity_retrofit.aspx>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

- iv. $\$196.88 [(\$277.77 \text{ Average Cost of Diesel Sedan (Gas)} - \$30.90 \text{ Average cost of EV for ADA route})] = \text{Average Annual Savings in Gas from Switch of a Sedan}$
- v. $\$590.64 [(\$196.88 \text{ Average Annual Savings} * 4 \text{ proposed sedan purchases})] = \text{Total Average Savings in Gas from Switch}$
- vi. $\$907.54 [(1,545 \text{ Vehicles Miles for ADA} / 6.4 \text{ Average Miles per gallon of Bus}) * (\$3.76 \text{ Cost of Diesel Fuel})] = \text{Average Cost of Diesel Bus to Travel ADA Route}$
- vii. $286.06 [(1,545 \text{ Vehicles Miles for ADA} / 5.4 \text{ Average MPG of Hybrid Buses})] = \text{Average Gallons of Gas to Travel ADA Route}$
- viii. $\$19.02 [(\$0.13 \text{ per kilowatt hour cost of electricity} * 286.06 \text{ Average Gallons of Fuel Needed to go ADA Route} / 2 \text{ (half time bus will use electric and other half diesel fuel)})] = \text{Average Cost of Hybrid Bus to Travel ADA Route}$
- ix. $\$537.80 [(\$3.76 \text{ Average Cost of Diesel Fuel} * 286.06 \text{ Average Gallons of Fuel Needed}) / 2 \text{ (half time bus will use electric and other half diesel fuel)}] = \text{Average Annual Cost in Diesel Fuel for Hybrid Bus to Travel ADA Route}$
- x. $\$556.83 [(\$19.02 \text{ Average Cost of Hybrid Buses for Electricity} + \$537.80 \text{ Average Cost of Hybrid Buses for Diesel})] = \text{Average Annual Cost of Hybrid Bus to Travel ADA Route}$
- xi. $\$350.72 [(\$907.54 \text{ Average Cost of Diesel Bus} - \$556.83 \text{ Average Overall Annual Cost of Hybrid Bus})] = \text{Average Annual Savings from Hybrid Bus traveling ADA Route}$
- xii. $432--\$941.36 [(\$350.72 \text{ Average Annual Savings from Hybrid Bus} + \$590.64 \text{ Average Annual Savings from 3 sedans})] = \text{Total Savings from Strategy Overall}$

b. Clean and Efficient Strategies

- i. 41,092 [(Estimated GHG Reduction in metric tons)]
 - ii. 41,092 [(41.09 Estimated GHG Reduction in Metric tons * 1000)] = Conversion of Estimated GHG Reductions into Kilograms
 - iii. 4,611.9 [(41,092 Estimated GHG Reductions in kilograms / 8.91)] = Conversion of Estimated GHG Reductions into Gallons of Fuel
 - iv. $\$15,818.81 [(4,611.9 \text{ Reduction in Gallons of Fuel} * \$3.43 \text{ Avg. price per gallon of fuel})] = \text{Total Saved Annually Due to Reductions}$
 - v. $432--\$3,071,327.40 [(\$3,087,071.40 \text{ average annual fuel savings to EV cars} - \$15,744.00 \text{ annual maintenance fees of 2 new recharge stations})] = \text{Average annual savings to Downtown Fleet}$
5. Input savings by sector into IMPLAN model and run impacts.
 - a. Household savings inputs were distributed among household income ranges using household income distribution percentages taken from the Census' 2005-2009 American Community Survey 5-Year estimates for Maryland. (Note: In some cases, totals do not add up to 100.0 percent due to margin of error.)
 6. Export impacts and analyze.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.14 Airport Initiatives

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. Compressed Natural Gas Buses**
 - i. 32—Natural gas distribution
 - ii. 283—Motor vehicle parts manufacturing
 - iii. 294—All other transportation equipment manufacturing
 - iv. 319—Wholesale trade businesses
 - v. 432—Other state and local government enterprises
 - b. Air Emissions Reductions**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 32—Natural gas distribution
 - iii. 375—Environmental and other technical consulting services
 - iv. 432—Other state and local government enterprises
 - c. BWI Energy Audit**
 - i. 375—Environmental and other technical consulting services
 - ii. 432—Other state and local government enterprises
 - d. BWI Utility Master Plan**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 32—Natural gas distribution
 - iii. 33—Water, sewage, and other treatment and delivery systems
 - iv. 315—Telecommunications
 - v. 375—Environmental and other technical consulting services
 - vi. 432—Other state and local government enterprises
 - e. BWI Energy Efficiency**
 - i. 39—Maintenance and repair construction of nonresidential structures
 - ii. 214—Air purification and ventilation equipment manufacturing
 - iii. 215—Heating equipment (except warm air furnances)
 - iv. 216—Air conditioning refrigeration, and warm air heating equipment manufacturing
 - v. 260—Lighting fixture manufacturing
 - vi. 369—Architectural, engineering, and related services
 - vii. 375—Environmental and other technical consulting services
 - viii. 432—Other state and local government enterprises
 - f. Enhanced Access to BWI by Other Travel Modes**
 - i. 332—Transport by air
 - ii. 375—Environmental and other technical consulting services
 - iii. 432—Other state and local government enterprises
 - g. BWI's Periodic Air Quality Assessments**
 - i. 375--Environmental and other technical consulting services
 - ii. 432—Other state and local government enterprises

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **Compressed Natural Gas Buses**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - b. **Air Emissions Reductions**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - c. **BWI Energy Audit**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - d. **BWI Utility Master Plan**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - e. **BWI Energy Efficiency**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - f. **Enhanced Access to BWI by Other Travel Modes**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - g. **BWI's Periodic Air Quality Assessments**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. **Compressed Natural Gas Buses**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$225,000 each
 - b. **Air Emissions Reductions**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$300,000 each
 - c. **BWI Energy Audit**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$900,000
 - d. **BWI Utility Master Plan**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$180,000 each
 - e. **BWI Energy Efficiency**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$128,571.43 each
 - f. **Enhanced Access to BWI by Other Travel Modes**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$450,000 each

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- g. BWI's Periodic Air Quality Assessments**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$900,000 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. Compressed Natural Gas Buses**
 - i. 332—Transport by air
 - b. Air Emissions Reductions**
 - i. 332—Transport by air
 - c. BWI Energy Audit**
 - i. 332—Transport by air
 - d. BWI Utility Master Plan**
 - i. 332—Transport by air
 - e. BWI Energy Efficiency**
 - i. 332—Transport by air
 - f. Enhanced Access to BWI by Other Travel Modes**
 - i. 332—Transport by air
 - g. BWI's Periodic Air Quality Assessments**
 - i. 332—Transport by air
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. Compressed Natural Gas Buses**
 - b. Air Emissions Reductions**
 - c. BWI Energy Audit**
 - d. BWI Utility Master Plan**
 - e. BWI Energy Efficiency**
 - f. Enhanced Access to BWI by Other Travel Modes**
 - g. BWI's Periodic Air Quality Assessments**
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. Compressed Natural Gas Buses**
 - i. Average Cost of Fuel – \$3.43 per gallon
 - b. Air Emissions Reductions**
 - i. Average Cost of Fuel – \$3.43 per gallon
 - c. BWI Energy Audit**
 - i. Average Cost of Fuel – \$3.43 per gallon
 - d. BWI Utility Master Plan**
 - i. Average Cost of Fuel – \$3.43 per gallon
 - e. BWI Energy Efficiency**
 - i. Average Cost of Fuel – \$3.43 per gallon

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- f. Enhanced Access to BWI by Other Travel Modes**
 - i. Average Cost of Fuel – \$3.43 per gallon
- g. BWI's Periodic Air Quality Assessments**
 - i. Average Cost of Fuel – \$3.43 per gallon
- 4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. Compressed Natural Gas Buses**
 - i. 2,548,958,000 kg [(2,578,958 metric tons Total Potential Airport Emissions Annually from BWI * 1000)]=Conversion of Reduction into kilograms
 - ii. 286,078,339 gallons [(2,548,958,000 kilograms Conversion of Reduction into kilograms / 8.91)]=Conversion of Reduction into gallons of gas
 - iii. \$981,248,702.58 [(286,078,339 gallons Conversion of Reduction into gallons of gas * \$3.43 Average Cost of gallon of gas)]=Annual Savings Emissions Reductions from All Airport Initiatives in Fuel Costs
 - iv. 332 – \$2,385,683.76 [(\$981,248,702.58 Annual Savings Emissions Reductions from All Airport Initiatives in Fuel Costs / 7 sub-programs aimed to achieve this goal)]=Average Annual Savings from Reduction in Fuel Costs associated with this program
 - b. Air Emissions Reductions**
 - i. 2,548,958,000 kg [(2,578,958 metric tons Total Potential Airport Emissions Annually from BWI * 1000)]=Conversion of Reduction into kilograms
 - ii. 286,078,339 gallons [(2,548,958,000 kilograms Conversion of Reduction into kilograms / 8.91)]=Conversion of Reduction into gallons of gas
 - iii. \$981,248,702.58 [(286,078,339 gallons Conversion of Reduction into gallons of gas * \$3.43 Average Cost of gallon of gas)]=Annual Savings Emissions Reductions from All Airport Initiatives in Fuel Costs
 - iv. 332 – \$2,385,683.76 [(\$981,248,702.58 Annual Savings Emissions Reductions from All Airport Initiatives in Fuel Costs / 7 sub-programs aimed to achieve this goal)]=Average Annual Savings from Reduction in Fuel Costs associated with this program
 - c. BWI Energy Audit**
 - i. 2,548,958,000 kg [(2,578,958 metric tons Total Potential Airport Emissions Annually from BWI * 1000)]=Conversion of Reduction into kilograms
 - ii. 286,078,339 gallons [(2,548,958,000 kilograms Conversion of Reduction into kilograms / 8.91)]=Conversion of Reduction into gallons of gas
 - iii. \$981,248,702.58 [(286,078,339 gallons Conversion of Reduction into gallons of gas * \$3.43 Average Cost of gallon of gas)]=Annual Savings Emissions Reductions from All Airport Initiatives in Fuel Costs

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- iv. 332 – \$2,385,683.76 [(\$981,248,702.58 Annual Savings Emissions Reductions from All Airport Initiatives in Fuel Costs / 7 sub-programs aimed to achieve this goal)]=Average Annual Savings from Reduction in Fuel Costs associated with this program

d. BWI Utility Master Plan

- i. 2,548,958,000 kg [(2,578,958 metric tons Total Potential Airport Emissions Annually from BWI * 1000)]=Conversion of Reduction into kilograms
- ii. 286,078,339 gallons [(2,548,958,000 kilograms Conversion of Reduction into kilograms / 8.91)]=Conversion of Reduction into gallons of gas
- iii. \$981,248,702.58 [(286,078,339 gallons Conversion of Reduction into gallons of gas * \$3.43 Average Cost of gallon of gas)]=Annual Savings Emissions Reductions from All Airport Initiatives in Fuel Costs
- iv. 332 – \$2,385,683.76 [(\$981,248,702.58 Annual Savings Emissions Reductions from All Airport Initiatives in Fuel Costs / 7 sub-programs aimed to achieve this goal)]=Average Annual Savings from Reduction in Fuel Costs associated with this program

e. BWI Energy Efficiency

- i. 2,548,958,000 kg [(2,578,958 metric tons Total Potential Airport Emissions Annually from BWI * 1000)]=Conversion of Reduction into kilograms
- ii. 286,078,339 gallons [(2,548,958,000 kilograms Conversion of Reduction into kilograms / 8.91)]=Conversion of Reduction into gallons of gas
- iii. \$981,248,702.58 [(286,078,339 gallons Conversion of Reduction into gallons of gas * \$3.43 Average Cost of gallon of gas)]=Annual Savings Emissions Reductions from All Airport Initiatives in Fuel Costs
- iv. 332 – \$2,385,683.76 [(\$981,248,702.58 Annual Savings Emissions Reductions from All Airport Initiatives in Fuel Costs / 7 sub-programs aimed to achieve this goal)]=Average Annual Savings from Reduction in Fuel Costs associated with this program

f. Enhanced Access to BWI by Other Travel Modes

- i. 2,548,958,000 kg [(2,578,958 metric tons Total Potential Airport Emissions Annually from BWI * 1000)]=Conversion of Reduction into kilograms
- ii. 286,078,339 gallons [(2,548,958,000 kilograms Conversion of Reduction into kilograms / 8.91)]=Conversion of Reduction into gallons of gas
- iii. \$981,248,702.58 [(286,078,339 gallons Conversion of Reduction into gallons of gas * \$3.43 Average Cost of gallon of gas)]=Annual Savings Emissions Reductions from All Airport Initiatives in Fuel Costs
- iv. 332 – \$2,385,683.76 [(\$981,248,702.58 Annual Savings Emissions Reductions from All Airport Initiatives in Fuel Costs / 7 sub-programs aimed to achieve this goal)]=Average Annual Savings from Reduction in Fuel Costs associated with this program



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- g. BWI's Periodic Air Quality Assessments**
 - i. 2,548,958,000 kg [(2,578,958 metric tons Total Potential Airport Emissions Annually from BWI * 1000)]=Conversion of Reduction into kilograms
 - ii. 286,078,339 gallons [(2,548,958,000 kilograms Conversion of Reduction into kilograms / 8.91)]=Conversion of Reduction into gallons of gas
 - iii. \$981,248,702.58 [(286,078,339 gallons Conversion of Reduction into gallons of gas * \$3.43 Average Cost of gallon of gas)]=Annual Savings Emissions Reductions from All Airport Initiatives in Fuel Costs
 - iv. 332 – \$2,385,683.76 [(\$981,248,702.58 Annual Savings Emissions Reductions from All Airport Initiatives in Fuel Costs / 7 sub-programs aimed to achieve this goal)]=Average Annual Savings from Reduction in Fuel Costs associated with this program
- 5. Input savings by sector into IMPLAN model and run impacts.
 - a. Household savings inputs were distributed among household income ranges using household income distribution percentages taken from the Census' 2005-2009 American Community Survey 5-Year estimates for Maryland. (Note: In some cases, totals do not add up to 100.0 percent due to margin of error.)
- 6. Export impacts and analyze.

3.2.15 Port Initiatives

Investment Phase

- 1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. Port of Baltimore Initiatives**
 - i. 207—Other industrial machinery manufacturing
 - ii. 277—Light truck and utility vehicle manufacturing
 - iii. 278—Heavy duty truck manufacturing
 - iv. 283—Motor vehicle parts manufacturing
 - v. 294—All other transportation equipment manufacturing
 - vi. 319—Wholesale trade businesses
 - vii. 369—Architectural, engineering, and related services
 - viii. 375—Environmental and other technical consulting services
 - ix. 432—Other state and local government enterprises
- 2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. Port of Baltimore Initiatives**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
- 3. Distribute inputs among identified IMPLAN sectors.
 - a. Port of Baltimore Initiatives**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$112,500 each
- 4. Input sales by sector into IMPLAN model and run impacts.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. Port of Baltimore Initiatives**
 - i. 334—Transport by water
 - ii. 335—Transport by truck
2. Determine part of program to be affected by savings (from 6.2.11 write-up).
 - a. Port of Baltimore Initiatives**
 - i. Retrofit tire gantry cranes with Diesel Oxidation Catalysts
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. Port of Baltimore Initiatives**
 - i. Total Tire Gantry Cranes to be Retrofitted¹⁸⁸—12 tire gantry cranes
 - ii. Average cost of Diesel Oxidation Catalysts Retrofit¹⁸⁹—\$1,200.00 per retrofitted vehicle
 - iii. Reductions resulting from DOC retrofit¹⁹⁰—20% air particles
 - iv. Fees associated with Title V Permit for emissions¹⁹¹—\$52.23 per ton + \$200 base fee
 - v. Useful Life of a Rubber Tire Gantry¹⁹²—19 years per RTG
 - vi. Emissions from Rubber Tire Gantry (average annually)¹⁹³—875 tons of pollutants per RTG
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. Port of Baltimore Initiatives**
 - i. $\$757.89 [(12 \text{ tire gantry cranes} * \$1,200.00 \text{ per retrofitted vehicle}) / [(19 \text{ number of useful years})]=\text{annual cost incurred per retrofit of RTGs}$
 - ii. $\$548,615.00 [(875 \text{ tons of pollutants from RTGs on average a year} * \$52.23 \text{ per ton})] + \{(\$200.00 \text{ base fee of Title V permit}) * [(12 \text{ cranes in operation at Seagrit})]=\text{annual average cost of permit from RTGs}$

¹⁸⁸ Port of Baltimore. 2009. Ports America - Home. PortsAmerica.com 11 Nov. 2011

<<http://www.portsamerica.com/baltimore-maryland.html>>.

¹⁸⁹ "U.S. EPA Sensitive Population Grant for the City of Baltimore and the City of Annapolis (Fire Trucks and Ambulances)." Maryland Department of the Environment (MDE). 14 Nov. 2011

<http://www.mde.state.md.us/programs/Air/MobileSources/DieselVehicleInformation/DieselRetrofitProjects/Pages/balto_annapcity_retrofit.aspx>.

¹⁹⁰ Green Port of Baltimore. Air Quality. Maryland Department of Transportation; Port Administration. 11 Nov. 2011 <<http://mpa.maryland.gov/content/air-quality.php>>.

¹⁹¹ MARC Parking Details | Maryland Transit Administration. Home | Maryland Transit Administration. Nov. 2011. Maryland Transit Administration (MTA). 14 Nov. 2011 <<http://mta.maryland.gov/marc-parking-details>>.

¹⁹² Starcrest Consulting Group, LLC. "Rubber Tired Gantry (RTG) Crane Load Factor Study." Nov. 2009. Port of Los Angeles; Port of Long Beach. 14 Nov. 2011

<<http://www.polb.com/civica/filebank/blobload.asp?BlobID=6915>>.

¹⁹³ New Hybrid Crane to Reduce the Carbon Footprint. About MAERSK. 31 March 2011. MAERSK. 11 Nov. 2011. <<http://www.maersk.com/AboutMaersk/News/Pages/20110331-154630.aspx>>.



Regional Economic Studies Institute

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- iii. $8,400 [(875 \text{ tons of pollutants from RTGs on average a year} * 20\% \text{ reduction in RTG pollution due to retrofit} * 12 \text{ cranes})]=\text{average reduction in tons of air pollutants from DOC retrofit}$
 - iv. $\$439,489.89 [((8,400 \text{ tons on average of air pollutants from RTG retrofitted} * \$52.23 \text{ per ton of pollutant}) + \$200.00 \text{ base fee of permit})]=\text{average annual cost of permit after retrofitting of twelve cranes}$
 - v. $\$440,247.79 [(\$438,732.00 \text{ average cost of new permit after retrofit} + \$63.16 \text{ per crane for cost of retrofit annually})]=\text{average annual cost of reduction in emissions}$
 - vi. $\$108,367.21 [(\$548,615.00 \text{ before retrofit permit costs} - \$440,247.79 \text{ average annual costs (permit and depreciating costs of retrofit)})]=\text{annual savings to industry}$
5. Input savings by sector into IMPLAN model and run impacts.
 - a. Household savings inputs were distributed among household income ranges using household income distribution percentages taken from the Census' 2005-2009 American Community Survey 5-Year estimates for Maryland. (Note: In some cases, totals do not add up to 100.0 percent due to margin of error.)
 6. Export impacts and analyze.

3.2.16 Freight and Freight Rail Strategies

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **Auxiliary Power Units for Existing Locomotives**
 - i. 225—Other engine equipment manufacturing
 - ii. 294—All other transportation equipment manufacturing
 - iii. 319—Wholesale trade businesses
 - iv. 336—Transit and ground passenger transportation
 - v. 338—Scenic and sightseeing transportation and support activities
 - vi. 375—Environmental and other technical consulting services
 - vii. 417—Commercial and industrial machinery and equipment repair
 - viii. 432—Other state and local government enterprises
 - b. **Technology Advances for Non-highway Vehicles**
 - i. 225—Other engine equipment manufacturing
 - ii. 294—All other transportation equipment manufacturing
 - iii. 319—Wholesale trade businesses
 - iv. 336—Transit and ground passenger transportation
 - v. 338—Scenic and sightseeing transportation and support activities
 - vi. 375—Environmental and other technical consulting services
 - vii. 377—Advertising and related services
 - viii. 417—Commercial and industrial machinery and equipment repair
 - ix. 432—Other state and local government enterprises



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan Final Draft

RESI of Towson University

2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **Auxiliary Power Units for Existing Locomotives**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - b. **Technology Advances for Non-highway Vehicles**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. **Auxiliary Power Units for Existing Locomotives**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$128,571 each
 - b. **Technology Advances for Non-highway Vehicles**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$112,500
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file). (Note: IMPLAN code 336 (Transit and ground passenger transportation) has been changed to 432 (Other state and local government enterprises) in all instances due to the state/local government overseeing MARC operations via MTA.)
 - a. **Auxiliary Power Units for Existing Locomotives**
 - i. 333—Transport by rail
 - ii. 336—Transit and ground passenger transportation
 - iii. 338—Scenic and sightseeing transportation and support activities
 - b. **Technology Advances for Non-highway Vehicles**
 - i. 333—Transport by rail
 - ii. 336—Transit and ground passenger transportation
 - iii. 338—Scenic and sightseeing transportation and support activities
2. Determine part of program to be affected by savings (from 6.2.3 write-up).
 - a. **Auxiliary Power Units for Existing Locomotives**
 - b. **Technology Advances for Non-highway Vehicles**
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Auxiliary Power Units for Existing Locomotives**
 - i. Marginal Savings per Year¹⁹⁴=\$1,339
 - ii. Number of Locomotives with CSX¹⁹⁵=20

¹⁹⁴ Truck and Locomotive Idling Solutions. South East Diesel Collaborative, 25 June 2008. Web. 14 Nov. 2011. <<http://www.southeastdiesel.org/Presentations%20for%203rd%20Annual%20Meeting/Day%202/Idle%20Reduct%20Tech-%20anthony%20erb.pdf>>.

¹⁹⁵ Fuel Efficiency. CSX Corporation. Web. 11 Nov. 2011.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

b. Technology Advances for Non-highway Vehicles

- i. Avg. Contribution in 2006 of CO₂ Emissions from US¹⁹⁶=55,400,000 tons
 - ii. Avg. Rail Miles in the US¹⁹⁷=140,000
 - iii. Avg. Rail Miles in Maryland¹⁹⁸=759
 - iv. Avg. Potential Fuel Reduction of Elect Loco¹⁹⁹=0.625
 - v. Average Reduction of Emissions from Program – 30%
 - vi. Avg. Cost of a gallon of gas in MD=\$3.43 per gallon
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).

a. Auxiliary Power Units for Existing Locomotives

- i. \$26,780 [(\$1,339 Marginal Savings per Year * 20Number of Locomotives with CSX)]=Average Annual Savings Associated with this program
- ii. \$8,926.67 [(\$26,780 Average Annual Savings Associated with this Program / 3 sub-programs within)]
- iii. 333 – \$8,926.67
- iv. 336 – \$8,926.67
- v. 338 – \$8,926.67

b. Technology Advances for Non-highway Vehicles

- i. 396 tons [(55,400,000 Average Contribution in 2006 of CO₂ Emissions from US in tons / 140,000 Average Rail Miles in the US)]=Average Carbon Emissions per Rail Mile
- ii. 300,347 metric tons [(759 Average Rail Miles in Maryland * 396 metric ton Average Carbon Emissions Per Rail Mile)]=Average Potential Contribution from Maryland Rails
- iii. Conversion of previous CO₂ emissions in gallons of fuel
 1. 300,347,142.9 [(300,347 metric tons Average Potential Contribution from MD Rails * 1000)]=Conversion of Emissions Contribution from MD Rails to kilograms
 2. 33,708,994.71 gallons [(300,347,142.90 kg Conversion of Emissions Contribution from MD Rails to kilograms / 8.91)]=Conversion of Emissions Contribution from MD rails into gallons of gas

< <http://www.csx.com/index.cfm/about-csx/projects-and-partnerships/fuel-efficiency/>>.

¹⁹⁶ Pathways to Reduced Transportation CO₂ in the Year 2050. Cornell University. 11 Nov. 2011

<<http://www.cee.cornell.edu/academics/graduate/loader.cfm?csModule=security/getfile&PageID=84226>>.

¹⁹⁷ Rail Track Mileage and Number of Class I Rail Carriers, United States, 1830-2008. The Geography of Transport Systems. Web. 14 Nov. 2011.

< <http://people.hofstra.edu/geotrans/eng/ch3en/conc3en/usrail18402003.html>>.

¹⁹⁸ Freight Railroads in Maryland. Association of American Railroads. 2009. Web. 11 Nov. 2011.

< <http://www.aar.org/Railroads-States/Maryland-2009.pdf>>.

¹⁹⁹ Pathways to Reduced Transportation CO₂ in the Year 2050. Cornell University. 11 Nov. 2011

<<http://www.cee.cornell.edu/academics/graduate/loader.cfm?csModule=security/getfile&PageID=84226>>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3. $\$115,621,851.85 [(33,708,994.71 \text{ gallons Conversion of Emissions Contribution from MD rails into gallons of gas} * \$3.43 \text{ Average Cost of a gallon of gas in MD)}]=\text{Average Cost of Emissions Contribution from MD Rails in Cost of Gas}$
- iv. 90,104.14 [(300,347 Average Potential Contribution from MD Rails * 30% Reduction in CO2 Emissions)]=Average Annual Reduction from MD Rails in Emissions from Program
- v. 10,112,698 [(90,104.14 Average Annual Reduction from MD Rails in
- vi. $\$34,686,555.56 [(10,112,698 \text{ Conversion of Average Annual Reduction from MD Rails in Gallons of Gas} * \$3.43 \text{ Average Cost of a gallon of gas)}]=\text{Average Annual savings Associated with program}$
- vii. Split Savings over 3 IMPLAN sectors= $\$11,562,185.19$
- viii. 333 – $\$11,562,185.19$
- ix. 336 – $\$11,562,185.19$
- x. 338 – $\$11,562,185.19$
5. Input savings by sector into IMPLAN model and run impacts.
 - a. Household savings inputs were distributed among household income ranges using household income distribution percentages taken from the Census' 2005-2009 American Community Survey 5-Year estimates for Maryland. (Note: In some cases, totals do not add up to 100.0 percent due to margin of error.)
6. Export impacts and analyze.

3.2.17 Federal Renewable Fuel Standard

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. Federal Renewable Fuel Standard**
 - i. 20—Extraction of oil and natural gas
 - ii. 28—Drilling oil and gas wells
 - iii. 29—Support activities for oil and gas operations
 - iv. 381—Management of companies and enterprises
 - v. 375—Environmental and other technical consulting services
 - vi. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. Federal Renewable Fuel Standard**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. Federal Renewable Fuel Standard**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$180,000 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file). (Note: IMPLAN code 336 (Transit and ground passenger transportation) has been changed to 432 (Other state and local government enterprises) in all instances due to the state/local government overseeing MARC operations via MTA.)
 - a. **Federal Renewable Fuel Standard**
 - i. 10001 – 10009 —Households – all income levels
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **Federal Renewable Fuel Standard**
 - i. Reduction=240,000 metric tons (.24*1,000,000)
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Federal Renewable Fuel Standard**
 - i. Cost of Avg. Gallon of Gas=\$3.43 per gallon
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **Federal Renewable Fuel Standard**
 - i. $240,000,000 [(240,000 \text{ metric tons in GHG reduction} * 1000)] =$ Conversion of reduction to kilograms
 - ii. $26,936,026.94 [(240,000,000 \text{ kg in GHG reductions} / 8.91)] =$ Conversion of reduction to Gallons of Gas
 - iii. $\$92,390,572.39 [(\$3.43 \text{ Cost of Avg. Gallon of Gas} * 26,936,026.94 \text{ Estimated GHG Reductions from Policy in Gallons of Gas})] =$ Average 1 Savings in GHG Reductions through Gallons of Gas
 - iv. 10001-10009 – Households - $\$11,548,821.55 (\$92,390,572.39 \text{ Average Savings in GHG Reductions through Gallons of Gas} / 8 \text{ years remaining in project completion date 2020}) =$ Average Annual Savings across Households
5. Input savings by sector into IMPLAN model and run impacts.
 - a. Household savings inputs were distributed among household income ranges using household income distribution percentages taken from the Census' 2005-2009 American Community Survey 5-Year estimates for Maryland. (Note: In some cases, totals do not add up to 100.0 percent due to margin of error.)
6. Export impacts and analyze.

3.2.18 Café Standards: Model Years 2008-2011**Investment Phase**

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **Café Standards: Model Years 2008-2011**
 - i. 20—Extraction of oil and natural gas
 - ii. 28—Drilling oil and gas wells
 - iii. 29—Support activities for oil and gas operations
 - iv. 31—Electric power generation, transmission, and distribution

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

- v. 276—Automobile manufacturing
 - vi. 283—Motor vehicle parts manufacturing
 - vii. 326—Retail stores – Gasoline Stations
 - viii. 375—Environmental and other technical services consulting
 - ix. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **Café Standards: Model Years 2008-2011**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 3. Distribute inputs among identified IMPLAN sectors.
 - a. **Café Standards: Model Years 2008-2011**
 - i. 100% from industries in automobile production to comply with new standards—(\$500,000) each
 - ii. 10% for government administrative costs/responsibilities—\$100,000
 - iii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$150,000 each
 4. Input sales by sector into IMPLAN model and run impacts.
 5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file). (Note: IMPLAN code 336 (Transit and ground passenger transportation) has been changed to 432 (Other state and local government enterprises) in all instances due to the state/local government overseeing MARC operations via MTA.)
 - a. **Café Standards: Model Years 2008-2011**
 - i. 10001-10009—Households – All income levels
2. Determine part of program to be affected by savings (from 6.2.6 write-up).
 - a. **Café Standards: Model Years 2008-2011**
 - i. Raise MPG standards for all new light vehicles to 27.5 mpg by 2011
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Café Standards: Model Years 2008-2011**
 - i. By 2011 New MPG²⁰⁰=27.3 mpg
 - ii. Average Annual Miles Driven By Population²⁰¹=13,041
 - iii. Avg. Price of Gas=\$3.43
 - iv. Previous Ruling on CAFÉ Standards²⁰²=22.5 mpg
 - v. Average Annual Miles Driven By Population²⁰³=13,041

²⁰⁰ "Average Fuel Economy Standards for Light Trucks." Department of Transportation. 14 Nov. 2011
<<http://www.nhtsa.gov/DOT/NHTSA/Rulemaking/Rules/Associated%20Files/2006FinalRule.pdf>>

²⁰¹ "State & Urbanized Area Statistics - Our Nation's Highways - 2000." Home | Federal Highway Administration. 4 Apr. 2011. Federal Highway Administration (FHWA). 11 Nov. 2011
<<http://www.fhwa.dot.gov/ohim/onh00/onh2p11.htm>>.

²⁰² "Average Fuel Economy Standards for Light Trucks." Department of Transportation. 14 Nov. 2011
<<http://www.nhtsa.gov/DOT/NHTSA/Rulemaking/Rules/Associated%20Files/2006FinalRule.pdf>>

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- vi. New Vehicle Registrations in MD=2,700 courtesy of MVA
- 4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **Café Standards: Model Years 2008-2011s**
 - i. $477.7 [(27.3 \text{ mpg By 2011 New MPG} / 13,041 \text{ Average Annual Miles Driven By Population})] = \text{Average Annual Gallons of Gas Used under New CAFE}$
 - ii. $\$1,638.484615 (477.7 \text{ Average Annual Gallons of Gas Used} * \$3.43 \text{ Avg. Price of Gas})] = \text{Average Cost to MD Driver Under New CAFE}$
 - iii. $579.6 [(13,041 \text{ Average Annual Miles Driven By Population} / 22.5 \text{ mpg Previous Ruling on CAFÉ Standards})] = \text{Average Annual Gallons of Gas Used Under Old CAFE}$
 - iv. $\$1,988.028 [(579.6 \text{ Annual Gallons of Gas Used Under old CAFÉ} * \$3.43 \text{ average price of gas})] = \text{Cost to Drivers Today Under Old CAFE}$
 - v. $10001 - 10009 \text{ Households} - \text{All income levels} - \$943,767.14 [(\$1,988.03 \text{ Cost to Drivers Today Under Old CAFÉ} - 1,638.48 \text{ Cost to Drivers Today Under New CAFÉ Standards} * 2,700 \text{ New Vehicle Registrations Annually in MD})] = \text{Annual Savings From New CAFÉ Standards}$
- 5. Input savings by sector into IMPLAN model and run impacts.
- 6. Export impacts and analyze.

3.2.19 Electric Vehicles Infrastructure

Investment Phase

- 1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **Electric Vehicle Infrastructure Program**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 36—Construction of other new nonresidential structures
 - iii. 294—All other transportation equipment manufacturing
 - iv. 369—Architectural, engineering, and related services
 - v. 375—Environmental and other technical consulting services
 - vi. 432—Other state and local government enterprises
 - b. **Maryland Hybrid Truck Goods Movement Initiative**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 36—Construction of other new nonresidential structures
 - iii. 294—All other transportation equipment manufacturing
 - iv. 369—Architectural, engineering, and related services
 - v. 375—Environmental and other technical consulting services
 - vi. 432—Other state and local government enterprises

²⁰³ Ibid.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **Electric Vehicle Infrastructure Program**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - b. **Maryland Hybrid Truck Goods Movement Initiative**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. **Electric Vehicle Infrastructure Program**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$180,000 each
 - b. **Maryland Hybrid Truck Goods Movement Initiative**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$180,000 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file). (Note: IMPLAN code 336 (Transit and ground passenger transportation) has been changed to 432 (Other state and local government enterprises) in all instances due to the state/local government overseeing MARC operations via MTA.)
 - a. **Electric Vehicle Infrastructure Program**
 - i. 10001-10009—Households – All income levels
 - b. **Maryland Hybrid Truck Goods Movement Initiative**
 - i. 335—Transport by truck
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **Electric Vehicle Infrastructure Program**
 - b. **Maryland Hybrid Truck Goods Movement Initiative**
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Electric Vehicle Infrastructure Program**
 - i. Total Hybrids registered in Maryland=10,874 (MDOT provided)
 - ii. Average Annual Savings to Drive an EV (from 3.2.11)=\$1,520.73
 - b. **Maryland Hybrid Truck Goods Movement Initiative**
 - i. Reduction in Diesel Fuel from Purchase²⁰⁴=138,420
 - ii. Cost of Diesel Fuel²⁰⁵=3.89
 - iii. Total Savings from Program=\$538,453.80

²⁰⁴ Project Benefits. Maryland Hybrid Truck Initiative (MHTI) a U.S. DOE Clean Cities project. 14 Nov. 2011 <<http://www.marylandhti.com/project-benefits/>>.

²⁰⁵ Lowest Diesel Fuel Prices in the Last 24 Hours. Maryland Gas Prices - Find Cheap Gas Prices in Maryland. 2011. Web. 14 Nov. 2011. <<http://www.marylandgasprices.com/index.aspx?fuel=D>>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **Electric Vehicle Infrastructure Program**
 - i. 10001 - 10009 -- \$16,536,361.76 [(10,874 Total Hybrids Registered in Maryland * \$1,520.73 Average Annual Savings to Drive an EV)]=Average Savings to all Hybrid Owners in Maryland
 - b. **Maryland Hybrid Truck Goods Movement Initiative**
 - i. 335 – \$538,453.80 [(138,420 gallons Reduction in Diesel Fuel from Purchase * \$3.89 Average Cost of Diesel Fuel Per gallon)]=Average Savings Associated with Purchase
5. Input savings by sector into IMPLAN model and run impacts.
 - a. Household savings inputs were distributed among household income ranges using household income distribution percentages taken from the Census' 2005-2009 American Community Survey 5-Year estimates for Maryland. (Note: In some cases, totals do not add up to 100.0 percent due to margin of error.)
6. Export impacts and analyze.

3.2.20 Pay-as-You-Drive (PAYD) Insurance

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **Voluntary Efforts to Promote Pay as Your Drive Insurance**
 - i. 357—Insurance carriers
 - ii. 358—Insurance agencies, brokerages, and relate agencies
 - iii. 375—Environmental and other technical consulting services
 - iv. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **Voluntary Efforts to Promote Pay as Your Drive Insurance**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. **Voluntary Efforts to Promote Pay as Your Drive Insurance**
 - i. 100% paid by insurance carriers and brokers to promote Pay as You Drive--\$500,000 each
 - ii. 10% for government administrative costs/responsibilities—\$100,000
 - iii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$900,000
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. **Voluntary Efforts to Promote Pay as Your Drive Insurance**
 - i. 10001-10009—Households – All income levels
2. Determine part of program to be affected by savings (strategy write-up).
 - a. **Voluntary Efforts to Promote Pay as Your Drive Insurance**
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Voluntary Efforts to Promote Pay as Your Drive Insurance**
 - i. Average Annual Miles – 13,041
 - ii. Average Annual Premium MD ²⁰⁶ – \$922
 - iii. Current price of a gallon of gas – \$3.43
 - iv. Number of Drivers in MD 65 and up – 523,839
 - v. Gallons used per vehicle – 751 gallons annually
 - vi. State Average MPG – 17.36 mpg
 - vii. MAIF Market Share – 1.36%
 - viii. Avg. of Top Five Market Share – 2.75%
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **Voluntary Efforts to Promote Pay as Your Drive Insurance**
 - i. $\$0.07$ [(922 Average Annual Premium MD / 13,041 Average Annual Miles)] = average premium paid per mile
 - ii. $\$110$ [((50 + 70) / 2)] = Average cost of PAYD device
 - iii. $\$2,575.93$ [(751 Gallons used per vehicle * \$3.43 Current price of a gallon of gas)] = Average cost of gallons purchased
 - iv. $\$0.20$ [(\$2,575.93 Average cost of gallons purchased / 13,041 Average Annual Miles)] = Average cost of gallons per mile
 - v. $\$3,497.93$ [(13,041 Average Annual Miles * (0.20 Average cost of gallons per mile + \$0.07 average premium paid per mile))] = Premium Paid up to 13,000 miles under PAYD for Average Driver
 - vi. $\$3,498.20$ [(13,042 Average Annual Miles * (0.20 Average cost of gallons per mile + \$0.07 average premium paid per mile))] = Premium Paid after 13,000 miles under PAYD for Average Driver
 - vii. $\$0.27$ [(\$3,498.20 < 13,000 miles - \$3,497.93 => 13,000 miles)] = Difference paid per mile after and before 13,000 (benefit to PAYD is for driver driving less than 13,000 miles a year)
 - viii. $\$24,919,989.28$ [(523,839 Maryland Licensed Drivers 65 and Older * 1.36% MAIF Market Share * 13,041 Average Annual Miles * \$0.27)] = Marginal Cost to drive at annual rates under PAYD for Potential MAIF Market Share of Older Drivers

²⁰⁶ Auto Insurance. Insurance Information Institute. U.S. Department of Labor, Bureau of Labor Statistics; National Association of Realtors, 2011. Web. 11 Nov. 2011. <<http://www.iii.org/media/facts/statsbyissue/auto/>>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- ix. $\$24,301,757.24 [(523,839 \text{ Maryland Licensed Drivers } 65 \text{ and Older} * 1.36\% \text{ MAIF Market Share} * 12,720 * \$0.27)] = \text{Marginal cost to drive at optimum mileage under PAYD}$
 - x. $\$618,232.05 [(\$24,919,989.28 \text{ Marginal Cost to drive at annual} - \$24,301,757.24 \text{ Marginal cost to drive at optimum})] = \text{Total Savings for PAYD if driving at only optimum for Voluntary Switch to PAYD}$
 - xi. $\$50,298,066.61 [(523,839 \text{ Maryland Licensed Drivers } 65 \text{ and Older} * 2.75\% \text{ Private Market Share} * 13,041 \text{ Average Annual Miles} * \$0.27)] = \text{Marginal Cost to drive at annual rates under PAYD for Potential Avg. Top Five Market Share of Older Drivers}$
 - xii. $\$49,050,006.54 [(523,839 \text{ Maryland Licensed Drivers } 65 \text{ and Older} * 2.75\% \text{ Private Market Share} * 12,720 * \$0.27)] = \text{Marginal cost to drive at optimum mileage under PAYD for Potential Market Share of Top Five}$
 - xiii. $\$1,248,060.07 [(\$50,298,066.61 \text{ Marginal Cost to drive at annual} - \$49,050,006.54 \text{ Marginal cost to drive at optimum})] = \text{Total Savings for PAYD if driving at only optimum for Private Sector Encouragement to switch to PAYD}$
 - xiv. 10001 – 10009 – $\$1,866,292.12 \text{ Total Savings for All Drivers } 65 \text{ and over in MD for switching to PAYD}$
5. Input savings by sector into IMPLAN model and run impacts.
 - a. Household savings inputs were distributed among household income ranges using household income distribution percentages taken from the Census' 2005-2009 American Community Survey 5-Year estimates for Maryland. (Note: In some cases, totals do not add up to 100.0 percent due to margin of error.)
 6. Export impacts and analyze.

C.3 Agriculture and Forestry

3.3.1 Managing Forests to Capture Carbon

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **Managing Forests to Capture Carbon**
 - i. 15—Forestry, forest products, and timber tract production
 - ii. 16—Commercial logging
 - iii. 19—Support activities for agriculture and forestry
 - iv. 95—Sawmills and wood preservation
 - v. 375—Environmental and other technical consulting services
 - vi. 424—Grantmaking, giving, and social advocacy organizations
 - vii. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **Managing Forests to Capture Carbon**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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3. Distribute inputs among identified IMPLAN sectors.
 - a. Managing Forests to Capture Carbon**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$150,000 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. Managing Forests to Capture Carbon**
 - i. 381—Management of companies and enterprises
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. Managing Forests to Capture Carbon**
 - i. Contribution to GDP per Acre=\$478
 - ii. Number of acres to be planted=30,000
 - iii. Acres planted thus far=12,618
 - iv. Total acres left=17,382 (number of acres planted- acres planted thus far)
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. Managing Forests to Capture Carbon**
 - i. Annual acres of trees planted per year=2,173
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. Managing Forests to Capture Carbon**
 - i. $\$8,308,596 - [(\$478 \text{ Contribution to GDP per Acre} * 17,382 \text{ Number of Acres to Planted})] = \text{Average Annual Contribution to GDP for Acres Left to Plant}$
 - ii. $381 - \$1,038,575 [(\$8,308,596 \text{ Average Annual Contribution to GDP for Acres Left to Plant} / 8 \text{ years left until 2020})] = \text{Average Annual Contribution to GDP over remainder of project}$
5. Input savings by sector into IMPLAN model and run impacts.
6. Export impacts and analyze.

3.3.2 Creating Ecosystem Markets to Encourage GHG Emissions Reductions

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. Wetland Markets**
 - i. 19—Support activities for agriculture and forestry
 - ii. 33—Water, sewage and other treatment and delivery
 - iii. 36—Construction of other new nonresidential structures
 - iv. 39—Maintenance & repair construction of nonresidential structures



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- v. 375—Environmental and other technical consulting services
- vi. 381—Management of companies and other enterprises
- vii. 432—Other state and local government enterprises

b. Stream and Waterway Markets

- i. 19—Support activities for agriculture and forestry
- ii. 33—Water, sewage and other treatment and delivery
- iii. 36—Construction of other new nonresidential structures
- iv. 39—Maintenance & repair construction of nonresidential structures
- v. 369—Architectural, engineering, and related services
- vi. 375—Environmental and other technical consulting services
- vii. 381—Management of companies and other enterprises
- viii. 432—Other state and local government enterprises

c. Forest Markets

- i. 6—Greenhouse, nursery, and floriculture production
- ii. 15—Forestry, forest products, and timber tract production
- iii. 19—Support activities for agriculture and forestry
- iv. 36—Construction of other new nonresidential structures
- v. 39—Maintenance & repair construction of nonresidential structures
- vi. 369—Architectural, engineering, and related services
- vii. 375—Environmental and other technical consulting services
- viii. 381—Management of companies and other enterprises
- ix. 432—Other state and local government enterprises

d. Critical Area Markets

- i. 19—Support activities for agriculture and forestry
- ii. 33—Water, sewage and other treatment and delivery
- iii. 36—Construction of other new nonresidential structures
- iv. 39—Maintenance & repair construction of nonresidential structures
- v. 369—Architectural, engineering, and related services
- vi. 375—Environmental and other technical consulting services
- vii. 381—Management of companies and other enterprises
- viii. 432—Other state and local government enterprises

e. Species and Habitat Markets

- i. 6—Greenhouse, nursery, and floriculture production
- ii. 19—Support activities for agriculture and forestry
- iii. 36—Construction of other new nonresidential structures
- iv. 39—Maintenance & repair construction of nonresidential structures
- v. 369—Architectural, engineering, and related services
- vi. 375—Environmental and other technical consulting services
- vii. 381—Management of companies and other enterprises
- viii. 424—Grantmaking, giving, and social advocacy organizations
- ix. 432—Other state and local government enterprises

f. Nutrient Markets

- i. 19—Support activities for agriculture and forestry
- ii. 375—Environmental and other technical consulting services



Regional Economic Studies Institute

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- iii. 381—Management of companies and other enterprises
 - iv. 432—Other state and local government enterprises
 - g. Carbon Markets: RGGI and Maryland CO2 Budget Trading Program Offsets**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 375—Environmental and other technical consulting services
 - iii. 381—Management of companies and other enterprises
 - iv. 432—Other state and local government enterprises
 - h. Carbon Markets: GGRA of 2009 – Offsets and Early Reductions**
 - i. 31— Electric power generation, transmission, and distribution
 - ii. 375—Environmental and other technical consulting services
 - iii. 381—Management of companies and other enterprises
 - iv. 432—Other state and local government enterprises
 - i. Carbon Markets: GGRA of 2009 – Nutrient Trading with Carbon Co-benefits**
 - i. 375—Environmental and other technical consulting services
 - ii. 381—Management of companies and other enterprises
 - iii. 432—Other state and local government enterprises
 - j. Biomass Markets**
 - i. 15—Forestry, forest products, and timber tract production
 - ii. 19—Support activities for agriculture and forestry
 - iii. 31—Electric power generation, transmission, and distribution
 - iv. 36—Construction of other new nonresidential structures
 - v. 39—Maintenance & repair construction of nonresident structures
 - vi. 369—Architectural, engineering, and related services
 - vii. 375—Environmental and other technical consulting services
 - viii. 381— Management of companies and other enterprises
 - ix. 432—Other state and local government enterprises
- 2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. Wetland Markets**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - b. Stream and Waterway Markets**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - c. Forest Markets**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - d. Critical Area Markets**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - e. Species and Habitat Markets**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - f. Nutrient Markets**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- g. Carbon Markets: RGGI and Maryland CO2 Budget Trading Program Offsets**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - h. Carbon Markets: GGRA of 2009 – Offsets and Early Reductions**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - i. Carbon Markets: GGRA of 2009 – Nutrient Trading with Carbon Co-benefits**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - j. Biomass Markets**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
- a. Wetland Markets**
 - i. 100% from industries in compliance—(\$1,000,000)
 - ii. 10% for government administrative costs/responsibilities—\$100,000
 - iii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$180,000 each
 - b. Stream and Waterway Markets**
 - i. 100% from industries in compliance—(\$1,000,000)
 - ii. 10% for government administrative costs/responsibilities—\$100,000
 - iii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$150,000 each
 - c. Forest Markets**
 - i. 100% from industries in compliance—(\$1,000,000)
 - ii. 10% for government administrative costs/responsibilities—\$100,000
 - iii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$128,571 each
 - d. Critical Area Markets**
 - i. 100% from industries in compliance—(\$1,000,000)
 - ii. 10% for government administrative costs/responsibilities—\$100,000
 - iii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$150,000 each
 - e. Species and Habitat Markets**
 - i. 100% from industries in compliance—(\$1,000,000)
 - ii. 10% for government administrative costs/responsibilities—\$100,000
 - iii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$128,571 each
 - f. Nutrient Markets**
 - i. 100% from industries in compliance—(\$1,000,000)
 - ii. 10% for government administrative costs/responsibilities—\$100,000
 - iii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$450,000 each

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- g. Carbon Markets: RGGI and Maryland CO2 Budget Trading Program Offsets**
 - i. 100% from industries in compliance—(\$1,000,000)
 - ii. 10% for government administrative costs/responsibilities—\$100,000
 - iii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$450,000 each
 - h. Carbon Markets: GGRA of 2009 – Offsets and Early Reductions**
 - i. 100% from industries compliance—(\$1,000,000)
 - ii. 10% for government administrative costs/responsibilities—\$100,000
 - iii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$450,000 each
 - i. Carbon Markets: GGRA of 2009 – Nutrient Trading with Carbon Co-benefits**
 - i. 100% from industries in compliance—(\$1,000,000)
 - ii. 10% for government administrative costs/responsibilities—\$100,000
 - iii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$900,000
 - j. Biomass Markets**
 - i. 100% from industries in compliance—(\$1,000,000)
 - ii. 10% for government administrative costs/responsibilities—\$100,000
 - iii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$128,571 each
4. Input sales by sector into IMPLAN model and run impacts.
 5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. Wetland Markets**
 - i. 381—Management of companies and enterprises
 - b. Stream and Waterway Markets**
 - i. 381—Management of companies and enterprises
 - c. Forest Markets**
 - i. 381—Management of companies and enterprises
 - d. Critical Area Markets**
 - i. 381—Management of companies and enterprises
 - e. Species and Habitat Markets**
 - i. 381—Management of companies and enterprises
 - f. Nutrient Markets**
 - i. 381—Management of companies and enterprises
 - g. Carbon Markets: RGGI and Maryland CO2 Budget Trading Program Offsets**
 - i. 432—Other state and local government enterprises
 - h. Carbon Markets: GGRA of 2009 – Offsets and Early Reductions**
 - i. 381—Management of companies and enterprises



**Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft**

RESI of Towson University

- i. **Carbon Markets: GGRA of 2009 – Nutrient Trading with Carbon Co-benefits**
 - i. 381—Management of companies and enterprises
- j. **Biomass Markets**
 - i. 381—Management of companies and enterprises
- 2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **Wetland Markets**
 - i. Acres of Wetlands=45
 - b. **Stream and Waterway Markets**
 - c. **Forest Markets**
 - i. Contribution to GDP per 1 acre of Forest Land – \$478
 - d. **Critical Area Markets**
 - i. Contribution to GDP per 1 acre of Forest Land – \$478
 - e. **Species and Habitat Markets**
 - f. **Nutrient Markets**
 - g. **Carbon Markets: RGGI and Maryland CO2 Budget Trading Program Offsets**
 - i. Total allowances yearly by the state of Maryland for GHG—37,503,983 metric tons
 - ii. Number of years of auctions – 4 years
 - h. **Carbon Markets: GGRA of 2009 – Offsets and Early Reductions**
 - i. **Carbon Markets: GGRA of 2009 – Nutrient Trading with Carbon Co-benefits**
 - j. **Biomass Markets**
- 3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Wetland Markets**
 - i. Average Value of Wetland (1 acre)=\$175,000
 - b. **Stream and Waterway Markets**
 - i. Current Miles of Waterway=15,000
 - ii. Benefit to Healthy Waterway=\$568,000,000 (spent by fishers on equipment to fish in MD in 2008)
 - iii. Percentage of Streams Unhealthy=46%
 - c. **Forest Markets**
 - i. Average Acentage Lost a year²⁰⁷=7,000
 - d. **Critical Area Markets**
 - i. Total Critical Area Acres in MD=680,000 acres
 - ii. Cost of Buffer=\$2 per feet
 - iii. Intensely Developed Land=0.05

²⁰⁷ Ecosystem Services Working Group Final Report. Maryland Department of Natural Resources. Maryland Department of Natural Resources, Oct. 2011. Web. 14 Nov. 2011. <<http://www.dnr.state.md.us/dnrnews/pdfs/ESWGFfinalReportOct2011.pdf>>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

- e. Species and Habitat Markets**
 - i. Cost per acre of habitat area²⁰⁸=\$5,750 per acre
 - ii. Species of Wildlife²⁰⁹=167
 - iii. Plants²¹⁰=447
 - iv. Total Habitat Creatures/Plants=614
 - v. Assuming each species needs 45 acres=27,630 acres needed
- f. Nutrient Markets**
 - i. Total Potential Realization²¹¹=\$45,000,000.00
- g. Carbon Markets: RGGI and Maryland CO2 Budget Trading Program Offsets**
 - i. Total Proceeds to Date²¹²=\$169,600,423.80
 - ii. Number of Years=4
- h. Carbon Markets: GGRA of 2009 – Offsets and Early Reductions**
 - i. ERA Awardees 2009-2011²¹³
 - ii. AES Warriors Run=\$75,169
 - iii. Mirant Chalk Point=\$142,534
 - iv. Sum of Awarded CO2=\$217,703
 - v. Auction Price at Time of Award=2.19
- i. Carbon Markets: GGRA of 2009 – Nutrient Trading with Carbon Co-benefits**
 - i. **Assumption**-We will stack the benefits together and package
 - ii. 50% CO2 Credits=\$21,200,052.98 (50% reduced revenue)
 - iii. 50% Potential Nutrient Credit²¹⁴=\$22,500,000.00 (50% reduced revenue)
- j. Biomass Markets**
 - i. Annual Savings from 2015-2020=\$21,413,700.00 (from DNR)

²⁰⁸ Ecosystem Services Working Group Final Report. Maryland Department of Natural Resources. Maryland Department of Natural Resources, Oct. 2011. Web. 14 Nov. 2011.

<<http://www.dnr.state.md.us/dnrnews/pdfs/ESWGFinalReportOct2011.pdf>>.

²⁰⁹ Ibid.

²¹⁰ Ibid.

²¹¹ Jones, CY, Evan Branosky, Mindy Selman, and Michelle Perez. "How Nutrient Trading Could Help Restore the Chesapeake Bay." World Resource Institute. World Resource Institute, Feb. 2010. Web. 14 Nov. 2011.

<http://pdf.wri.org/working_papers/how_nutrient_trading_could_help_restore_the_chesapeake_bay.pdf>.

²¹² MD Proceeds by Auction. Regional Greenhouse Gas Initiative (RGGI) CO2 Budget Trading Program - Welcome. Regional Greenhouse Gas Initiative CO2 Budget Trading Program, 2011. Web. 14 Nov. 2011.

<http://rggi.org/docs/MD_Proceeds_by_Auction.pdf>.

²¹³ Early Reduction CO2 Allowance Awards. Regional Greenhouse Gas Initiative (RGGI) CO2 Budget Trading Program. Regional Greenhouse Gas Initiative (RGGI) CO2 Budget Trading Program, 18 Dec. 2009. Web. 16 Nov. 2011.

<http://www.rrgi.org/docs/md_proceeds_by_auction.pdf>.

²¹⁴ Jones, CY, Evan Branosky, Mindy Selman, and Michelle Perez. "How Nutrient Trading Could Help Restore the Chesapeake Bay." World Resource Institute. World Resource Institute, Feb. 2010. Web. 14 Nov. 2011.

<http://pdf.wri.org/working_papers/how_nutrient_trading_could_help_restore_the_chesapeake_bay.pdf>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **Wetland Markets**
 - i. $381 - \$7,875,000 [(45 \text{ acres of Wetlands to be restored} * \$175,000 \text{ value of an acre of wetland})]=\text{Average Savings from Restoration of 45 Acres of Wetlands}$
 - b. **Stream and Waterway Markets**
 - i. $381 - \$261,280,000 [(\$568,000,000 \text{ Annual Benefit attributed to Healthy Waterways} * 46\% \text{ Waterways unhealthy})]=\text{Current Loss of Savings, But Potential Realization of Savings if these Waterways are Brought from unhealthy to healthy}$
 - c. **Forest Markets**
 - i. $381 - \$3,346,000 [(7,000 \text{ acres of Forest Land Lost Annually} * \$478 \text{ Contribution to GDP of one acre of Forest Area})]=\text{Average Annual Savings of restoration of Forest Areas}$
 - d. **Critical Area Markets**
 - i. $34,000 \text{ acres} [(680,000 \text{ acres of Critical Area in MD} * 5\% \text{ Intensely Developed Land})]=\text{Total Acres of Intensely Developed Land in acres}$
 - ii. $8,851.38 \text{ square feet} [(\text{square root}(34,000 \text{ acres of Intensely Developed Land} * 43,560 \text{ sq feet per acre}) * 23\% \text{ of which may be buffer area})]=\text{Sq. Feet of Critical Areas that are Buffer Zone}$
 - iii. $\$17,702.77 [(8,851.38 \text{ sq feet of buffer area} * \$2.00 \text{ per sq feet})]=\text{Average Savings to Buffer Area}$
 - iv. $\$15,392,269.20 [(\$478 \text{ Total Contribution to GDP from Forest Acres} * 32,201.4 \text{ Acres of Woods})]=\text{Average Annual Savings from Rest of Critical Area}$
 - v. $381 - \$15,409,971.97 [(\$17,702.77 \text{ Average Savings to Buffer Area} + \$15,392,269.20 \text{ Average Annual Savings from Rest of Critical Area})]=\text{Average Annual Savings From Whole Critical Area}$
 - e. **Species and Habitat Markets**
 - i. $2,763 [(27,630 \text{ acres available} * 10\% \text{ sold a year})]=\text{Average Annual Acres Sold a Year}$
 - ii. $381 - \$15,887,250 [(2,763 \text{ acres} * \$5,750 \text{ Value of Habitat Area})]=\text{Average Revenue from Sale of Habitat Area}$
 - f. **Nutrient Markets**
 - i. $381 - \$45,000,000 [(\text{Potential Realization from DNR website})]$
 - g. **Carbon Markets: RGGI and Maryland CO2 Budget Trading Program Offsets**
 - i. $432 - \$42,400,105.95 [(\$169,600,423.80 \text{ Total Proceeds to Date} / 4 \text{ Years of Auctions to Date})]=\text{Average Annual Revenue from RGGI Auctions}$

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- h. Carbon Markets: GGRA of 2009 – Offsets and Early Reductions**
 - i. $217,703 \text{ ERAs} [(75,169 \text{ AES Warriors Run ERA} + 142,534 \text{ Mirant Chalk Point ERA})]=\text{Sum of ERAs Awarded thus Far}$
 - ii. $381 - \$476,769.57 [(217,703 \text{ Sum of ERAs Awarded thus Far} * \$2.19 \text{ Auction Prices at Time Of Award})]=\text{Average Savings to Awardees}$
 - i. Carbon Markets: GGRA of 2009 – Nutrient Trading with Carbon Co-benefits**
 - i. $381 - \$43,700,052.98 [(\$21,200,052.98 \text{ Potential Profits from CO}_2 \text{ Credit Sales} + \$22,500,000 \text{ Potential Profit from Nutrient Credit Sales})]=\text{Total Potential Revenue from the Bundle}$
 - j. Biomass Markets**
 - i. $381 - \$4,282,740.00 \text{ [(From DNR)]}$
5. Input savings by sector into IMPLAN model and run impacts.
 6. Export impacts and analyze.

3.3.3 Increasing Urban Trees to Capture Carbon

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. Increasing Urban Trees to Capture Carbon**
 - i. 6—Greenhouse, nursery, and floriculture production
 - ii. 33—Water, sewage and other treatment and delivery
 - iii. 319—Wholesale trade businesses
 - iv. 375—Environmental and other technical consulting services
 - v. 388—Services to buildings and dwellings
 - vi. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. Increasing Urban Trees to Capture Carbon**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. Increasing Urban Trees to Capture Carbon**
 - i. 100% from industries in electric production to purchase allowances—(\$1,000,000)
 - ii. 10% for government administrative costs/responsibilities—\$100,000
 - iii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$180,000 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. Increasing Urban Trees to Capture Carbon**
 - i. 381—Management of companies and enterprises



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

2. Determine part of program to be affected by savings (from strategy write-up).
 - a. Increasing Urban Trees to Capture Carbon**
 - i. Number of Trees to be planted=600,000
 - ii. Trees planted thus far=58,487
 - iii. Remaining Trees to Plant=541,513
 - iv. Number of years Left=8
 - v. Average Planting of Trees per year=67,689
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. Increasing Urban Trees to Capture Carbon**
 - i. Retail GDP for 2009²¹⁵=23,144,000,000
 - ii. Number of Retailers=65,489
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. Increasing Urban Trees to Capture Carbon**
 - i. \$2,430,120,000 per year – [(\$23,144,000,000.00 in Retail GDP 2009 * 10.5 percent contribution to retail sales from urban trees)] = Average Annual Contribution per retailer to GDP
 - ii. 541,513 trees left to be planted – [(600,000 trees to be planted by 2020 – 58,487 trees planted so far)] = number of trees left to be planted by 2020
 - iii. 67,689 trees on average to be planted per year – [541,513 trees left to be planted / 8 years left in program] = trees on average to be planted per year
 - iv. \$4,050.20 per tree contribution to retail GDP – [(\$2,430,120,000.00 contribution to GDP per year per retailer / 600,000 urban tree)] = average annual contribution to retail sales per tree
 - v. 381 – \$274,154,494.08 contribution annually of newly planted urban trees – [(\$4,050.20 * 67,689 average trees to be planted every year)]
5. Input savings by sector into IMPLAN model and run impacts.
6. Export impacts and analyze.

3.3.4 Creating and Protecting Wetlands and Waterway Borders to Capture

Carbon

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. Creating and Protecting Wetlands and Waterway Borders to Capture Carbon**
 - i. 19—Support activities for agriculture and forestry
 - ii. 33—Water, sewage and other treatment and delivery
 - iii. 36—Construction of other new nonresidential structures

²¹⁵ Maryland | Retail Means Jobs. Retail Means Jobs | Retail Supports 1 in 4 American Jobs | 42 Million Strong. PricewaterhouseCoopers LLP, July-Aug. 2011. Web. 11 Nov. 2011. <<http://www.retailmeansjobs.com/data/MD/0>>.



Regional Economic Studies Institute

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- iv. 39—Maintenance & repair construction of nonresidential structures
 - v. 95—Sawmills and wood preservation
 - vi. 127—Plastics material and resin manufacturing
 - vii. 375—Environmental and other technical consulting services
 - viii. 424—Grantmaking, giving, and social advocacy organizations
 - ix. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **Creating and Protecting Wetlands and Waterway Borders to Capture Carbon**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 3. Distribute inputs among identified IMPLAN sectors.
 - a. **Creating and Protecting Wetlands and Waterway Borders to Capture Carbon**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$112,500 each
 4. Input sales by sector into IMPLAN model and run impacts.
 5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. **Creating and Protecting Wetlands and Waterway Borders to Capture Carbon**
 - i. 10001 – 10009—Households – All income levels
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **Creating and Protecting Wetlands and Waterway Borders to Capture Carbon**
 - i. Wetlands Acres to Restore -16,678
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Creating and Protecting Wetlands and Waterway Borders to Capture Carbon**
 - i. Avg. Cost of Restoration per Acre²¹⁶=\$92,500
 - ii. Average Value of Wetland (1 acre)²¹⁷=\$175,000
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).

²¹⁶ “Wetlands Restoration/Constructed Wetlands.” Brookhaven National Laboratory. 14 Nov. 2011

<<http://www.bnl.gov/erd/peconic/factsheet/wetlands.pdf>>

²¹⁷ 5 Star Grant Program | Wetlands | Office of Wetlands, Oceans, and Watersheds | US EPA. US Environmental Protection Agency. EPA, 05 Mar. 2011. Web. 11 Nov. 2011. <<http://www.epa.gov/owow/wetlands/restore/5star/>>.



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- a. **Creating and Protecting Wetlands and Waterway Borders to Capture Carbon**
 - i. \$1,542,715,000 [(\$92,500 Avg. Cost of Restoration per Acre * 16,678 Wetlands Acres to Restore)] = Average Cost of Restoration for Whole Project
 - ii. \$2,918,650,000 [(\$175,000 Avg. Value of Restored Wetland per Acre * 16,678 Wetland Acres to Restore)] = Average Savings from Restored Wetlands
 - iii. \$1,375,935,000 [(\$2,918,650,000 Average Savings from Restored Wetlands - \$1,542,715,000 Average Cost of Restoration for Whole Project)] = Average Savings Associated with Proposed Restoration of Wetlands in this project
 - iv. 10001–10009 -- \$171,991,875 [(\$1,375,935,000 Average Savings Associated with Proposed Restoration of Wetlands in this project / 8 years for project to be completed)] = Average Annual Savings Associated with Restoration of Wetlands
5. Input savings by sector into IMPLAN model and run impacts.
6. Export impacts and analyze.

3.3.5 Geological Opportunities to Store Carbon

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **Geological Opportunities to Store Carbon**
 - i. 30—Support activities for other mining
 - ii. 369—Architectural, engineering, and related services
 - iii. 375—Environmental and other technical consulting services
 - iv. 376—Scientific research and development services
 - v. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **Geological Opportunities to Store Carbon**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. **Geological Opportunities to Store Carbon**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$225,000 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. **Geological Opportunities to Store Carbon**
 - i. 381—Management of companies and enterprises
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **Geological Opportunities to Store Carbon**
 - i. Target Waste Gate Formation 4.4 gigatonnes
 - ii. Target Needmore Shale 0.01 gigatonnes
 - iii. Target Oriskany Sandstone 0.981 gigatonnes
 - iv. Target Medina Sandstone 3.382 gigatonnes
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Geological Opportunities to Store Carbon**
 - i. Tonnes to Gallon Conversion=317.76
 - ii. Number of Gallons in a barrel=42
 - iii. Cost per Barrel ²¹⁸=101

Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).

- b. **Geological Opportunities to Store Carbon**
 - i. 8.773 gigatonnes (4.4 gigatonnes of waste gate formation + 0.01 gigatonnes of Needmore Shale + 0.981 gigatonnes + 3.382 gigatonnes of Medina Sandstone) = Total Target Gigatonnes
 - ii. 8,773,000,000 tonnes (8.773 total target in gigatonnes * 10⁹) = conversion from gigatonnes to tonnes
 - iii. 27,608,925.19 gallons of fuel (8,773,000,000 total target tonnes / 317.75 gallons associated with a tonne) = target reduction in gallons of fuel
 - iv. 657,355.36 barrels of oil (27,608,925.19 target reduction in gallons of fuel / 42 gallons to a barrel) = Average Reduction Target in Number of Barrels conserved
 - v. 381= \$66,392,891.54 (657,355.36 average reduction target in number of barrels conserved * \$101 per barrel) = average annual savings from reduction techniques associated with strategy
4. Input savings by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

3.3.6 Planting Forests in Maryland

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).

²¹⁸ “Petroleum and other Liquids.” U.S. Energy Information Agency. EIA. Gov Web. 16 Nov 2011 <
<http://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=RCLC1&f=D>>

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- a. **Planting Forests in Maryland**
 - i. 6—Greenhouse, nursery, and floriculture production
 - ii. 19—Support activities for agriculture and forestry
 - iii. 33—Water, sewage and other treatment and delivery
 - iv. 36—Construction of other new nonresidential structures
 - v. 39—Maintenance & repair construction of nonresidential structures
 - vi. 95—Sawmills and wood preservation
 - vii. 319—Wholesale trade businesses
 - viii. 375—Environmental and other technical consulting services
 - ix. 424—Grantmaking, giving, and social advocacy organizations
 - x. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **Planting Forests in Maryland**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. **Planting Forests in Maryland**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$100,000 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. **Planting Forests in Maryland**
 - i. 10001 – 10009—Households – All income levels
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **Planting Forests in Maryland**
 - i. Number of Acres planted by 2020=36,400
 - ii. Contribution to GDP per acre=\$478 annually
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Planting Forests in Maryland**
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **Planting Forests in Maryland**
 - i. $\$17,399,200$ ($\$478.00$ contribution to GDP per acre annually * 36,400 number of acres planted by 2020) = Total Contribution to GDP annually after all acres are planted
 - ii. 10001 – 10009 - $\$2,174,900$ ($\$17,399,200$ Total Contribution to GDP annually after all acres are planted by 2020 / 8 years until completion) = Average Annual Savings
5. Input savings by sector into IMPLAN model and run impacts.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

6. Export impacts and analyze.

3.3.7 Expanded Use of Forests and Feedstocks for Energy Production

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. Expanded Use of Forests and Feedstocks for Energy Production**
 - i. 15—Forestry, forest products, and timber tract production
 - ii. 19—Support activities for agriculture and forestry
 - iii. 31—Electric power generation, transmission, and distribution
 - iv. 36—Construction of other new nonresidential structures
 - v. 39—Maintenance & repair construction of nonresidential structures
 - vi. 369—Architectural, engineering, and related services
 - vii. 375—Environmental and other technical consulting services
 - viii. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. Expanded Use of Forests and Feedstocks for Energy Production**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. Expanded Use of Forests and Feedstocks for Energy Production**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$128,571 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. Expanded Use of Forests and Feedstocks for Energy Production**
 - i. 31—Electric power generation, transmission, and distribution
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. Expanded Use of Forests and Feedstocks for Energy Production**
 - i. Annual Savings Per Year from Write up - \$1,019,700 (applicable to sector 31)
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. Expanded Use of Forests and Feedstocks for Energy Production**
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. Expanded Use of Forests and Feedstocks for Energy Production**
 - i. 31— \$1,019,700.00 (applicable savings from strategy write-up)
5. Input savings by sector into IMPLAN model and run impacts.
6. Export impacts and analyze.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.3.8 Conservation of Agricultural Land for GHG Benefits

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **Conservation of Agricultural Land for GHG Benefits**
 - i. 19—Support activities for agriculture and forestry
 - ii. 36—Construction of other new nonresidential structures
 - iii. 39—Maintenance & repair construction of nonresidential structures
 - iv. 369—Architectural, engineering, and related services
 - v. 375—Environmental and other technical consulting services
 - vi. 424—Grantmaking, giving, and social advocacy organizations
 - vii. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **Conservation of Agricultural Land for GHG Benefits**
 - i. 1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. **Conservation of Agricultural Land for GHG Benefits**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$150,000 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. **Conservation of Agricultural Land for GHG Benefits**
 - i. 10001 - 10009—Households – All income levels
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **Conservation of Agricultural Land for GHG Benefits**
 - i. Total Acres to Be Conserved Annually—68,200
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Conservation of Agricultural Land for GHG Benefits**
 - i. Value of Real Estate for Farmland per acre²¹⁹—\$7,200 per acre
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).

²¹⁹ Land Values 2011 Summary. National Agricultural Statistics Services. United States Department of Agriculture, 4 Aug. 2011. Web. 16 Nov. 2011. <<http://usda01.library.cornell.edu/usda/current/AgriLandVa/AgriLandVa-08-04-2011.pdf>>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- a. **Conservation of Agricultural Land for GHG Benefits**
 - i. $\$491,040,000.00 [(7,200 \text{ Value of Real Estate for Farmland per acre} * 68,200 \text{ Total Acres to Be Conserved Annually})]=\text{Total Annually Reinvested into MD}$
 - ii. $10001 - 10009 -\$491,040,000.00 [(7,200 \text{ Value of Real Estate for Farmland per acre} * 68,200 \text{ Total Acres to Be Conserved Annually})]=\text{Total Annually Reinvested into MD}$
5. Input savings by sector into IMPLAN model and run impacts.
6. Export impacts and analyze.

3.3.9 Buy Local for GHG Benefits

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **Buy Local for GHG Benefits**
 - i. 319—Wholesale trade businesses
 - ii. 324—Retail Stores – Food and beverage
 - iii. 375—Environmental and other technical consulting services
 - iv. 377—Advertising and related services
 - v. 413—Food services and drinking places
 - vi. 425—Civic, social, professional, and similar organizations
 - vii. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **Buy Local for GHG Benefits**
 - i. 1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. **Buy Local for GHG Benefits**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$150,000 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. **Buy Local for GHG Benefits**
 - i. 319—Wholesale trade businesses
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **Buy Local for GHG Benefits**



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Buy Local for GHG Benefits**
 - i. Assume Each Household Buys Local Produce Every Other Week—\$5
 - ii. Number of Households in MD²²⁰—2,092,538
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **Buy Local for GHG Benefits**
 - i. $26 [(52 \text{ weeks in a year} / 2 \text{ if buying every other week})]$ =Number of times each household buys local produce in a year
 - ii. $\$130 [(26 \text{ purchases of local produce in a year} * \$5 \text{ on local produce})]$ =Spent Annually on Local Produce in a Household
 - iii. $\$272,029,940 [(\$130 \text{ Spent Annually on Local Produce in a Household} * 2,092,538 \text{ Households in MD})]$ =Total Spent Annually Overall
 - iv. $319-\$272,029,940 [(\$130 \text{ Spent Annually on Local Produce in a Household} * 2,092,538 \text{ Households in MD})]$ =Total Spent Annually Overall
5. Input savings by sector into IMPLAN model and run impacts.
6. Export impacts and analyze.

3.3.10 Nutrient Trading for GHG Benefits

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **Nutrient Trading for GHG Benefits**
 - i. 19—Support activities for agriculture and forestry
 - ii. 33—Water, sewage and other treatment and delivery services
 - iii. 36—Construction of other new nonresidential structures
 - iv. 39—Maintenance & repair construction of nonresidential structures
 - v. 369—Architectural, engineering, and related services
 - vi. 375—Environmental and other technical consulting services
 - vii. 381—Management of companies and other enterprises
 - viii. 390—Waste management and remediation services
 - ix. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **Nutrient Trading for GHG Benefits**
 - i. 1,000,000 (per \$1m basis due to no actual investment dollar figures)

²²⁰ Maryland QuickFacts from the US Census Bureau. State and County QuickFacts. U.S. Census Bureau, 13 Oct. 2011. Web. 11 Nov. 2011. <<http://quickfacts.census.gov/qfd/states/24000.html>>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3. Distribute inputs among identified IMPLAN sectors.
 - a. **Nutrient Trading for GHG Benefits**
 - i. 100% from industries in compliance—(\$1,000,000)
 - ii. 10% for government administrative costs/responsibilities—\$100,000
 - iii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$128,571 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. **Nutrient Trading for GHG Benefits**
 - i. 381—Management of companies and enterprises
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **Nutrient Trading for GHG Benefits**
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Nutrient Trading for GHG Benefits**
 - i. Total Potential Realization²²¹—\$45,000,000.00
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **Nutrient Trading for GHG Benefits**
 - i. 381—\$45,000,000.00=Total Potential Realization
5. Input savings by sector into IMPLAN model and run impacts.
6. Export impacts and analyze.

C.4 Recycling

3.4.1 Recycling and Source Reduction

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **Recycling and Source Reduction**
 - i. 33—Water, sewage and other treatment and delivery
 - ii. 375—Environmental and other technical consulting services
 - iii. 390—Waste management and remediation services
 - iv. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **Recycling and Source Reduction**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)

²²¹ Jones, CY, Evan Branosky, Mindy Selman, and Michelle Perez. "How Nutrient Trading Could Help Restore the Chesapeake Bay." World Resource Institute. World Resource Institute, Feb. 2010. Web. 14 Nov. 2011. <http://pdf.wri.org/working_papers/how_nutrient_trading_could_help_restore_the_chesapeake_bay.pdf>.



Regional Economic Studies Institute

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3. Distribute inputs among identified IMPLAN sectors.
 - a. **Recycling and Source Reduction**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$300,000 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. **Recycling and Source Reduction**
 - i. 381—Management of companies and enterprises
 - ii. 432—Other state and local government enterprises
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **Recycling and Source Reduction**
 - i. Average Landfill capacity is 1,000 pounds per cubic year (0.5 tons)
 - ii. Total Recycled Annually (from MDE website)²²² – 6,866,424 tons
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Recycling and Source Reduction**
 - i. Average Percentage of Recycled Waste in Maryland²²³—43.88% annual average
 - ii. Cubic Yard to GHG – 3.3 cubic yards per GHG emission
 - iii. Total Cubic Yards Saved – 3,433,212 cubic yards in landfills
 - iv. Base Cost - \$200 for license + \$52.23 per ton
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **Recycling and Source Reduction**
 - i. 1,040,367 metric tons [(3,433,212 cubic yards of landfill saved from recycling / 3.3 cubic yards per GHG emissions)]=Average Annual Reduction in GHG emissions from recycling
 - ii. \$54,338,582.65 [(1,040,367 metric tons reduced that can be sold * \$52.23 carbon permit per ton)]=Average annual savings associated with landfill offset
 - iii. 381--\$27,169,291.33
 - iv. 432--\$27,169,291.33
5. Input savings by sector into IMPLAN model and run impacts.
6. Export impacts and analyze.

²²² County Recyclables by Commodity in Tons for Calendar Year 2008. Maryland Department of the Environment (MDE). 2008. Web. 11 Nov. 2011. <www.mde.maryland.gov/assets/document/recycling_chart.pdf>.

²²³ County Recyclables by Commodity in Tons for Calendar Year 2008. Maryland Department of the Environment (MDE). 2008. Web. 11 Nov. 2011. <www.mde.maryland.gov/assets/document/recycling_chart.pdf>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

C.5 Multi-Sector

3.5.3 Outreach and Public Education

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. Outreach and Public Education**
 - i. 350—Internet publishing and broadcasting
 - ii. 352—Data processing, hosting, ISP, web search portals
 - iii. 375—Environmental and other technical consulting services
 - iv. 377—Advertising and related services
 - v. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. Outreach and Public Education**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. Outreach and Public Education**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$225,000
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. Outreach and Public Education**
 - i. 10001-10009—Households-all income levels
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. Outreach and Public Education**
 - i. Pay to MDE Staff member – \$43,286.00
 - ii. Number of those on Board – 5
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. Outreach and Public Education**
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. Outreach and Public Education**
 - i. \$216,427.50 [((\$43,286.00 pay to MDE staff member * 5 staff members)]=Total Wages
 - ii. 10001 – 10009 Households – All income levels - \$216,427.00
5. Input savings by sector into IMPLAN model and run impacts.
6. Export impacts and analyze.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

C.6 Buildings

3.6.1 Green Buildings

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **Green Buildings**
 - i. 36—Construction of new nonresidential structures
 - ii. 39—Maintenance & repair construction of nonresidential structures
 - iii. 375—Environmental and other technical consulting services
 - iv. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **Green Buildings**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. **Green Buildings**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$300,000 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. **Green Buildings**
 - i. 381—Management of companies and enterprises
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **Green Buildings**
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Green Buildings**
 - i. Avg. Savings from Green Buildings²²⁴= 30%
 - ii. Avg. Cost to Build a Green Building= \$4 per sq foot
 - iii. Avg. use of energy in a commercial building²²⁵=1,153,191.49
 - iv. Avg. Cost per kwh²²⁶=\$0.11
 - v. Avg. Savings=\$39,473.75

²²⁴ Kats, Gregory H. "Green Building Costs and Financial Benefits." NH Partnership for High Performance Schools - Home. <http://www.nhphps.org/docs/documents/GreenBuildingspaper.pdf>, 2003. Web. 11 Nov. 2011. <<http://www.nhphps.org/>>.

²²⁵ Building Energy Data Book. Buildings Energy Data Book. U.S. Energy Information Administration, Mar. 2011. Web. 11 Nov. 2011. <<http://buildingsdatabook.eren.doe.gov/ChapterIntro3.aspx>>.

²²⁶ SEDS | State Energy Data System. U.S. Energy Information Administration (EIA). U.S. Energy Information Administration (EIA), 2009. Web. 16 Nov. 2011. <http://www.eia.gov/state/seds/hf.jsp?incfile=sep_prices/com/pr_com_MD.html&mstate=Maryland>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- vi. Number of Buildings Proposed²²⁷=37
- 4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **Green Buildings**
 - i. \$131,579.15 (1,153,191.49 Avg. Use in kWh in a commercial building annually * \$0.11 Avg, Cost per kWh for electricity) = Average Annual Electricity Costs for a Commercial Building
 - ii. \$39,473.75 (\$131,579.15 Average Annual Electricity Costs for a Commercial Building * 30% reduction associated with Green Buildings) = Average Annual Savings for a Green Building in Energy
 - iii. 381 - \$1,460,528.553 (\$39,473.75 Average Annual Savings for a Green Building * 37 Proposed Green Buildings to be Built) = Average Annual Savings for Proposed Strategy
- 5. Input savings by sector into IMPLAN model and run impacts.
- 6. Export impacts and analyze.

3.6.2 Building and Trade Codes in Maryland

Investment Phase

- 1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **Building and Trade Codes in Maryland**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 34—Construction of new nonresidential commercial and healthcare structures
 - iii. 39—Maintenance & repair construction of nonresidential structures
 - iv. 369—Architectural, engineering, and related services
 - v. 375—Environmental and other technical consulting services
 - vi. 432—Other state and local government enterprises
- 2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **Building and Trade Codes in Maryland**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
- 3. Distribute inputs among identified IMPLAN sectors.
 - a. **Building and Trade Codes in Maryland**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$180,000 each
- 4. Input sales by sector into IMPLAN model and run impacts.
- 5. Export impacts and analyze.

²²⁷ Maryland Green Building Council 2010 Annual Report. Maryland Green Building Council. Maryland Department of General Services, 2011. Web. 11 Nov. 2011. <<http://www.dgs.maryland.gov/pdfs/2010GreenBldgReport.pdf>>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft
 RESI of Towson University

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. **Building and Trade Codes in Maryland**
 - i. 381—Management of companies and enterprises
 - ii. 10001 – 10009—Households – All income levels
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **Building and Trade Codes in Maryland**
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Building and Trade Codes in Maryland**
 - i. Number of those trained annually²²⁸=67 average a year
 - ii. Median Annual Wage²²⁹=\$50,180
 - iii. Avg. Cost (FHA) to bring up to code²³⁰=13% value of residence
 - iv. Avg. Home Price in MD²³¹=\$291,202
 - v. Avg Fine Cost to Companies²³²=\$300 a day
 - vi. Avg. Days to Resolve=30 days
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **Building and Trade Codes in Maryland**
 - i. $381 - \$9,000 (\$300 \text{ Avg. Fine Cost a Day} * 30 \text{ Avg Days to Resolve before Further Legal Problems}) = \text{Avg. Savings Associated with Training employee in proper building codes}$
 - ii. $432 - \$3,362,060 = (67 \text{ Number of Employees Trained Annually} * \$50,180 \text{ Median Annual Wage of a Building Code Inspector}) = \text{Average Annual Increase in Household Income from New Jobs}$
5. Input savings by sector into IMPLAN model and run impacts.
6. Export impacts and analyze.

²²⁸ StateStat. Maryland StateStat Report. Department of Housing & Community Development, July 2011. Web. 11 Nov. 2011. <http://www.statestat.maryland.gov/reports/20110825_DHCD_Template.pdf>.

²²⁹ Construction and Building Inspectors. U.S. Bureau of Labor Statistics. Bureau of Labor Statistics, 17 Dec. 2009. Web. 11 Nov. 2011. <<http://www.bls.gov/oco/ocos004.htm>>.

²³⁰ Listokin, David, and David Hattis. "Building Codes and Housing." 2004. Web. 11 Nov. 2011. <http://www.huduser.org/rbc/pdf/building_codes.pdf>.

²³¹ Housing Statistics: Year End 2010. Maryland Association of Realtors Homepage. Maryland Association of Realtors, 2010. Web. 11 Nov. 2011.

<<http://www.mdrealtor.org/LinkClick.aspx?fileticket=aGcV7fnZEBk%3d&tabid=161&mid=543>>.

²³² Code Enforcement Bureau. Baltimore County, MD Government Home Page. Code Enforcement Bureau, 17 June 2011. Web. 11 Nov. 2011.

<http://www.baltimorecountymd.gov/agencies/permits/pdmfaq/pdmfaq_cdenfo.html#q3>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

C.7 Land Use

3.7.1 Reducing GHG Emissions from the Transportation Sector through Land Use and Location Efficiency

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **Sustainable Communities Tax Credit**
 - i. 375—Environmental and other technical consulting services
 - ii. 432—Other state and local government enterprises
 - b. **PlanMaryland**
 - i. 375—Environmental and other technical consulting services
 - ii. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **Sustainable Communities Tax Credit**
 - i. 1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - b. **PlanMaryland**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. **Sustainable Communities Tax Credit**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$900,000
 - b. **PlanMaryland**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$900,000
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. **Sustainable Communities Tax Credit**
 - i. 10001 – 10009—Households – All income levels
 - b. **PlanMaryland**
 - i. 10001 – 10009—Households – All income levels
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **Sustainable Communities Tax Credit**
 - b. **Plan Maryland**
 - i. Contribution to GDP from Acre = \$478
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Sustainable Communities Tax Credit**

**Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft**

RESI of Towson University

- i. Tax Credit Given to 10 Projects²³³ = \$11,180,000
- b. **Plan Maryland**
 - i. Projected Land Saved²³⁴=300,000 acres
 - ii. Annual Acres Saved²³⁵=12,000
 - iii. Contribution to GDP per acre saved=\$478
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **Sustainable Communities Tax Credit**
 - i. 381 -- \$11,180,000
 - b. **Plan Maryland**
 - i. 10001-10009 -- \$9,560,000 [(12,000 acres annual acres saved * \$478 contribution to GDP from Acre)]=Average Annual Savings from Acres Saved
5. Input savings by sector into IMPLAN model and run impacts.
6. Export impacts and analyze.

**3.7.2 Transportation GHG Targets for Local Governments and Metropolitan Planning Organizations
Investment Phase**

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **Transportation GHG Targets for Local Governments and Metropolitan Planning Organizations**
 - i. 36—Construction of other new nonresidential structures
 - ii. 369—Architectural, engineering, and related services
 - iii. 375—Environmental and other technical consulting services
 - iv. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **Transportation GHG Targets for Local Governments and Metropolitan Planning Organizations**
 - i. 1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. **Transportation GHG Targets for Local Governments and Metropolitan Planning Organizations**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$300,000 each

²³³ “The Sustainable Communities Tax Credit.” State of Maryland Governor’s Office. Jan. 2010. Web. 27 Oct. 2011 <<http://www.governor.maryland.gov/documents/sustainablecredits.pdf>>.

²³⁴ “PlanMaryland Revised Draft – September 2011 Highlights.” State of Maryland. Sept. 2011. Web. 27 Oct. 2011. <<http://plan.maryland.gov/PDF/draftPlan/PlanMarylandHighlightsSept2011.pdf>>.

²³⁵ Ibid.



Regional Economic Studies Institute

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. **Transportation GHG Targets for Local Governments and Metropolitan Planning Organizations**
 - i. 432—Other state and local government enterprises
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **Transportation GHG Targets for Local Governments and Metropolitan Planning Organizations**
 - i. Reduction by 2020- Assume that there is a 1.875% reduction annually (by 2020 we will have a 15% reduction in CO₂ from this sector)
 - ii. Number of Registered Vehicles=3,382,451 (provided by MDE courtesy of MVA)
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Transportation GHG Targets for Local Governments and Metropolitan Planning Organizations**
 - i. Conversion from Metric tons into Gallons of Gas
 1. Change to kg=0.01875
 - ii. Average Annual Miles Driven By Population²³⁶=13,041
 - iii. Avg. MPG for a 4-door sedan=27
 - iv. Transfer from Gallons to KG²³⁷=1,455,647,935
 - v. Transfer to Metric Tons of Co₂=1,455,647.935 (annual metric tons from driving in MD)
 - vi. Avg. Cost of Gas Per Gallon in MD=3.43
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **Transportation GHG Targets for Local Governments and Metropolitan Planning Organizations**
 - i. Assume 10% Are State Owned Fleet=338,245.1 (number of registered vehicles*0.1)
 - ii. Total Miles Traveled in MD=4,411,054,349 (average annual miles driven by population*Assume 10% Are State Owned Fleet)
 - iii. Number of Gallons used =163,372,383.3 (total miles traveled in MD*avg. MPG for a 4-door sedan)
 - iv. Reduction=27,293.39879 (Change to kg*Transfer to Metric Tons of Co₂)

²³⁶ State and Urbanized Area Statistics. U.S. Department of Transportation, 4 April. 2011. Web. 11 Nov. 2011. <<http://www.fhwa.dot.gov/ohim/onh00/onh2p11.htm>>.

²³⁷ "How We Calculate Your Carbon Footprint." Carbon offsets for your carbon footprint & fighting global warming. 2011. CarbonFund.org. 14 Nov. 2011 <http://www.carbonfund.org/site/pages/carbon_calculators/category/Assumptions#Transportation>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- v. New Metric Tons of Co2 Consumed=1,428,355 (Transfer to Metric Tons of Co2-reduction)
 - vi. Convert to kg =1,428,354,536 (New Metric Tons of Co2 Consumed*1,000)
 - vii. Convert to Gallons=160,309,151.1 (convert to kg/8.91)
 - viii. Previous Cost to Travel Annually=560,367,274.7 (Number of Gallons used*Avg. Cost of Gas Per Gallon in MD)
 - ix. New Cost to Travel Annually=549,860,388.3 (Convert to Gallons*Avg. Cost of Gas Per Gallon in MD)
 - x. 432--\$10,506,886.40 (Previous Cost to Travel Annually-New Cost to Travel Annually)
5. Input savings by sector into IMPLAN model and run impacts.
 6. Export impacts and analyze.

3.7.3 Land Use Planning for GHG Benefits

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **Funding Mechanisms for Smart Growth**
 - i. 36—Construction of other new nonresidential structures
 - ii. 38—Construction of other new residential structures
 - iii. 39—Maintenance & repair construction of nonresidential structures
 - iv. 40— Maintenance & repair construction of residential structures
 - v. 369—Architectural, engineering, and related services
 - vi. 375—Environmental and other technical consulting services
 - vii. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **Funding Mechanisms for Smart Growth**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. **Funding Mechanisms for Smart Growth**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$150,000 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. **Funding Mechanisms for Smart Growth**
 - i. 432 – Other state and local government enterprises



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **Funding Mechanisms for Smart Growth**
 - i. Annual Savings from Write Up in Construction—4,400,000,000.00
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Funding Mechanisms for Smart Growth**
 - i. Housing Units in 2000 Census of the US²³⁸—115,904,641
 - ii. Housing Units in 2010 Census of the US²³⁹—131,704,730
 - iii. Housing Units in 2010 Census of MD²⁴⁰—2,378,814
 - iv. Housing Units in 2000 Census of MD²⁴¹—2,145,283
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **Funding Mechanisms for Smart Growth**
 - i. $0.01806172 [(131,704,730 \text{ Housing Units in 2010 Census of the US} / 2,378,814 \text{ Housing Units in 2010 Census of MD})]=\text{Maryland's Multiplier with the US}$
 - ii. $1.18\% [(131,704,730 \text{ Housing Units in 2010 Census of the US} / 2,378,814 \text{ Housing Units in 2010 Census of MD})]=\text{Percent}$
 - iii. $\$79,471,569.47 [(4,400,000,000.00 \text{ Annual Savings from Write Up in Construction} * 1.18\% \text{ Percent})]=\text{Annual Savings Scaled for MD}$
 - iv. $432-\$79,471,569.47 [(4,400,000,000.00 \text{ Annual Savings from Write Up in Construction} * 1.18\% \text{ Percent})]=\text{Annual Savings Scaled for MD}$
5. Input savings by sector into IMPLAN model and run impacts.
6. Export impacts and analyze.

3.7.4 GHG Benefits from Priority Funding Areas and Other Growth Boundaries Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **GHG Benefits from Priority Funding Areas and Other Growth Boundaries**
 - i. 36—Construction of other new nonresidential structures
 - ii. 38—Construction of other new residential structures
 - iii. 39—Maintenance & repair construction of nonresidential structures

²³⁸ 2000 Census of Population and Housing. U.S. Census Bureau, April 2004. Web. 11 Nov. 2011. <<http://www.census.gov/prod/cen2000/phc3-us-pt1.pdf>>.

²³⁹ USA QuickFacts from the US Census Bureau. State and County QuickFacts. U.S. Census Bureau, 13 Oct. 2011. Web. 11 Nov. 2011.

< <http://quickfacts.census.gov/qfd/states/00000.html>>

²⁴⁰ Maryland QuickFacts from the US Census Bureau. State and County QuickFacts. U.S. Census Bureau, 13 Oct. 2011. Web. 11 Nov. 2011. <<http://quickfacts.census.gov/qfd/states/24000.html>>.

²⁴¹ Profile of Selected Housing Characteristics: 2000. U.S. Census Bureau. Web. 11 Nov. 2011.

< http://factfinder.census.gov/servlet/QTTable?_bm=y&-geo_id=04000US24&-qr_name=DEC_2000_SF3_U_DP4&-ds_name=DEC_2000_SF3_U&-redoLog=false>.

**Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft**

RESI of Towson University

- iv. 40— Maintenance & repair construction of residential structures
- v. 369—Architectural, engineering, and related services
- vi. 375—Environmental and other technical consulting services
- vii. 424—Grantmaking, giving, and social advocacy organizations
- viii. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **GHG Benefits from Priority Funding Areas and Other Growth Boundaries**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. **GHG Benefits from Priority Funding Areas and Other Growth Boundaries**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$128,571 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. **GHG Benefits from Priority Funding Areas and Other Growth Boundaries**
 - i. 10001 - 10009—Households – All income levels
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **GHG Benefits from Priority Funding Areas and Other Growth Boundaries**
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **GHG Benefits from Priority Funding Areas and Other Growth Boundaries**
 - i. Savings towards Building a Home through Policy²⁴²—\$16,000.00
 - ii. Housing Units in 2010 Census of MD²⁴³—2,378,814
 - iii. Housing Units in 2000 Census of MD²⁴⁴—2,145,283
 - iv. Housing Units in 2010 Census of the US²⁴⁵—131,704,730

²⁴² Housing Statistics: Year End 2010. Maryland Association of Realtors Homepage. Maryland Association of Realtors, 2010. Web. 11 Nov. 2011.

<<http://www.mdrealtor.org/LinkClick.aspx?fileticket=aGcV7fnZEBk%3d&tabid=161&mid=543>>.

²⁴³ Maryland QuickFacts from the US Census Bureau. State and County QuickFacts. U.S. Census Bureau, 13 Oct. 2011. Web. 11 Nov. 2011. <<http://quickfacts.census.gov/qfd/states/24000.html>>.

²⁴⁴ Profile of Selected Housing Characteristics: 2000. U.S. Census Bureau. Web. 11 Nov. 2011. <http://factfinder.census.gov/servlet/QTTTable?_bm=y&-geo_id=04000US24&-qr_name=DEC_2000_SF3_U_DP4&-ds_name=DEC_2000_SF3_U&-redoLog=false>.

²⁴⁵ USA QuickFacts from the US Census Bureau. State and County QuickFacts. U.S. Census Bureau, 13 Oct. 2011. Web. 11 Nov. 2011.

<<http://quickfacts.census.gov/qfd/states/00000.html>>



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **GHG Benefits from Priority Funding Areas and Other Growth Boundaries**
 - i. $23,353.10 \left[\left(\frac{2,378,814 \text{ Housing Units in 2010 Census of MD} - 2,145,283 \text{ Housing Units in 2000 Census of MD}}{10} \right) \right] = \text{Annually Units Built}$
 - ii. $1.18\% \left[\left(\frac{131,704,730 \text{ Housing Units in 2010 Census of the US}}{2,378,814 \text{ Housing Units in 2010 Census of MD}} \right) \right] = \text{Percent}$
 - iii. $\$288.99 \left[\left(\frac{\$16,000.00 \text{ Savings towards Building a Home through Policy}}{1.18\% \text{ Percent}} \right) \right] = \text{Percentage of Savings to MD}$
 - iv. $\$6,748,754.58 \left[\left(\$288.99 \text{ Percentage of Savings to MD} * 23,353.10 \text{ Annually Units Built} \right) \right] = \text{Total Annual Possible Savings}$
 - v. $10001 - 10009 - \text{Households} - \text{All income levels} - \$6,748,754.58 \left[\left(\$288.99 \text{ Percentage of Savings to MD} * 23,353.10 \text{ Annually Units Built} \right) \right] = \text{Total Annual Possible Savings}$
5. Input savings by sector into IMPLAN model and run impacts.
6. Export impacts and analyze.

C.8 Innovative Initiatives

3.8.1 Leadership-by-Example—Local Government

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - c. **Leadership-by-Example—Local Government**
 - iii. 31—Electric power generation, transmission, and distribution
 - iv. 33—Water, sewage and other treatment and delivery
 - v. 34— Construction of new nonresidential commercial and healthcare structures
 - vi. 39— Maintenance & repair construction of nonresidential structures
 - vii. 369— Architectural, engineering, and related services
 - viii. 375—Environmental and other technical consulting services
 - ix. 390—Waste management and remediation services
 - x. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - d. **Leadership-by-Example—Local Government**
 - xi. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - e. **Leadership-by-Example—Local Government**
 - xii. 10% for government administrative costs/responsibilities—\$100,000
 - xiii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$128,571 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. **Leadership-by-Example—Local Government**
 - i. 432—Other state and local government enterprises
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **Leadership-by-Example—Local Government**
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Leadership-by-Example—Local Government**
 - i. Avg. Number of Sq. Feet Needed per Employee²⁴⁶—387
 - ii. Energy Consumption per Sq. Feet²⁴⁷—68.61
 - iii. Avg. Cost per kwh²⁴⁸—0.11
 - iv. Number of Local Government Employees²⁴⁹—241,869
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **Leadership-by-Example—Local Government**
 - i. 93,603,303 [(387 Avg. Number of Sq. Feet Needed per Employee * 241,869 Local Government Employees)]=Avg. Sq Feet of Local Government Buildings
 - ii. 6,422,122,618.83 [(68.61 Units of Energy Consumed per Sq. Feet * 93603303 Avg. Sq Feet of Local Government Buildings)]=Avg. Energy Consumption in Local Govt. Buildings in kilowatts
 - iii. \$706,433,488.07 [(6,422,122,618.83 Avg. Energy Consumption in Local Govt. Buildings * 0.11 Cost in khw)]=Avg. Cost of Energy Consumption in Local Govt.
 - iv. 834,875,940.45 [(6,422,122,618.83 Avg. Energy Consumption in Local Govt. Buildings * 0.13)]=If Target is 13% for savings in kilowatts
 - v. 5,587,246,678.38 [(6,422,122,618.83 Avg. Energy Consumption in Local Govt. Buildings - 834,875,940.45 If Target is 13% for savings)]=New Energy Consumption in kilowatts
 - vi. \$614,597,134.62 [(5,587,246,678.38 New Energy Consumption * 0.11 Cost in khw)]=New Costs in kwh

²⁴⁶ Employment and Payrolls - Industry Series - Maryland 2009 - Employment and Payrolls - Division of Workforce Development and Adult Learning. Maryland Department of Labor, Licensing and Regulation. Maryland Department of Labor, Licensing and Regulation, 1 June 2011. Web. 11 Nov. 2011. <<http://www.dllr.state.md.us/lmi/emppay/md2010ep.shtml>>.

²⁴⁷ Building Energy Data Book. Buildings Energy Data Book. U.S. Energy Information Administration, Mar. 2011. Web. 11 Nov. 2011. <<http://buildingsdatabook.eren.doe.gov/ChapterIntro3.aspx>>.

²⁴⁸ A Look at Office Buildings - How Many Employees Are There. U.S. Energy Information Administration (EIA). U.S. Energy Information Administration (EIA), 3 Jan. 2001. Web. 14 Nov. 2011. <http://www.eia.gov/emeu/consumptionbriefs/cbecs/pbawebbsite/office/office_howmanyempl.htm>.

²⁴⁹ Employment and Payrolls - Industry Series - Maryland 2009 - Employment and Payrolls - Division of Workforce Development and Adult Learning. Maryland Department of Labor, Licensing and Regulation. Maryland Department of Labor, Licensing and Regulation, 1 June 2011. Web. 11 Nov. 2011. <<http://www.dllr.state.md.us/lmi/emppay/md2010ep.shtml>>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- vii. $\$91,836,353.45 [(\$706,433,488.07 \text{ Avg. Cost of Energy Consumption in Local Govt.} - \$614,597,134.62 \text{ New Costs})]=\text{New Savings}$
- 5. Input savings by sector into IMPLAN model and run impacts.
- 6. Export impacts and analyze.

3.8.2 Leadership-by-Example—Federal Government

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. Leadership-by-Example—Federal Government**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 33—Water, sewage and other treatment and delivery
 - iii. 34—Construction of new nonresidential commercial and healthcare structures
 - iv. 39— Maintenance & repair construction of nonresidential structures
 - v. 369— Architectural, engineering, and related services
 - vi. 375—Environmental and other technical consulting services
 - vii. 390—Waste management and remediation services
 - viii. 429—Other Federal Government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. Leadership-by-Example—Federal Government**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. Leadership-by-Example—Federal Government**
 - ii. 10% for government administrative costs/responsibilities—\$100,000
 - iii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$128,571 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. Leadership-by-Example—Federal Government**
 - i. 429—Other Federal Government enterprises
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. Leadership-by-Example—Federal Government**
 - i. Energy Saved – 13.00%

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

3. Research savings data for each policy according to part of program to be affected by savings.
 - a. Leadership-by-Example—Federal Government**
 - i. Avg. Number of Sq. Feet Needed per Employee²⁵⁰—387
 - ii. Energy Consumption per Sq. Feet²⁵¹—68.61
 - iii. Avg. Cost per kwh²⁵²—0.11
 - iv. Federal Employees in MD²⁵³—139,927
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. Leadership-by-Example—Federal Government**
 - i. \$587,156.93 [((68.61 units of energy consumed per sq. feet * 75000 sq. feet) * 0.11 per kwh)]=Avg. Cost per 75,000 Sq. Feet
 - ii. \$76,330.40 [(\$587,156.93 Avg. Cost per 75,000 Sq. Feet * 13.00% Energy Saved)]=Reduction
 - iii. \$510,826.53 [(\$587,156.93 Avg. Cost per 75,000 Sq. Feet - \$76,330.40 Reduction)]=Avg. Annual Savings
 - iv. 54,151,749 [(139,927 Federal Employees in MD * 387 Sq. Feet per employee)]=Estimated Number of Sq. Feet
 - v. 3,715,521,464.23 [(54,151,749 Estimated Number of Sq. Feet * 68.61 units of energy consumed per sq. feet)]=Avg. Used in Federal Building per Sq. Feet
 - vi. \$423,940,999.07 [(3,715,521,464.23 Avg. Used in Federal Building per Sq. Feet * 0.11 Avg. Cost per kwh)]=Avg. Cost per kwh
 - vii. 483,017,790.40 [(3,715,521,464.23 Avg. Used in Federal Building per Sq. Feet * 13.00% Energy Saved)]=Avg. Savings
 - viii. 3,232,503,674 [(3,715,521,464.23 Avg. Used in Federal Building per Sq. Feet - 483,017,790.40 Avg. Savings)]=New Amount Used
 - ix. \$368,828,669.19 [(3,232,503,674 New Amount Used * 0.11 Avg. Cost per kwh)]=Total Cost of New Amount
 - x. 429--\$55,112,329.88 [(\$423,940,999.07 Avg. Cost per kwh - \$368,828,669.19 Total Cost of New Amount)]=Avg. Annual Savings
5. Input savings by sector into IMPLAN model and run impacts.

²⁵⁰ Employment and Payrolls - Industry Series - Maryland 2009 - Employment and Payrolls - Division of Workforce Development and Adult Learning. Maryland Department of Labor, Licensing and Regulation. Maryland Department of Labor, Licensing and Regulation, 1 June 2011. Web. 11 Nov. 2011. <<http://www.dllr.state.md.us/lmi/emppay/md2010ep.shtml>>.

²⁵¹ Building Energy Data Book. Buildings Energy Data Book. U.S. Energy Information Administration, Mar. 2011. Web. 11 Nov. 2011. <<http://buildingsdatabook.eren.doe.gov/ChapterIntro3.aspx>>.

²⁵² A Look at Office Buildings - How Many Employees Are There. U.S. Energy Information Administration (EIA). U.S. Energy Information Administration (EIA), 3 Jan. 2001. Web. 14 Nov. 2011. <http://www.eia.gov/emeu/consumptionbriefs/cbecs/pbawebiste/office/office_howmanyempl.htm>.

²⁵³ Employment and Payrolls - Industry Series - Maryland 2009 - Employment and Payrolls - Division of Workforce Development and Adult Learning. Maryland Department of Labor, Licensing and Regulation. Maryland Department of Labor, Licensing and Regulation, 1 June 2011. Web. 11 Nov. 2011. <<http://www.dllr.state.md.us/lmi/emppay/md2010ep.shtml>>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

6. Export impacts and analyze.

3.8.3 Leadership-by-Example—Maryland Colleges and Universities

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. Leadership-by-Example—Maryland Colleges and Universities**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 33—Water, sewage and other treatment and delivery
 - iii. 36—Construction of other new nonresidential structures
 - iv. 39— Maintenance & repair construction of nonresidential structures
 - v. 261—Small electrical appliance manufacturing
 - vi. 319—Wholesale trade businesses
 - vii. 332—Transportation by air
 - viii. 336—Transit and ground passenger transportation
 - ix. 369— Architectural, engineering, and related services
 - x. 375—Environmental and other technical consulting services
 - xi. 390—Waste management and remediation services
 - xii. 392—Private junior colleges, colleges, universities
 - xiii. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. Leadership-by-Example—Maryland Colleges and Universities**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. Leadership-by-Example—Maryland Colleges and Universities**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$75,000 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. Leadership-by-Example—Maryland Colleges and Universities**
 - i. 392—Private junior colleges, colleges, universities
 - ii. 432—Other state and local government enterprises
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. Leadership-by-Example—Maryland Colleges and Universities**
 - i. Number of MD Public Universities – 64,222
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. Leadership-by-Example—Maryland Colleges and Universities**



Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- i. Avg. Number of Sq. Feet Needed per Employee²⁵⁴—387
 - ii. Energy Consumption per Sq. Feet²⁵⁵—68.61
 - iii. Avg. Cost per kwh²⁵⁶—0.11
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
- a. **Leadership-by-Example—Maryland Colleges and Universities**
 - i. 24,853,914 [(64,222 MD Public Universities * 387 Sq. Feet Needed per Employee)]=Avg. Sq feet in Universities
 - ii. 1,705,227,040 [(24,853,914 Avg. Sq. Feet in Universities * 68.61 Units of Energy Consumed per Sq. Feet)]=Avg. Electricity Used in Universities
 - iii. \$187,574,974.35 [(1,705,227,040 Avg. Electricity Used in Universities * \$0.11 Cost in khw)]=Avg. Cost
 - iv. 0.215 [((0.1 + 0.33) / 2)]=Avg. Reduction Target by 2020 from Universities
 - v. 0.026875 [(0.215 Avg. Reduction Target by 2020 from Universities / 8)]=Target Reduction Annually
 - vi. 45,827,976.69 [(1,705,227,040 Avg. Electricity Used in Universities * 0.026875 Target Reduction Annually)]=Savings Annually
 - vii. 1,659,399,063 [(1,705,227,040 Avg. Electricity Used in Universities - 45,827,976.69 Savings Annually)]=Avg. Annual Savings
 - viii. \$182,533,896.91 [(1,659,399,063 Avg. Annual Savings * \$0.11 Cost in khw)]=Avg. Cost After Reduction
 - ix. \$5,041,077.44 [(\$187,574,974.35 Avg. Cost - \$182,533,896.91 Avg. Cost After Reduction)]=Avg. Annual Savings
 - x. 392—\$2,520,538.72 [(\$5,041,077.44 Avg. Annual Savings / 2)]=Avg. Annual Savings
 - xi. 432—\$2,520,538.72 [(\$5,041,077.44 Avg. Annual Savings / 2)]=Avg. Annual Savings
5. Input savings by sector into IMPLAN model and run impacts.
6. Export impacts and analyze.

²⁵⁴ Employment and Payrolls - Industry Series - Maryland 2009 - Employment and Payrolls - Division of Workforce Development and Adult Learning. Maryland Department of Labor, Licensing and Regulation. Maryland Department of Labor, Licensing and Regulation, 1 June 2011. Web. 11 Nov. 2011. <<http://www.dlir.state.md.us/lmi/emppay/md2010ep.shtml>>.

²⁵⁵ Building Energy Data Book. Buildings Energy Data Book. U.S. Energy Information Administration, Mar. 2011. Web. 11 Nov. 2011. <<http://buildingsdatabook.eren.doe.gov/ChapterIntro3.aspx>>.

²⁵⁶ A Look at Office Buildings - How Many Employees Are There. U.S. Energy Information Administration (EIA). U.S. Energy Information Administration (EIA), 3 Jan. 2001. Web. 14 Nov. 2011. <http://www.eia.gov/emeu/consumptionbriefs/cbecs/pbawebiste/office/office_howmanyempl htm>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.8.4 GHG Early Voluntary Reductions

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. GHG Early Voluntary Reductions**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 33—Water, sewage and other treatment and delivery
 - iii. 34—Construction of new nonresidential commercial and healthcare structures
 - iv. 36—Construction of other new nonresidential structures
 - v. 39—Maintenance & repair construction of nonresidential structures
 - vi. 369—Architectural, engineering, and related services
 - vii. 375—Environmental and other technical consulting services
 - viii. 390—Waste Management and remediation services
 - ix. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. GHG Early Voluntary Reductions**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. GHG Early Voluntary Reductions**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$112,500 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. GHG Early Voluntary Reductions**
 - i. 381—Management of companies and enterprises
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. GHG Early Voluntary Reductions**
 - i. Annual Reduction Target by 2020 – 1.03 million metric tons
 - ii. Number of years of auctions – 4 years
 - iii. Number of years until Target – 8 years
 - iv. Average Reductions per year – 128,750 allowances annually

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **GHG Early Voluntary Reductions**
 - i. Proceeds From Auctions²⁵⁷—\$169,600,423.80 (total to date)
 - ii. Allowances Sold to Date²⁵⁸-- 68,507,184
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **GHG Early Voluntary Reductions**
 - i. \$42,400,105.95 [(\$169,600,423.80 total proceeds from auctions to date / 4 years)] = annual cost from sales of allowances
 - ii. \$2.48 [(\$169,600,423.80 total proceeds from auctions to date / 68,507,184 total carbon allowances sold to date)] = average cost of carbon allowances
 - iii. 17,126,796 [(68,507,184 total carbon allowances sold to date / 4 years)] = average carbon credits sold annually
 - iv. 16,998,046 [(17,126,796 average carbon credits sold annually – 128,750 proposed annual reduction target)] = average annual carbon credit to be purchased under reductions
 - v. \$42,081,364.86 [(16,998,046 average annual carbon credits purchased under reduction target * \$2.48 average cost per carbon credit allowance)] = average cost to firm for carbon credits under new reduction target
 - vi. 381--\$318,741.09 [(\$42,400,105.95 current average annual carbon credit costs - \$42,081,364.86 average carbon credit costs under target reduction policy)] = savings to firms from reductions
5. Input savings by sector into IMPLAN model and run impacts.
6. Export impacts and analyze.

3.8.5 State of Maryland Initiative to Lead by Example

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **High Performance Buildings**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 36—Construction of other new nonresidential structures
 - iii. 39—Maintenance & repair construction of nonresidential structures
 - iv. 369—Architectural, engineering, and related services
 - v. 375—Environmental and other technical consulting services
 - vi. 432—Other state and local government enterprises

²⁵⁷ MD Proceeds by Auction. Regional Greenhouse Gas Initiative (RGGI) CO2 Budget Trading Program - Welcome. Regional Greenhouse Gas Initiative CO2 Budget Trading Program, 2011. Web. 14 Nov. 2011. <http://rggi.org/docs/MD_Proceeds_by_Auction.pdf>.

²⁵⁸ Ibid.



Regional Economic Studies Institute

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- b. Green Maryland Act of 2010**
 - i. 319—Wholesale trade businesses
 - ii. 375—Environmental and other technical consulting services
 - iii. 432—Other state and local government enterprises
 2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. High Performance Buildings**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 - b. Green Maryland Act of 2010**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
 3. Distribute inputs among identified IMPLAN sectors.
 - a. High Performance Buildings**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$180,000 each
 - b. Green Maryland Act of 2010**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$450,000 each
 4. Input sales by sector into IMPLAN model and run impacts.
 5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. High Performance Buildings**
 - i. 432—Other state and local government enterprises
 - b. Green Maryland Act of 2010**
 - i. 432—Other state and local government enterprises
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. High Performance Buildings**
 - i. Number of Projects=31
 - b. Green Maryland Act of 2010**
 - i. Total allowances yearly by the state of Maryland for GHG—37,503,983 metric tons
 - ii. Number of years of auctions – 4 years
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. High Performance Buildings**
 - i. Electricity Savings=30.00% from Green Building Annually
 - ii. Avg. Use of Commercial Building=1,153,191.49 kilowatts

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

- iii. Avg Cost per KWH²⁵⁹=0.11 (see 6.5.3)
- b. **Green Maryland Act of 2010**
 - i. Recycled Paper=5,000 (made from 50% recycled materials)
 - ii. Cost²⁶⁰=\$54.99 (retail price)
 - iii. Cost per Sheet=\$0.011 (recycled paper/cost)
 - iv. Virgin Paper=5,000
 - v. Cost²⁶¹=\$56.99 (retail price)
 - vi. Cost per sheet=\$0.0113 (virgin paper/cost)
 - vii. Price difference=\$.0004
 - viii. Avg. Use of Paper by Office Employee²⁶²=10,000
 - ix. Number of state employees²⁶³=102,312 (avg. 2010 employment)
- 4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **High Performance Buildings**
 - i. \$131,579.15 [(1,153,191.49 kilowatts Avg. use of commercial building * \$0.11 avg cost per KWH)]=Average Annual Cost to Commercial Buildings for Energy
 - ii. \$39,473.75 [(\$131,579.15 Avg. Cost Annually * 30% Electricity Savings)]=Average Annual Savings in Electricity to Green Buildings
 - iii. 432--\$1,223,686.085 [(31 number of projects * \$39,473.75 savings)]=Average Savings from All Projects
 - b. **Green Maryland Act of 2010**
 - i. 1,023,120,000 [(102,312 number of state employees * 10,000 sheets avg. use of paper by office employee)]=Average Annual Sheets of Paper Used by State employees
 - ii. \$11,252,273.76 [(\$0.011 cost per sheet of recycled paper * 1,023,120,000 sheets total paper use in MD State government)] Cost to Government if Only Using Recycled Paper

²⁵⁹ SEDS | State Energy Data System. U.S. Energy Information Administration (EIA). U.S. Energy Information Administration (EIA, 2009). Web. 16 Nov. 2011.

<http://www.eia.gov/state/seds/hf.jsp?incfile=sep_prices/com/pr_com_MD.html&mstate=Maryland>.

²⁶⁰ OfficeMax 50% Recycled Multipurpose Paper. Office Supplies, Office Furniture & Office Technology at OfficeMax. Office Supplies, OfficeFurniture & Office Technology at OfficeMax, 2011. Web. 14 Nov. 2011. <<http://www.officemax.com/office-supplies/paper/recycled-paper/product-prod2110264>>

²⁶¹ OfficeMax 50% Recycled Multipurpose Paper. Office Supplies, Office Furniture & Office Technology at OfficeMax. OfficeMax, 2011. Web. 11 Nov. 2011. <<http://www.officemax.com/office-supplies/paper/copy-multipurpose-paper/product-ARS22305>>.

²⁶² Ask Green America - Recycled Paper FAQ. Ask Green America - Knowledgebase Login. Green Irene, 2011. Web. 11 Nov. 2011. <http://askgreenamerica.custhelp.com/app/answers/detail/a_id/1340/~recycled-paper-fa>

²⁶³ Employment and Payrolls - Industry Series - Maryland 2009 - Employment and Payrolls - Division of Workforce Development and Adult Learning. Maryland Department of Labor, Licensing and Regulation. Maryland Department of Labor, Licensing and Regulation, 1 June 2011. Web. 11 Nov. 2011.

<<http://www.dllr.state.md.us/lmi/emppay/md2010ep.shtml>>.



**Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft**

RESI of Towson University

- iii. $\$11,661,521.76 [(\$0.0113 \text{ cost per sheet of virgin paper} * 1,023,120,000 \text{ total paper use in MD State government})]=\text{Total Cost to Government Annually using Virgin Paper}$
- iv. $432--\$409,248 [(\text{cost of virgin paper}-\text{cost of recycled paper})]=\text{Average Annual Savings from Shifting Paper Supplies to Recycled Paper}$
- 5. Input savings by sector into IMPLAN model and run impacts.
- 6. Export impacts and analyze.

3.8.6 State of Maryland Carbon and Footprint Initiatives

Investment Phase

- 1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. Maryland Environment Footprint**
 - i. 31—Electric power generation, transmission, and distribution
 - ii. 33—Water, sewage, and other treatment and delivery
 - iii. 319—Wholesale trade businesses
 - iv. 385—Facilities support services
 - v. 388—Services to buildings and dwellings
 - vi. 390—Waste management and remediation services
 - vii. 375—Environmental and other technical consulting services
 - viii. 432—Other state and local government enterprises
- 2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. Maryland Environment Footprint**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
- 3. Distribute inputs among identified IMPLAN sectors.
 - a. Maryland Environment Footprint**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$128,571 each
- 4. Input sales by sector into IMPLAN model and run impacts.
- 5. Export impacts and analyze.

Operation Phase

- 1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. Maryland Environment Footprint**
 - i. 432—Other state and local government enterprises
- 2. Determine part of program to be affected by savings (from strategy write-up).
 - a. Maryland Environment Footprint**

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Maryland Environment Footprint**
 - i. Electric Use in 2008 (kWh)²⁶⁴=1,732,064,108
 - ii. Electric Use in 2009 (KwH)²⁶⁵=1,455,031,107
 - iii. Cost per KwH²⁶⁶=0.11
 - iv. Water Use in 2008 (gallon)²⁶⁷=4,419,552,548
 - v. Water Use in 2009 (gallon)²⁶⁸=4,860,488,430
 - vi. Average Cost of Water ²⁶⁹= \$2.00 per 1,000 gallons
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **Maryland Environment Footprint**
 - i. 277,033,001 [(1,732,064,108 kilowatt Electric Use in 2008 (kWh) - 1,455,031,107 Electric Use in 2009 (KwH))] = Savings in Electric Used Annually in kilowatts
 - ii. \$31,609,465.41 [(277,033,001 kilowatts Savings in Electric Used Annually (kWh) * \$0.11 Cost per kWh in Maryland)] = Average Annual Savings associated with cost of electric
 - iii. -440,935,882 gallons [(4,419,552,548 Water Use in 2008 (gallon) - 4,860,488,430 Water Use in 2009 (gallon))] = Average Annual Savings in Water Use (gallon)
 - iv. -\$881,871.76 [(-440,935,882 Average Annual Savings in Water Use (gallon) / 1000 gallons) *(\$2.00 per 1,000 gallons)] = Average Annual savings in Water per 1,000 gallons
 - v. 432--\$30,727,593.65 [(\$31,609,465.41 Average Annual Savings in Electricity + -\$881,871.76 Average Annual savings in Water)]= Average Annual Savings Associated with this program
5. Input savings by sector into IMPLAN model and run impacts.
6. Export impacts and analyze.

²⁶⁴ Maryland Environmental Footprint. Maryland: Smart, Green and Growing. Maryland Environmental Service, Spring 2010. Web. 16 Nov. 2011. <http://www.green.maryland.gov/carbon_footprint_page.html>.

²⁶⁵ Ibid.

²⁶⁶ SEDS | State Energy Data System. U.S. Energy Information Administration (EIA). U.S. Energy Information Administration (EIA, 2009). Web. 16 Nov. 2011. <http://www.eia.gov/state/seds/hf.jsp?incfile=sep_prices/com/pr_com_MD.html&mstate=Maryland>.

²⁶⁷ Maryland Environmental Footprint. Maryland: Smart, Green and Growing. Maryland Environmental Service, Spring 2010. Web. 16 Nov. 2011. <http://www.green.maryland.gov/carbon_footprint_page.html>.

²⁶⁸ Ibid.

²⁶⁹ Water on Tap. US Environmental Protection Agency. US Environmental Protection Agency. Web. 11 Nov. 2011. <<http://www.epa.gov/>>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.8.7 Job Creation and Economic Development

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **The Green Jobs and Industry Task Force**
 - i. 375—Environmental and other technical consulting services
 - ii. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **The Green Jobs and Industry Task Force**
 - i. 1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. **The Green Jobs and Industry Task Force**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$900,000
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. **The Green Jobs and Industry Task Force**
 - i. 432—Other state and local government enterprises
 - ii. 10001 – 10009—Households – All income levels
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **The Green Jobs and Industry Task Force**
 - i. Number of Jobs Estimate by 2012 – 2,500
3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **The Green Jobs and Industry Task Force**
 - i. Avg. Income of Green Job²⁷⁰—\$47,000.00 (annually)
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **The Green Jobs and Industry Task Force**
 - i. $10001 \text{ --- } \$117,500,000 \text{ (} \$47,000 \text{ Avg. Annual Income of Green Job } * 2,500 \text{ number of estimated new green jobs by 2012) = Avg. Annual New Income Total for New Green Jobs}$
5. Input savings by sector into IMPLAN model and run impacts.
6. Export impacts and analyze.

²⁷⁰ 2009 County Business Patterns. Censtats Database. NAICS, 2009. Web. 11 Nov. 2011. <<http://censtats.census.gov/cgi-bin/cbpnaic/cbpsect.pl>>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.8.8 Public Health Initiatives Related to Climate Change

Investment Phase

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **State Climate Change Environmental Health and Protection Advisory Council**
 - i. 345—Software Publishers
 - ii. 353—Other information services
 - iii. 375—Environmental and other technical consulting services
 - iv. 396—Medical and diagnostic labs and outpatient
 - v. 394—Offices of physicians
 - vi. 397—Private hospitals
 - vii. 432—Other state and local government enterprises
2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **State Climate Change Environmental Health and Protection Advisory Council**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. **State Climate Change Environmental Health and Protection Advisory Council**
 - i. 100% from doctor's offices and hospitals working towards compliance—(\$500,000) each
 - ii. 10% for government administrative costs/responsibilities—\$100,000
 - iii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$225,000 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

1. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. **State Climate Change Environmental Health and Protection Advisory Council**
 - i. 10001 – 10009—Households – All income levels
2. Determine part of program to be affected by savings (from strategy write-up).
 - a. **State Climate Change Environmental Health and Protection Advisory Council**

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

3. Research savings data for each policy according to part of program to be affected by savings.
 - a. **State Climate Change Environmental Health and Protection Advisory Council**
 - i. Avg. Cost of an ER visit for Asthma attacks²⁷¹—\$512
 - ii. Number of those in MD diagnosed with Asthma²⁷²—11,474
 - iii. Number of Deaths from Asthma in 2009²⁷³—221
 - iv. Average Funeral Costs in Maryland²⁷⁴—\$4,500
4. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **State Climate Change Environmental Health and Protection Advisory Council**
 - i. \$5,874,688 [(11,474 Number of those in MD diagnosed with Asthma * 512 Avg. Cost of an ER visit for Asthma attacks)]=Cost to MD Households Annually
 - ii. 10001 – 10009 \$5,874,688.00 [(11,474 Number of those in MD diagnosed with Asthma * 512 Avg. Cost of an ER visit for Asthma attacks)]=Savings from System
5. Input savings by sector into IMPLAN model and run impacts.
6. Export impacts and analyze.

3.8.9 Title V Permits for GHG Sources**Investment Phase**

1. Determine relevant IMPLAN sectors for each program under the policy (taken from IMPLAN Excel file).
 - a. **Title V Permits for GHG Sources**
 - i. 352—Data processing, hosting, ISP, web search portals, and related services
 - ii. 375—Environmental and other technical consulting services
 - iii. 376—Scientific research and development services
 - iv. 381—Management of companies and enterprises
 - v. 432—Other state and local government enterprises

²⁷¹ Collins, Mary, and Judy Chen. "Under-Controlled Asthma's Economic Impact | Feature Articles | Perspectives | Payer Solutions." IMS Health. IMS Health, Spring 2010. Web. 14 Nov. 2011. <<http://www.imshealth.com/portal/site/imshealth/menuitem.a46c6d4df3db4b3d88f611019418c22a/?vgnnextoid=da12b0ac2e6e6210VgnVCM100000ed152ca2RCRD>>.

²⁷² Asthma Hospitalizations in Maryland. Family Health Administration. Department of Health and Mental Hygiene, Aug. 2011. Web. 14 Nov. 2011. <<http://fha.maryland.gov/pdf/mch/DataBrief-3-AsthmaHospitalizationsinMaryland2011.pdf>>.

²⁷³ Asthma Mortality in Maryland. Family Health Administration. Department of Health and Mental Hygiene, Aug. 2011. Web. 14 Nov. 2011. <<http://fha.maryland.gov/pdf/mch/DataBrief2-AsthmaMortalityinMaryland2011.pdf>>.

²⁷⁴ Mary, Stephenson J., and Donna Brinsfield. "Funeral Planning." University of Maryland Cooperative Extension Fact Sheet. University of Maryland Cooperative Extension. Web. 14 Nov. 2011. <<http://extension.umd.edu/publications/pdfs/fs409.pdf>>.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

2. Determine overall cost of policy implementation for each program under the policy. If no funding levels have been provided for a policy, use a per \$1 million basis.
 - a. **Title V Permits for GHG Sources**
 - i. \$1,000,000 (per \$1m basis due to no actual investment dollar figures)
3. Distribute inputs among identified IMPLAN sectors.
 - a. **Title V Permits for GHG Sources**
 - i. 10% for government administrative costs/responsibilities—\$100,000
 - ii. 90% spread evenly among remaining sectors providing goods and services aimed at implementing policy—\$450,000 each
4. Input sales by sector into IMPLAN model and run impacts.
5. Export impacts and analyze.

Operation Phase

2. Determine relevant IMPLAN sectors (taken from IMPLAN Excel file).
 - a. **Title V Permits for GHG Sources**
 - i. 432— Other state and local government enterprises
3. Determine part of program to be affected by savings (from 6.1.8 write-up).
 - a. **Title V Permits for GHG Sources**
 - i. Minimum air pollution sources to obtain permit – 17,000 sources
 - ii. Minimum possible annually – 100 tons per year of **CO₂** equivalent
4. Research savings data for each policy according to part of program to be affected by savings.
 - a. **Title V Permits for GHG Sources**
 - i. Fees associated with Compliance²⁷⁵—\$52.23 per ton + \$200.00 base fee annually
 - ii. Number of Agencies currently holding permits²⁷⁶—120
 - iii. Total Minimum for Any Air Pollutant²⁷⁷—100 tons
 - iv. Total Minimum for Nitrogen Oxides²⁷⁸—25 tons
 - v. Total Minimum for Volatile Organic Components²⁷⁹—37.5 tons (varies by county, average)
 - vi. Total Minimum for Hazardous Air Pollutants (average)²⁸⁰—17.5 tons (single is 10 tons, and combination of variety is 25 tons)

²⁷⁵ “Title V Fee Sheet” The Department of the Environment. 14 Nov. 2011

<<http://www.mde.state.md.us/programs/Permits/AirManagementPermits/TitleVProgramInformation/Pages/title5feesheet.aspx>>

²⁷⁶ “Issued Part 70 Permits” The Department of the Environment. 14 Nov. 2011

<<http://www.mde.state.md.us/programs/Permits/AirManagementPermits/TitleVProgramInformation/Pages/title5issuedpermits.aspx>>

²⁷⁷ “Chronology of Maryland’s Part 70 Permit Program” The Department of the Environment. 14 Nov. 2011

<<http://www.mde.state.md.us/programs/Permits/AirManagementPermits/TitleVProgramInformation/Pages/title5factsheet.aspx>>

²⁷⁸ Ibid.

²⁷⁹ “Chronology of Maryland’s Part 70 Permit Program” The Department of the Environment. 14 Nov. 2011

<<http://www.mde.state.md.us/programs/Permits/AirManagementPermits/TitleVProgramInformation/Pages/title5factsheet.aspx>>

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

5. Estimate total annual increase in savings/revenue for each program and then calculate for complete study period (2011-2020).
 - a. **Title V Permits for GHG Sources**
 - i. \$650,760.00 [(120 current permit holders * (\$52.23 per ton * 100 ton minimum + \$200.00 base fee)]=annual revenue to government from companies compliance with Clean Air Act
 - ii. \$180,690.00 [(120 current permit holders * (\$52.23 per ton * 25 ton minimum + \$200.00 base fee)]=annual revenue to government from companies compliance with Nitrogen Oxide Permit
 - iii. \$259,035.00 [(120 current permit holders * (\$52.23 per ton * 37.5 ton minimum + \$200.00 base fee)]=annual revenue to government from companies compliance with Volatile Organic Component Permit
 - iv. \$133,683.00 [(120 current permit holders * (\$52.23 per ton * 17.5 ton minimum + \$200.00 base fee)]=annual revenue to government from companies compliance with Hazardous Air Pollutants Permit
 - v. 432--\$306,042.00 [(\$650,760.00 annual revenue if all apply under any air pollutant + \$180,690.00 annual revenue if all apply under nitrogen oxide permit + \$259,035.00 annual revenue if all apply under volatile organic component permit + \$133,683.00 annual revenue if all apply under hazardous air pollutants permit)] / [(4 different types of permits)]=average possible annual minimum revenue from Title V permits
6. Input savings by sector into IMPLAN model and run impacts.
7. Export impacts and analyze.

²⁸⁰ Ibid.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan**Final Draft**

RESI of Towson University

Appendix D—Occupational Data

This appendix contains information regarding the five top-gaining industries in terms of total employment for each strategy for both the investment and operation phases. RESI matched these industries with their top occupations in terms of employment on the national level. The top occupations were taken from BLS occupational industry overview data.

These occupations provide examples of some of the jobs which may experience employment gains as a result of investment or operation of each strategy. It is important to note that RESI analyzed the total employment gain rather than the direct employment gain, so some of the occupations listed in this appendix may experience an indirect or induced employment impact. In some cases, some occupations may not experience much impact at all, if any. It is important to note that IMPLAN does not provide impacts on the occupational level, so the data contained in this appendix serves only as examples of what job titles may be affected due to each strategy.

It is important to note that job creation during the investment phase does not necessarily assure that such jobs will be retained. In some cases, these jobs may only exist during the implementation period. On the other hand, most operational jobs will ultimately be retained rather than created after initial strategy implementation has occurred and operation is ongoing.

This appendix is meant to act as a guide for understanding the jobs associated with the industries defined in the final report. Some strategies showed gains in or retention of employment within industries which may not seem to have a direct relation to the relevant strategy. In many cases, such impacts were driven primarily by indirect and induced effects.

Industries which saw gain from many strategies included in this report are *Professional, scientific, and technical services* and *Public administration*. Although the types of jobs contained within these sectors may not be as transparent as *Construction* or *Retail trade*, RESI used national level BLS data to demonstrate the types of jobs that exist within these industries. For many strategies, one of the goals is to stimulate green job growth. The industries defined by IMPLAN do not offer much insight into the exact job titles within them, but consider the following: When a company must comply with certain regulations such as GHG emissions targets or caps, they will often need to hire environmental consultants, lawyers, and eventually developers to assist in cost-effective measures while remaining compliant with regulations. These jobs would typically fall under industries such as *Professional, scientific and technical services* and *Construction*.

Some strategies' operation phase revealed a significant impact on employment within *Health care and social assistance* and *Retail trade*. These total employment impacts were generally driven by either an indirect or induced effect, as mentioned previously, coming from the change in household income. For example, under the *Clean Cars Program for Maryland* strategy, RESI expects that many households would probably wait until after the strategy had been implemented and new technology had been introduced to purchase a new vehicle. Once the new vehicles that are compliant with new regulations become available, car dealerships would see an increase in sales during the operation phase of the strategy. Therefore, they would need to hire new sales

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

representatives to meet the increased demand. This would demonstrate a possible direct effect in *Retail trade*. The indirect effect may be an equal or lesser effect in *Health care and social assistance* as a new group of people now have either an increased income or a second income and therefore can allocate more money toward their personal health. In addition, employers would be providing health benefits to a greater number of people. This could lead to a hiring effect in nursing, for example, for doctor's offices and hospitals as the demand for healthcare increases. This is just one example of how these strategies may affect sectors which are not directly discussed within the strategy.

The state of Maryland is home to many highly ranked higher educational institutions such as Johns Hopkins University and the University of Maryland. Students and graduates of such institutions are on the forefront of leading technological advances and medical discoveries within the state's borders on a daily basis. Employment related with many of the industries defined and frequently repeated throughout the report as benefitting from the strategies discussed would be ideal fields for future Maryland graduates. If students were to graduate and stay within the state after graduation because they received a steady position, this could ultimately lead to a positive effect on the state's gross domestic product.

All tables enclosed within this appendix represent strategies RESI was tasked with analyzing by MDE. Only three strategies were omitted from this analysis: 3.2.13 (Evaluating the GHG Emissions Impacts from Major Projects and Plans), 3.5.1 (Greenhouse Gas Emissions Inventory Development), and 3.5.2 (Subprogram Analysis, Goals, and Overall Implementation).

Please refer to the main body of the report for more information regarding impacts by strategy and phase as well as discussion of some of the potential reasons for employment gain in the top-gaining industries presented here. Please refer to Appendix B for a more detail explanation of direct, indirect, and induced impacts.

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft
 RESI of Towson University

D.1 Energy

3.1.1 Regional Greenhouse Gas Initiative (RGGI)—Investment Phase

Professional, scientific, and technical services	7.8	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Administrative and support and waste management and remediation services	0.7	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Health care and social assistance	0.6	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	0.5	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Other services (except public administration)	0.4	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.1.1 Regional Greenhouse Gas Initiative (RGGI)—Operation Phase

Public administration	159.7	Executive, Legislative, and Other General Government Support Justice, Public Order, and Safety Activities Administration of Human Resource Programs Administration of Environmental Quality Programs Administration of Housing Programs, Urban Planning, and Community Development
Professional, scientific, and technical services	44.4	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Administrative and support and waste management and remediation services	34	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Real estate and rental and leasing	25.8	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general
Health care and social assistance	25.2	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.1.2 GHG Reductions from Imported Power—Investment Phase

Professional, scientific, and technical services	4.3	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Health care and social assistance	0.7	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	0.6	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Administrative and support and waste management and remediation services	0.6	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Utilities	0.5	Electrical power-line installers and repairers Control and valve installers and repairers, except mechanical door Meter readers, utilities First-line supervisors/managers of mechanics, installers, and repairers Electrical engineers

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.1.2 GHG Reductions from Imported Power—Operation Phase

Utilities	0.9	Electrical power-line installers and repairers Control and valve installers and repairers, except mechanical door Meter readers, utilities First-line supervisors/managers of mechanics, installers, and repairers Electrical engineers
Retail trade	0.3	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Professional, scientific, and technical services	0.3	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Health care and social assistance	0.3	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Accommodation and food services	0.3	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.1.3 Federal New Source Performance Standard—Investment Phase

Professional, scientific, and technical services	7.8	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Administrative and support and waste management and remediation services	0.7	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Health care and social assistance	0.7	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	0.6	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Real estate and rental and leasing	0.4	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.1.3 Federal New Source Performance Standard—Operation Phase

Utilities	1.6	Electrical power-line installers and repairers Control and valve installers and repairers, except mechanical door Meter readers, utilities First-line supervisors/managers of mechanics, installers, and repairers Electrical engineers
Accommodation and food services	0.6	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Retail trade	0.5	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Professional, scientific, and technical services	0.5	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Health care and social assistance	0.5	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.1.4 MACT—Investment Phase

Professional, scientific, and technical services	2.1	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Public administration	0.4	Executive, Legislative, and Other General Government Support Justice, Public Order, and Safety Activities Administration of Human Resource Programs Administration of Environmental Quality Programs Administration of Housing Programs, Urban Planning, and Community Development
Utilities	0.2	Control and valve installers and repairers, except mechanical door Meter readers, utilities First-line supervisors/managers of mechanics, installers, and repairers Electrical engineers Construction laborers
Construction	0.1	Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Retail trade	0.1	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.1.4 MACT—Operation Phase

Utilities	11.3	Electrical power-line installers and repairers Control and valve installers and repairers, except mechanical door Meter readers, utilities First-line supervisors/managers of mechanics, installers, and repairers Electrical engineers
Accommodation and food services	3.9	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Health care and social assistance	3.7	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	3.4	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Professional, scientific, and technical services	3.3	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

**3.1.5 GHG Prevention of Significant Deterioration Permitting Program—
Investment Phase**

Information	3.3	Computer software engineers, applications Computer support specialists Customer service representatives Network and computer systems administrators Telecommunications equipment installers and repairers, except line installers
Professional, scientific, and technical services	2.2	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Public administration	0.4	Executive, Legislative, and Other General Government Support Justice, Public Order, and Safety Activities Administration of Human Resource Programs Administration of Environmental Quality Programs Administration of Housing Programs, Urban Planning, and Community Development
Administrative and support and waste management and remediation services	0.3	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Transportation and warehousing	0.1	Truck drivers, heavy and tractor-trailer Bus drivers, school Airline pilots, copilots, and flight engineers Railroad conductors and yardmasters Sailors and marine oilers

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

**3.1.5 GHG Prevention of Significant Deterioration Permitting Program—
Operation Phase**

Public administration	0.4	Executive, Legislative, and Other General Government Support Justice, Public Order, and Safety Activities Administration of Human Resource Programs Administration of Environmental Quality Programs Administration of Housing Programs, Urban Planning, and Community Development
Construction	0.1	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Retail trade	0.1	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Real estate and rental and leasing	0.1	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general
Professional, scientific, and technical services	0.1	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.1.6 Energy Efficiency in the Residential Sector—Investment Phase

Retail trade	5.1	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Professional, scientific, and technical services	3.7	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Construction	1.3	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Health care and social assistance	0.8	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Other services (except public administration)	0.8	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.1.6 Energy Efficiency in the Residential Sector—Operation Phase

Health care and social assistance	48	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	38.3	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Accommodation and food services	22.1	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Other services (except public administration)	19.7	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general
Real estate and rental and leasing	15.9	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

**3.1.7 Energy Efficiency in the Commercial and Industrial Sectors—
Investment Phase**

Professional, scientific, and technical services	4.2	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Retail trade	3.6	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Construction	1.1	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Health care and social assistance	0.8	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Administrative and support and waste management and remediation services	0.7	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

**3.1.7 Energy Efficiency in the Commercial and Industrial Sectors—
Operation Phase**

Management of companies and enterprises	169.9	Bookkeeping, accounting, and auditing clerks Accountants and auditors General and operations managers Financial managers First-line supervisors/managers of office and administrative support workers
Professional, scientific, and technical services	35.1	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Health care and social assistance	29.8	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	25.6	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Accommodation and food services	18.3	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.1.8 Energy Efficiency – Appliances and Other Products—Investment Phase

Retail trade	9.2	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Professional, scientific, and technical services	2.4	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Wholesale trade	1.3	Laborers and freight, stock, and material movers, hand Sales representatives, wholesale and manufacturing, except technical and scientific products Sales representatives, wholesale and manufacturing, technical and scientific products Truck drivers, heavy and tractor-trailer Wholesale and retail buyers, except farm products
Health care and social assistance	0.8	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Real estate and rental and leasing	0.5	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.1.8 Energy Efficiency – Appliances and Other Products—Operation Phase

Health care and social assistance	16.3	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	13	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Accommodation and food services	7.5	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Real estate and rental and leasing	5.1	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general
Finance and insurance	4.9	Tellers Insurance sales agents Securities, commodities, and financial services sales agents Loan officers Accountants and auditors

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.1.9 Energy Efficiency in the Power Sector – General—Investment Phase

Professional, scientific, and technical services	3.0	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Administrative and support and waste management and remediation services	0.5	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Health care and social assistance	0.5	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Accommodation and food services	0.4	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Public administration	0.4	Executive, Legislative, and Other General Government Support Justice, Public Order, and Safety Activities Administration of Human Resource Programs Administration of Environmental Quality Programs Administration of Housing Programs, Urban Planning, and Community Development

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.1.9 Energy Efficiency in the Power Sector – General—Operation Phase

Utilities	32.5	Electrical power-line installers and repairers Control and valve installers and repairers, except mechanical door Meter readers, utilities First-line supervisors/managers of mechanics, installers, and repairers Electrical engineers
Accommodation and food services	11.3	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Health care and social assistance	10.6	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	9.6	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Professional, scientific, and technical services	9.5	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.1.10 EmPOWER – Utility Subprograms—Investment Phase

Retail trade	5.6	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Professional, scientific, and technical services	2.6	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Construction	1.2	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Wholesale trade	0.8	Laborers and freight, stock, and material movers, hand Sales representatives, wholesale and manufacturing, except technical and scientific products Sales representatives, wholesale and manufacturing, technical and scientific products Truck drivers, heavy and tractor-trailer Wholesale and retail buyers, except farm products
Health care and social assistance	0.8	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.1.10 EmPOWER – Utility Subprograms—Operation Phase

Health care and social assistance	89.0	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	71.3	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Management of companies and enterprises	57.5	Bookkeeping, accounting, and auditing clerks Accountants and auditors General and operations managers Financial managers First-line supervisors/managers of office and administrative support workers
Accommodation and food services	42.1	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Other services (except public administration)	38.0	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

**3.1.11 Maryland Renewable Energy Portfolio Standard Subprogram—
Investment Phase**

Professional, scientific, and technical services	4.5	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Construction	3.3	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Retail trade	0.8	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Health care and social assistance	0.8	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Administrative and support and waste management and remediation services	0.7	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

**3.1.11 Maryland Renewable Energy Portfolio Standard Subprogram—
Operation Phase**

Health care and social assistance	48.4	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	38.6	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Accommodation and food services	22.8	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Other services (except public administration)	20.0	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general
Real estate and rental and leasing	15.7	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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**3.1.12 Incentives and Grant Subprograms to Support Renewable Energy—
Investment Phase**

Professional, scientific, and technical services	3.3	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Retail trade	1.8	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Manufacturing	0.8	Team assemblers Inspectors, testers, sorters, samplers and weighers Machinists Helpers--production workers Purchasing agents, except wholesale, retail and farm products
Health care and social assistance	0.7	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Administrative and support and waste management and remediation services	0.6	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

**3.1.12 Incentives and Grant Subprograms to Support Renewable Energy—
Operation Phase**

Management of companies and enterprises	44.6	Bookkeeping, accounting, and auditing clerks Accountants and auditors General and operations managers Financial managers First-line supervisors/managers of office and administrative support workers
Public administration	27.2	Executive, Legislative, and Other General Government Support Justice, Public Order, and Safety Activities Administration of Human Resource Programs Administration of Environmental Quality Programs Administration of Housing Programs, Urban Planning, and Community Development
Health care and social assistance	24.4	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	20.4	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Professional, scientific, and technical services	18.6	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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3.1.13 Offshore Wind Initiatives to Support Renewable Energy—Investment Phase

Professional, scientific, and technical services	3	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Administrative and support and waste management and remediation services	0.7	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Manufacturing	0.6	Team assemblers Inspectors, testers, sorters, samplers and weighers Machinists Helpers--production workers Purchasing agents, except wholesale, retail and farm products
Health care and social assistance	0.6	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	0.5	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.1.13 Offshore Wind Initiatives to Support Renewable Energy—Operation Phase

Management of companies and enterprises	19.9	Bookkeeping, accounting, and auditing clerks Accountants and auditors General and operations managers Financial managers First-line supervisors/managers of office and administrative support workers
Professional, scientific, and technical services	4.2	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Health care and social assistance	4	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	3.4	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Accommodation and food services	2.4	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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3.1.14 Combined Heat and Power—Investment Phase

Professional, scientific, and technical services	5.6	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Health care and social assistance	0.7	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	0.6	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Administrative and support and waste management and remediation services	0.6	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Accommodation and food services	0.5	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.1.14 Combined Heat and Power—Operation Phase

Management of companies and enterprises	37.9	Bookkeeping, accounting, and auditing clerks Accountants and auditors General and operations managers Financial managers First-line supervisors/managers of office and administrative support workers
Health care and social assistance	10.7	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Professional, scientific, and technical services	10.6	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Retail trade	9.2	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Utilities	9.0	Electrical power-line installers and repairers Control and valve installers and repairers, except mechanical door Meter readers, utilities First-line supervisors/managers of mechanics, installers, and repairers Electrical engineers

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.1.15 Main Street—Investment Phase

Professional, scientific, and technical services	5.0	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Construction	2.9	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Retail trade	0.8	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Health care and social assistance	0.8	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Administrative and support and waste management and remediation services	0.6	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.1.15 Main Street—Operation Phase

Management of companies and enterprises	138.2	Bookkeeping, accounting, and auditing clerks Accountants and auditors General and operations managers Financial managers First-line supervisors/managers of office and administrative support workers
Health care and social assistance	34.5	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Professional, scientific, and technical services	30.4	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Retail trade	29	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Accommodation and food services	19.5	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

**3.1.16 Weatherization and Energy Efficiency for Low-Income Houses—
Investment Phase**

Professional, scientific, and technical services	4.9	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Construction	1.5	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Retail trade	0.8	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Health care and social assistance	0.7	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Administrative and support and waste management and remediation services	0.6	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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**3.1.16 Weatherization and Energy Efficiency for Low-Income Houses—
Operation Phase**

Health care and social assistance	0.3	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	0.2	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Finance and insurance	0.1	Tellers Insurance sales agents Securities, commodities, and financial services sales agents Loan officers Accountants and auditors
Real estate and rental and leasing	0.1	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general
Professional, scientific, and technical services	0.1	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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D.2 Transportation

3.2.1 Maryland Clean Cars Subprogram—Investment Phase

Management of companies and enterprises	0.1	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Mining	0.0	Roustabouts, oil and gas Operating engineers and other construction equipment operators First-line supervisors/managers of construction trades and extraction workers Helpers--extraction workers Mining and geological engineers, including mining safety engineers
Agriculture and Forestry	-0.1	Farmworkers and laborers, crop, nursery and greenhouse Logging equipment operators Agricultural equipment operators Truck drivers, heavy and tractor-trailer First-line supervisors/managers of farming, fishing and forestry workers
Utilities	-0.1	Electrical power-line installers and repairers Control and valve installers and repairers, except mechanical door Meter readers, utilities First-line supervisors/managers of mechanics, installers, and repairers Electrical engineers
Information	-0.6	Computer software engineers, applications Computer support specialists Customer service representatives Network and computer systems administrators Telecommunications equipment installers and repairers, except line installers

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.1 Maryland Clean Cars Subprogram—Operation Phase

Health care and social assistance	19.0	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	14.8	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Accommodation and food services	8.7	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Other services (except public administration)	7.5	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general
Real estate and rental and leasing	6.1	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.2 Federal Medium- and Heavy-Duty GHG Standards—Investment Phase

Retail trade	2.3	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Professional, scientific, and technical services	1.6	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Transportation and warehousing	1.3	Truck drivers, heavy and tractor-trailer Bus drivers, school Airline pilots, copilots, and flight engineers Railroad conductors and yardmasters Sailors and marine oilers
Wholesale trade	0.6	Laborers and freight, stock, and material movers, hand Sales representatives, wholesale and manufacturing, except technical and scientific products Sales representatives, wholesale and manufacturing, technical and scientific products Truck drivers, heavy and tractor-trailer Wholesale and retail buyers, except farm products
Administrative and support and waste management and remediation services	0.5	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.2 Federal Medium- and Heavy-Duty GHG Standards—Investment Phase

Health care and social assistance	1.5	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	1.2	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Accommodation and food services	0.7	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Other services (except public administration)	0.6	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general
Real estate and rental and leasing	0.5	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.3 Clean Fuel Standard—Investment Phase

Professional, scientific, and technical services	7.6	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Administrative and support and waste management and remediation services	0.6	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Health care and social assistance	0.5	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Public administration	0.4	Executive, Legislative, and Other General Government Support Justice, Public Order, and Safety Activities Administration of Human Resource Programs Administration of Environmental Quality Programs Administration of Housing Programs, Urban Planning, and Community Development
Accommodation and food services	0.3	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.3 Clean Fuel Standard—Operation Phase

Health care and social assistance	9.0	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	7.0	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Accommodation and food services	4.1	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Other services (except public administration)	3.5	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general
Real estate and rental and leasing	2.9	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.4 Transportation Climate Initiative—Investment Phase

Transportation and warehousing	7.0	Truck drivers, heavy and tractor-trailer Bus drivers, school Airline pilots, copilots, and flight engineers Railroad conductors and yardmasters Sailors and marine oilers
Professional, scientific, and technical services	1.4	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Administrative and support and waste management and remediation services	0.7	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Health care and social assistance	0.7	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	0.6	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.4 Transportation Climate Initiative—Operation Phase

Health care and social assistance	0.5	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	0.4	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Accommodation and food services	0.2	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Other services (except public administration)	0.2	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general
Wholesale trade	0.1	Laborers and freight, stock, and material movers, hand Sales representatives, wholesale and manufacturing, except technical and scientific products Sales representatives, wholesale and manufacturing, technical and scientific products Truck drivers, heavy and tractor-trailer Wholesale and retail buyers, except farm products

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.5 Public Transportation Initiatives—Investment Phase

Transportation and warehousing	3.7	Truck drivers, heavy and tractor-trailer Bus drivers, school Airline pilots, copilots, and flight engineers Railroad conductors and yardmasters Sailors and marine oilers
Professional, scientific, and technical services	3.3	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Educational services	1.8	Elementary school teachers, except special education Teacher assistants Secondary school teachers, except special and vocational education Middle school teachers, except special and vocational education Education administrators, elementary and secondary school
Construction	0.7	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Retail trade	0.7	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.5 Public Transportation Initiatives—Operation Phase

Health care and social assistance	88.8	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	70.4	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Accommodation and food services	40.6	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Agriculture, forestry, fishing, and hunting	40.5	Farmworkers and laborers, crop, nursery and greenhouse Logging equipment operators Agricultural equipment operators Truck drivers, heavy and tractor-trailer First-line supervisors/managers of farming, fishing and forestry workers
Other services (except public administration)	36	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.6 Initiatives to Double Transit Ridership by 2020—Investment Phase

Professional, scientific, and technical services	3.9	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Construction	2.7	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Health care and social assistance	0.8	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	0.7	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Administrative and support and waste management and remediation services	0.7	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.6 Initiatives to Double Transit Ridership by 2020—Operation Phase

Health care and social assistance	32.6	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	25.9	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Accommodation and food services	14.9	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Other services (except public administration)	13.2	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general
Real estate and rental and leasing	10.2	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.7 Intercity Transportation Initiatives—Investment Phase

Transportation and warehousing	2.7	Truck drivers, heavy and tractor-trailer Bus drivers, school Airline pilots, copilots, and flight engineers Railroad conductors and yardmasters Sailors and marine oilers
Professional, scientific, and technical services	2.3	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Construction	1.9	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Other services (except public administration)	1.3	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general
Retail trade	0.7	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.7 Intercity Transportation Initiatives—Operation Phase

Public administration	186.6	Executive, Legislative, and Other General Government Support Justice, Public Order, and Safety Activities Administration of Human Resource Programs Administration of Environmental Quality Programs Administration of Housing Programs, Urban Planning, and Community Development
Health care and social assistance	67.5	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Professional, scientific, and technical services	58.3	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Retail trade	57.2	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Real state and rental and leasing	41.7	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.8 Bike and Pedestrian Initiatives—Investment Phase

Professional, scientific, and technical services	2.8	Executive, Legislative, and Other General Government Support Justice, Public Order, and Safety Activities Administration of Human Resource Programs Administration of Environmental Quality Programs Administration of Housing Programs, Urban Planning, and Community Development
Construction	1.0	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Public administration	0.9	Executive, Legislative, and Other General Government Support Justice, Public Order, and Safety Activities Administration of Human Resource Programs Administration of Environmental Quality Programs Administration of Housing Programs, Urban Planning, and Community Development
Real estate and rental and leasing	0.8	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general
Wholesale trade	0.7	Laborers and freight, stock, and material movers, hand Sales representatives, wholesale and manufacturing, except technical and scientific products Sales representatives, wholesale and manufacturing, technical and scientific products Truck drivers, heavy and tractor-trailer Wholesale and retail buyers, except farm products

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.8 Bike and Pedestrian Initiatives—Operation Phase

Health care and social assistance	41.7	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	33.1	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Accommodation and food services	19	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Other services (except public administration)	16.9	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general
Real estate and rental and leasing	13	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.9 Pricing Initiatives—Investment Phase

Professional, scientific, and technical services	4.4	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Transportation and warehousing	1.3	Truck drivers, heavy and tractor-trailer Bus drivers, school Airline pilots, copilots, and flight engineers Railroad conductors and yardmasters Sailors and marine oilers
Public administration	1.0	Executive, Legislative, and Other General Government Support Justice, Public Order, and Safety Activities Administration of Human Resource Programs Administration of Environmental Quality Programs Administration of Housing Programs, Urban Planning, and Community Development
Construction	0.9	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Other services (except public administration)	0.8	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.9 Pricing Initiatives—Operation Phase

Public administration	2,806.6	Executive, Legislative, and Other General Government Support Justice, Public Order, and Safety Activities Administration of Human Resource Programs Administration of Environmental Quality Programs Administration of Housing Programs, Urban Planning, and Community Development
Professional, scientific, and technical services	782.8	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Administrative and support and waste management and remediation services	601.7	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Health care and social assistance	460.1	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	421.0	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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3.2.10 Transportation Technology Initiatives—Investment Phase

Professional, scientific, and technical services	4.7	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Manufacturing	1.1	Team assemblers Inspectors, testers, sorters, samplers and weighers Machinists Helpers--production workers Purchasing agents, except wholesale, retail and farm products
Administrative and support and waste management and remediation services	0.8	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Health care and social assistance	0.7	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	0.6	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.10 Transportation Technology Initiatives—Operation Phase

Transportation and warehousing	568.0	Truck drivers, heavy and tractor-trailer Bus drivers, school Airline pilots, copilots, and flight engineers Railroad conductors and yardmasters Sailors and marine oilers
Health care and social assistance	165.0	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	145.8	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Administrative and support and waste management and remediation services	107.8	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Accommodation and food services	82.0	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.11 Electric Vehicle Initiatives—Investment Phase

Professional, scientific, and technical services	2.7	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Construction	1.1	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Retail trade	0.9	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Other services (except public administration)	0.9	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general
Manufacturing	0.7	Team assemblers Inspectors, testers, sorters, samplers and weighers Machinists Helpers--production workers Purchasing agents, except wholesale, retail and farm products

Sources: BLS, RESI

**Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft**

RESI of Towson University

3.2.11 Electric Vehicle Initiatives—Operation Phase

Public administration	13.7	Executive, Legislative, and Other General Government Support Justice, Public Order, and Safety Activities Administration of Human Resource Programs Administration of Environmental Quality Programs Administration of Housing Programs, Urban Planning, and Community Development
Health care and social assistance	5.0	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Professional, scientific, and technical services	4.3	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Retail trade	4.2	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Administrative and support and waste management and remediation services	3.5	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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3.2.12 Low-Emitting Vehicles Initiatives—Investment Phase

Manufacturing	1.4	Team assemblers Inspectors, testers, sorters, samplers and weighers Machinists Helpers--production workers Purchasing agents, except wholesale, retail and farm products
Wholesale trade	1.0	Laborers and freight, stock, and material movers, hand Sales representatives, wholesale and manufacturing, except technical and scientific products Sales representatives, wholesale and manufacturing, technical and scientific products Truck drivers, heavy and tractor-trailer Wholesale and retail buyers, except farm products
Other services (except public administration)	1.0	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general
Professional, scientific, and technical services	0.9	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Retail trade	0.6	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.12 Low-Emitting Vehicles Initiatives—Operation Phase

Public administration	0.1	Executive, Legislative, and Other General Government Support Justice, Public Order, and Safety Activities Administration of Human Resource Programs Administration of Environmental Quality Programs Administration of Housing Programs, Urban Planning, and Community Development
Agriculture, forestry, fishing, and hunting	0.0	Farmworkers and laborers, crop, nursery and greenhouse Logging equipment operators Agricultural equipment operators Truck drivers, heavy and tractor-trailer First-line supervisors/managers of farming, fishing and forestry workers
Mining	0.0	Roustabouts, oil and gas Operating engineers and other construction equipment operators First-line supervisors/managers of construction trades and extraction workers Helpers--extraction workers Mining and geological engineers, including mining safety engineers
Utilities	0.0	Electrical power-line installers and repairers Control and valve installers and repairers, except mechanical door Meter readers, utilities First-line supervisors/managers of mechanics, installers, and repairers Electrical engineers
Construction	0.0	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.14 Airport Initiatives—Investment Phase

Professional, scientific, and technical services	4.1	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Health care and social assistance	0.7	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Manufacturing	0.6	Team assemblers Inspectors, testers, sorters, samplers and weighers Machinists Helpers--production workers Purchasing agents, except wholesale, retail and farm products
Retail trade	0.6	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Administrative and support and waste management and remediation services	0.6	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.14 Airport Initiatives—Operation Phase

Transportation and warehousing	51.2	Truck drivers, heavy and tractor-trailer Bus drivers, school Airline pilots, copilots, and flight engineers Railroad conductors and yardmasters Sailors and marine oilers
Finance and insurance	12.6	Tellers Insurance sales agents Securities, commodities, and financial services sales agents Loan officers Accountants and auditors
Professional, scientific, and technical services	12.4	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Health care and social assistance	9.6	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Administrative and support and waste management and remediation services	9.0	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.15 Port Initiatives—Investment Phase

Professional, scientific, and technical services	2.2	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Manufacturing	1.3	Team assemblers Inspectors, testers, sorters, samplers and weighers Machinists Helpers--production workers
Wholesale trade	0.8	Purchasing agents, except wholesale, retail and farm products Laborers and freight, stock, and material movers, hand Sales representatives, wholesale and manufacturing, except technical and scientific products Sales representatives, wholesale and manufacturing, technical and scientific products Truck drivers, heavy and tractor-trailer Wholesale and retail buyers, except farm products
Retail trade	0.5	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Administrative and support and waste management and remediation services	0.5	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.15 Port Initiatives—Operation Phase

Transportation and warehousing	0.2	Truck drivers, heavy and tractor-trailer Bus drivers, school Airline pilots, copilots, and flight engineers Railroad conductors and yardmasters Sailors and marine oilers
Agriculture, forestry, fishing, and hunting	0.0	Farmworkers and laborers, crop, nursery and greenhouse Logging equipment operators Agricultural equipment operators Truck drivers, heavy and tractor-trailer First-line supervisors/managers of farming, fishing and forestry workers
Mining	0.0	Roustabouts, oil and gas Operating engineers and other construction equipment operators First-line supervisors/managers of construction trades and extraction workers Helpers--extraction workers Mining and geological engineers, including mining safety engineers
Utilities	0.0	Electrical power-line installers and repairers Control and valve installers and repairers, except mechanical door Meter readers, utilities First-line supervisors/managers of mechanics, installers, and repairers Electrical engineers
Construction	0.0	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.16 Freight and Freight Rail Strategies—Investment Phase

Transportation and warehousing	4.1	Truck drivers, heavy and tractor-trailer Bus drivers, school Airline pilots, copilots, and flight engineers Railroad conductors and yardmasters Sailors and marine oilers
Professional, scientific, and technical services	1.9	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Other services (except public administration)	1.5	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general
Wholesale trade	0.8	Laborers and freight, stock, and material movers, hand Sales representatives, wholesale and manufacturing, except technical and scientific products Sales representatives, wholesale and manufacturing, technical and scientific products Truck drivers, heavy and tractor-trailer Wholesale and retail buyers, except farm products
Retail trade	0.7	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.16 Freight and Freight Rail Strategies—Operation Phase

Transportation and warehousing	413.8	Truck drivers, heavy and tractor-trailer Bus drivers, school Airline pilots, copilots, and flight engineers Railroad conductors and yardmasters Sailors and marine oilers
Health care and social assistance	25.9	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	23.3	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Retail salespersons
Administrative and support and waste management and remediation services	21.1	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Finance and insurance	17.8	Tellers Insurance sales agents Securities, commodities, and financial services sales agents Loan officers Accountants and auditors

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.17 Renewable Fuels Standard—Investment Phase

Professional, scientific, and technical services	2.2	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Mining	1.7	Roustabouts, oil and gas Operating engineers and other construction equipment operators First-line supervisors/managers of construction trades and extraction workers Helpers--extraction workers Mining and geological engineers, including mining safety engineers
Management of companies and enterprises	0.9	Bookkeeping, accounting, and auditing clerks Accountants and auditors General and operations managers Financial managers First-line supervisors/managers of office and administrative support workers
Health care and social assistance	0.6	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	0.5	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives

Sources: BLS, RESI

**Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft**

RESI of Towson University

3.2.17 Renewable Fuels Standard—Operation Phase

Health care and social assistance	17.7	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	14	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Accommodation and food services	8.1	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Other services (except public administration)	7.2	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general

Sources: BLS, RESI

**Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft**

RESI of Towson University

3.2.18 CAFÉ Standards: Model Years 2008-2011—Investment Phase

Retail trade	2.3	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Professional, scientific, and technical services	1.6	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Transportation and warehousing	1.3	Truck drivers, heavy and tractor-trailer Bus drivers, school Airline pilots, copilots, and flight engineers Railroad conductors and yardmasters Sailors and marine oilers
Wholesale trade	0.6	Laborers and freight, stock, and material movers, hand Sales representatives, wholesale and manufacturing, except technical and scientific products Sales representatives, wholesale and manufacturing, technical and scientific products Truck drivers, heavy and tractor-trailer Wholesale and retail buyers, except farm products
Administrative and support and waste management and remediation services	0.5	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.18 CAFÉ Standards: Model Years 2008-2011—Operation Phase

Health care and social assistance	8.2	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	6.5	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Accommodation and food services	3.7	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Other services (except public administration)	3.3	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general
Real estate and rental and leasing	2.6	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.19 Promoting Hybrid and Electric Vehicles—Investment Phase

Wholesale trade	1.6	Laborers and freight, stock, and material movers, hand Sales representatives, wholesale and manufacturing, except technical and scientific products Sales representatives, wholesale and manufacturing, technical and scientific products Truck drivers, heavy and tractor-trailer Wholesale and retail buyers, except farm products
Professional, scientific, and technical services	1.4	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Administrative and support and waste management and remediation services	1.0	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Other services (except public administration)	1.0	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general
Manufacturing	0.6	Team assemblers Inspectors, testers, sorters, samplers and weighers Machinists Helpers--production workers Purchasing agents, except wholesale, retail and farm products

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.19 Promoting Hybrid and Electric Vehicles—Operation Phase

Health care and social assistance	25.6	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	20.5	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Accommodation and food services	11.7	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Other services (except public administration)	10.5	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general
Real estate and rental and leasing	8.1	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.20 PAYD Insurance in Maryland—Investment Phase

Finance and insurance	3.8	Tellers Insurance sales agents Securities, commodities, and financial services sales agents Loan officers Accountants and auditors
Professional, scientific, and technical services	3.0	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Administrative and support and waste management and remediation services	0.8	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Retail trade	0.7	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Health care and social assistance	0.7	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.2.20 PAYD Insurance in Maryland—Operation Phase

Health care and social assistance	2.9	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	2.3	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Accommodation and food services	1.3	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Other services (except public administration)	1.2	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general
Real estate and rental and leasing	0.9	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

D.3 Agriculture and Forestry

3.3.1 Managing Forests to Capture Carbon—Investment Phase

Agriculture, forestry, fishing, and hunting	10.1	Farmworkers and laborers, crop, nursery and greenhouse Logging equipment operators Agricultural equipment operators Truck drivers, heavy and tractor-trailer First-line supervisors/managers of farming, fishing and forestry workers
Other services (except public administration)	1.9	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general
Professional, scientific, and technical services	1.8	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Manufacturing	0.7	Team assemblers Inspectors, testers, sorters, samplers and weighers Machinists Helpers--production workers Purchasing agents, except wholesale, retail and farm products
Health care and social assistance	0.7	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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3.3.1 Managing Forests to Capture Carbon—Operation Phase

Management of companies and enterprises	4.8	Bookkeeping, accounting, and auditing clerks Accountants and auditors General and operations managers Financial managers First-line supervisors/managers of office and administrative support workers
Professional, scientific, and technical services	1.0	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Health care and social assistance	0.8	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	0.7	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Real estate and rental and leasing	0.5	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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3.3.2 Creating Ecosystem Markets to Encourage GHG Emissions Reductions—Investment Phase

Agriculture, forestry, fishing, and hunting	62.1	Farmworkers and laborers, crop, nursery and greenhouse Logging equipment operators Agricultural equipment operators Truck drivers, heavy and tractor-trailer First-line supervisors/managers of farming, fishing and forestry workers
Professional, scientific, and technical services	28.8	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Construction	14.1	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Public administration	3.8	Executive, Legislative, and Other General Government Support Justice, Public Order, and Safety Activities Administration of Human Resource Programs Administration of Environmental Quality Programs Administration of Housing Programs, Urban Planning, and Community Development
Utilities	3.0	Electrical power-line installers and repairers Control and valve installers and repairers, except mechanical door Meter readers, utilities First-line supervisors/managers of mechanics, installers, and repairers Electrical engineers

Sources: BLS, RESI

**Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft**

RESI of Towson University

3.3.2 Creating Ecosystem Markets to Encourage GHG Emissions Reductions—Operation Phase

Management of companies and enterprises	1,850.7	Bookkeeping, accounting, and auditing clerks Accountants and auditors General and operations managers Financial managers First-line supervisors/managers of office and administrative support workers
Professional, scientific, and technical services	426.4	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Health care and social assistance	350.2	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	302.3	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Real estate and rental and leasing	216.7	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.3.3 Increasing Urban Trees to Capture Carbon—Investment Phase

Administrative and support and waste management and remediation services	3.9	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Agriculture, forestry, fishing, and hunting	2.3	Farmworkers and laborers, crop, nursery and greenhouse Logging equipment operators Agricultural equipment operators Truck drivers, heavy and tractor-trailer First-line supervisors/managers of farming, fishing and forestry workers
Professional, scientific, and technical services	2.2	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Health care and social assistance	0.7	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	0.6	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.3.3 Increasing Urban Trees to Capture Carbon—Operation Phase

Management of companies and enterprises	49.5	Bookkeeping, accounting, and auditing clerks Accountants and auditors General and operations managers Financial managers First-line supervisors/managers of office and administrative support workers
Professional, scientific, and technical services	10.2	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Health care and social assistance	8.7	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	7.5	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Accommodation and food services	5.3	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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3.3.4 Creating and Protecting Wetlands and Waterway Borders to Capture Carbon—Investment Phase

Agriculture, forestry, fishing, and hunting	28.4	Farmworkers and laborers, crop, nursery and greenhouse Logging equipment operators Agricultural equipment operators Truck drivers, heavy and tractor-trailer First-line supervisors/managers of farming, fishing and forestry workers
Construction	10.5	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Professional, scientific, and technical services	9.0	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Other services (except public administration)	8.5	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general
Health care and social assistance	4.0	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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3.3.4 Creating and Protecting Wetlands and Waterway Borders to Capture Carbon—Operation Phase

Health care and social assistance	262.9	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	208.9	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Accommodation and food services	120	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Other services (except public administration)	106.7	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general
Real estate and rental and leasing	81.9	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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3.3.5 Geological Opportunities to Store Carbon—Investment Phase

Professional, scientific, and technical services	5.9	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Administrative and support and waste management and remediation services	0.9	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Health care and social assistance	0.8	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	0.7	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Real estate and rental and leasing	0.5	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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3.3.5 Geological Opportunities to Store Carbon—Operation Phase

Management of companies and enterprises	309.1	Bookkeeping, accounting, and auditing clerks Accountants and auditors General and operations managers Financial managers First-line supervisors/managers of office and administrative support workers
Professional, scientific, and technical services	63.9	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Health care and social assistance	54.3	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	46.7	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Accommodation and food services	33.3	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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3.3.6 Planting Forests in Maryland—Investment Phase

Agriculture, forestry, fishing, and hunting	5.6	Farmworkers and laborers, crop, nursery and greenhouse Logging equipment operators Agricultural equipment operators Truck drivers, heavy and tractor-trailer First-line supervisors/managers of farming, fishing and forestry workers
Construction	1.7	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Professional, scientific, and technical services	1.5	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Other services (except public administration)	1.4	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general
Health care and social assistance	0.8	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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3.3.6 Planting Forests in Maryland—Operation Phase

Health care and social assistance	3.3	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	2.6	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Accommodation and food services	1.5	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Other services (except public administration)	1.3	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general
Finance and insurance	1.0	Tellers Insurance sales agents Securities, commodities, and financial services sales agents Loan officers Accountants and auditors

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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3.3.7 Biomass for Energy Production—Investment Phase

Agriculture, forestry, fishing, and hunting	6.8	Farmworkers and laborers, crop, nursery and greenhouse Logging equipment operators Agricultural equipment operators Truck drivers, heavy and tractor-trailer First-line supervisors/managers of farming, fishing and forestry workers
Professional, scientific, and technical services	2.6	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Construction	2.1	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Retail trade	0.7	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Health care and social assistance	0.7	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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3.3.7 Biomass for Energy Production—Operation Phase

Utilities	1.1	Electrical power-line installers and repairers Control and valve installers and repairers, except mechanical door Meter readers, utilities First-line supervisors/managers of mechanics, installers, and repairers Electrical engineers
Health care and social assistance	0.4	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Accommodation and food services	0.4	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Retail trade	0.3	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Professional, scientific, and technical services	0.3	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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3.3.8 Conservation of Agricultural Land for GHG Benefits—Investment Phase

Agriculture, forestry, fishing, and hunting	6.5	Farmworkers and laborers, crop, nursery and greenhouse Logging equipment operators Agricultural equipment operators Truck drivers, heavy and tractor-trailer First-line supervisors/managers of farming, fishing and forestry workers
Professional, scientific, and technical services	3.1	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Construction	2.4	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Other services (except public administration)	2.0	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general
Health care and social assistance	0.9	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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3.3.8 Conservation of Agricultural Land for GHG Benefits—Operation Phase

Health care and social assistance	750.7	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	596.5	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Accommodation and food services	342.6	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Other services (except public administration)	304.8	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general
Real estate and rental and leasing	233.9	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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3.3.9 Buy Local for GHG Benefits—Investment Phase

Retail trade	3.9	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Professional, scientific, and technical services	3.9	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Accommodation and food services	3.6	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Other services (except public administration)	3.0	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general
Wholesale trade	1.2	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks

Sources: BLS, RESI

**Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft**

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3.3.9 Buy Local for GHG Benefits—Operation Phase

Wholesale trade	1,385.8	<ul style="list-style-type: none"> Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Health care and social assistance	188.4	<ul style="list-style-type: none"> Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	167.2	<ul style="list-style-type: none"> Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Administrative and support and waste management and remediation services	165.9	<ul style="list-style-type: none"> Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Professional, scientific, and technical services	138.7	<ul style="list-style-type: none"> Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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3.3.10 Nutrient Trading for GHG Benefits—Investment Phase

Agriculture, forestry, fishing, and hunting	5.5	Farmworkers and laborers, crop, nursery and greenhouse Logging equipment operators Agricultural equipment operators Truck drivers, heavy and tractor-trailer First-line supervisors/managers of farming, fishing and forestry workers
Construction	2.1	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Professional, scientific, and technical services	1.8	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Administrative and support and waste management and remediation services	0.9	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Utilities	0.5	Electrical power-line installers and repairers Control and valve installers and repairers, except mechanical door Meter readers, utilities First-line supervisors/managers of mechanics, installers, and repairers Electrical engineers

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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3.3.10 Nutrient Trading for GHG Benefits—Operation Phase

Management of companies and enterprises	209.5	Bookkeeping, accounting, and auditing clerks Accountants and auditors General and operations managers Financial managers First-line supervisors/managers of office and administrative support workers
Professional, scientific, and technical services	43.3	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Health care and social assistance	36.8	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	31.6	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Accommodation and food services	22.6	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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D.4 Recycling

3.4.1 Recycling and Source Reduction—Investment Phase

Professional, scientific, and technical services	3.2	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Administrative and support and waste management and remediation services	2.4	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Utilities	1.2	Electrical power-line installers and repairers Control and valve installers and repairers, except mechanical door Meter readers, utilities First-line supervisors/managers of mechanics, installers, and repairers Electrical engineers
Health care and social assistance	0.7	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	0.6	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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3.4.1 Recycling and Source Reduction—Operation Phase

Management of companies and enterprises	127.3	Bookkeeping, accounting, and auditing clerks Accountants and auditors General and operations managers Financial managers First-line supervisors/managers of office and administrative support workers
Public administration	104.3	Executive, Legislative, and Other General Government Support Justice, Public Order, and Safety Activities Administration of Human Resource Programs Administration of Environmental Quality Programs Administration of Housing Programs, Urban Planning, and Community Development
Professional, scientific, and technical services	54.6	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Health care and social assistance	38.4	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	33.9	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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D.5 Multi-Sector

3.5.3 Outreach and Public Education—Investment Phase

Professional, scientific, and technical services	4.4	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Information	2.8	Computer software engineers, applications Computer support specialists Customer service representatives Network and computer systems administrators Telecommunications equipment installers and repairers, except line installers
Health care and social assistance	0.7	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	0.6	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Administrative and support and waste management and remediation services	0.6	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.5.3 Outreach and Public Education—Operation Phase

Retail trade	0.3	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Health care and social assistance	0.3	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Accommodation and food services	0.2	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Finance and insurance	0.1	Tellers Insurance sales agents Securities, commodities, and financial services sales agents Loan officers Accountants and auditors
Real estate and rental and leasing	0.1	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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D.6 Buildings

3.6.1 Green Building Initiatives—Investment Phase

Construction	4.6	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Professional, scientific, and technical services	3.3	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Retail trade	0.9	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Health care and social assistance	0.8	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Administrative and support and waste management and remediation services	0.6	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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3.6.1 Green Building Initiatives—Operation Phase

Management of companies and enterprises	6.8	Bookkeeping, accounting, and auditing clerks Accountants and auditors General and operations managers Financial managers First-line supervisors/managers of office and administrative support workers
Professional, scientific, and technical services	1.4	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Health care and social assistance	1.2	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	1.0	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Real estate and rental and leasing	0.7	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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3.6.2 Building Codes—Investment Phase

Professional, scientific, and technical services	3.5	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Construction	2.9	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Retail trade	0.7	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Health care and social assistance	0.7	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Administrative and support and waste management and remediation services	0.6	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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3.6.2 Building Codes—Operation Phase

Health care and social assistance	5.1	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	4.1	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Accommodation and food services	2.4	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Other services (except public administration)	2.1	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general
Real estate and rental and leasing	1.6	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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D.7 Land Use

3.7.1 Reducing Transportation Issues through Smart Growth—Investment Phase

Professional, scientific, and technical services	5.2	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Information	1.1	Computer software engineers, applications Computer support specialists Customer service representatives Network and computer systems administrators Telecommunications equipment installers and repairers, except line installers
Construction	0.8	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Administrative and support and waste management and remediation services	0.7	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Retail trade	0.5	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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3.7.1 Reducing Transportation Issues through Smart Growth—Operation Phase

Professional, scientific, and technical services	13.3	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Agriculture, forestry, fishing, and hunting	6.5	Farmworkers and laborers, crop, nursery and greenhouse Logging equipment operators Agricultural equipment operators Truck drivers, heavy and tractor-trailer First-line supervisors/managers of farming, fishing and forestry workers
Information	3.2	Computer software engineers, applications Computer support specialists Customer service representatives Network and computer systems administrators Telecommunications equipment installers and repairers, except line installers
Construction	2.5	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Other services (except public administration)	2.5	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

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3.7.2 GHG Targets for Local Government's Transportation and Land Use Planning—Investment Phase

Professional, scientific, and technical services	5.5	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Construction	2.3	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Retail trade	0.8	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Administrative and support and waste management and remediation services	0.8	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Health care and social assistance	0.8	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.7.2 GHG Targets for Local Government's Transportation and Land Use Planning—Operation Phase

Public administration	39.6	Executive, Legislative, and Other General Government Support Justice, Public Order, and Safety Activities Administration of Human Resource Programs Administration of Environmental Quality Programs Administration of Housing Programs, Urban Planning, and Community Development
Professional, scientific, and technical services	11	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Administrative and support and waste management and remediation services	8.4	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Real estate and rental and leasing	6.4	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general
Health care and social assistance	6.2	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.7.3 Land Use Planning GHG Benefits—Investment Phase

Construction	4.3	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Professional, scientific, and technical services	3.0	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Retail trade	1.0	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Health care and social assistance	0.7	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Administrative and support and waste management and remediation services	0.6	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general

Sources: BLS, RESI

**Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft**

RESI of Towson University

3.7.3 Land Use Planning GHG Benefits—Operation Phase

Public administration	299.4	Executive, Legislative, and Other General Government Support Justice, Public Order, and Safety Activities Administration of Human Resource Programs Administration of Environmental Quality Programs Administration of Housing Programs, Urban Planning, and Community Development
Professional, scientific, and technical services	83.2	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Administrative and support and waste management and remediation services	63.8	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Real estate and rental and leasing	48.4	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general
Health care and social assistance	47.2	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.7.4 Growth Boundary GHG Benefits—Investment Phase

Construction	3.7	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Professional, scientific, and technical services	2.7	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Other services (except public administration)	1.7	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general
Retail trade	1.0	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Health care and social assistance	0.8	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.7.4 Growth Boundary GHG Benefits—Operation Phase

Health care and social assistance	10.3	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	8.2	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Accommodation and food services	4.7	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Other services (except public administration)	4.2	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general
Real estate and rental and leasing	3.2	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

D.8 Innovative Initiatives

3.8.1 Leadership-by-Example – Local Government—Investment Phase

Professional, scientific, and technical services	2.7	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Construction	2.2	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Administrative and support and waste management and remediation services	1.3	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Retail trade	0.7	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Health care and social assistance	0.7	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers

Sources: BLS, RESI

**Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan
Final Draft**

RESI of Towson University

3.8.1 Leadership-by-Example – Local Government—Operation Phase

Public administration	346.0	Executive, Legislative, and Other General Government Support Justice, Public Order, and Safety Activities Administration of Human Resource Programs Administration of Environmental Quality Programs Administration of Housing Programs, Urban Planning, and Community Development
Professional, scientific, and technical services	96.1	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Administrative and support and waste management and remediation services	73.7	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Real estate and rental and leasing	55.9	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general
Health care and social assistance	54.5	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.8.2 Leadership-by-Example – Federal Government—Investment Phase

Professional, scientific, and technical services	2.7	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Construction	2.2	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Public administration	1.4	Executive, Legislative, and Other General Government Support Justice, Public Order, and Safety Activities Administration of Human Resource Programs Administration of Environmental Quality Programs Administration of Housing Programs, Urban Planning, and Community Development
Administrative and support and waste management and remediation services	1.3	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Utilities	0.7	Electrical power-line installers and repairers Control and valve installers and repairers, except mechanical door Meter readers, utilities First-line supervisors/managers of mechanics, installers, and repairers Electrical engineers

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.8.2 Leadership-by-Example – Federal Government—Operation Phase

Public administration	728.7	Executive, Legislative, and Other General Government Support Justice, Public Order, and Safety Activities Administration of Human Resource Programs Administration of Environmental Quality Programs Administration of Housing Programs, Urban Planning, and Community Development
Administrative and support and waste management and remediation services	69.3	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Information	63.5	Computer software engineers, applications Computer support specialists Customer service representatives Network and computer systems administrators Telecommunications equipment installers and repairers, except line installers
Accommodation and food services	60.5	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Professional, scientific, and technical services	52.4	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.8.3 Leadership-by-Example – Maryland University Lead-by-Example Initiatives—Investment Phase

Professional, scientific, and technical services	2.7	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Construction	2.2	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Administrative and support and waste management and remediation services	1.3	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Health care and social assistance	0.7	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	0.7	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.8.3 Leadership-by-Example – Maryland University Lead-by-Example Initiatives—Operation Phase

Educational services	24.9	Elementary school teachers, except special education Teacher assistants Secondary school teachers, except special and vocational education Middle school teachers, except special and vocational education Education administrators, elementary and secondary school
Public administration	10.0	Executive, Legislative, and Other General Government Support Justice, Public Order, and Safety Activities Administration of Human Resource Programs Administration of Environmental Quality Programs Administration of Housing Programs, Urban Planning, and Community Development
Real estate and rental and leasing	3.8	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general
Professional, scientific, and technical services	3.8	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Health care and social assistance	3.6	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.8.4 Voluntary Stationary Source Reductions—Investment Phase

Construction	2.7	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Professional, scientific, and technical services	2.5	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Administrative and support and waste management and remediation services	1.2	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Retail trade	0.7	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Health care and social assistance	0.7	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.8.4 Voluntary Stationary Source Reductions—Operation Phase

Management of companies and enterprises	1.5	Bookkeeping, accounting, and auditing clerks Accountants and auditors General and operations managers Financial managers First-line supervisors/managers of office and administrative support workers
Professional, scientific, and technical services	0.3	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Health care and social assistance	0.3	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	0.2	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Real estate and rental and leasing	0.2	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.8.5 State of Maryland Initiatives to Lead by Example—Investment Phase

Professional, scientific, and technical services	3.9	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Construction	1.5	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Wholesale trade	1.3	Laborers and freight, stock, and material movers, hand Sales representatives, wholesale and manufacturing, except technical and scientific products Sales representatives, wholesale and manufacturing, technical and scientific products Truck drivers, heavy and tractor-trailer Wholesale and retail buyers, except farm products
Health care and social assistance	0.8	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	0.7	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.8.5 State of Maryland Initiatives to Lead by Example—Operation Phase

Public administration	6.2	Executive, Legislative, and Other General Government Support Justice, Public Order, and Safety Activities Administration of Human Resource Programs Administration of Environmental Quality Programs Administration of Housing Programs, Urban Planning, and Community Development
Professional, scientific, and technical services	1.7	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Administrative and support and waste management and remediation services	1.3	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Real estate and rental and leasing	1.0	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general
Health care and social assistance	1.0	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.8.6 State of Maryland Carbon and Footprint Initiatives—Investment Phase

Administrative and support and waste management and remediation services	4.3	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Professional, scientific, and technical services	1.7	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Wholesale trade	0.8	Laborers and freight, stock, and material movers, hand Sales representatives, wholesale and manufacturing, except technical and scientific products Sales representatives, wholesale and manufacturing, technical and scientific products Truck drivers, heavy and tractor-trailer Wholesale and retail buyers, except farm products
Utilities	0.6	Electrical power-line installers and repairers Control and valve installers and repairers, except mechanical door Meter readers, utilities First-line supervisors/managers of mechanics, installers, and repairers Electrical engineers
Retail trade	0.6	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.8.6 State of Maryland Carbon and Footprint Initiatives—Operation Phase

Public administration	118.3	Executive, Legislative, and Other General Government Support Justice, Public Order, and Safety Activities Administration of Human Resource Programs Administration of Environmental Quality Programs Administration of Housing Programs, Urban Planning, and Community Development
Professional, scientific, and technical services	32.9	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Administrative and support and waste management and remediation services	25.2	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Real estate and rental and leasing	19.1	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general
Health care and social assistance	18.6	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.8.7 Job Creation and Economic Development Initiatives Related to Climate Change—Investment Phase

Professional, scientific, and technical services	8.2	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general
Administrative and support and waste management and remediation services	1.0	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Health care and social assistance	0.9	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	0.8	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Accommodation and food services	0.6	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.8.7 Job Creation and Economic Development Initiatives Related to Climate Change—Operation Phase

Health care and social assistance	179.6	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	142.7	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Accommodation and food services	82	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Other services (except public administration)	72.9	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general
Real estate and rental and leasing	56	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.8.8 Public Health Initiatives Related to Climate Change—Investment Phase

Information	2.9	Computer software engineers, applications Computer support specialists Customer service representatives Network and computer systems administrators Telecommunications equipment installers and repairers, except line installers
Professional, scientific, and technical services	2.1	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general
Administrative and support and waste management and remediation services	0.3	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Public administration	0.3	Executive, Legislative, and Other General Government Support Justice, Public Order, and Safety Activities Administration of Human Resource Programs Administration of Environmental Quality Programs Administration of Housing Programs, Urban Planning, and Community Development
Agriculture, forestry, fishing, and hunting	0.0	Farmworkers and laborers, crop, nursery and greenhouse Logging equipment operators Agricultural equipment operators Truck drivers, heavy and tractor-trailer First-line supervisors/managers of farming, fishing and forestry workers

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.8.8 Public Health Initiatives Related to Climate Change—Operation Phase

Health care and social assistance	9.0	Registered nurses Nursing aides, orderlies, and attendants Home health aides Licensed practical and licensed vocational nurses Medical and health services managers
Retail trade	7.1	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Accommodation and food services	4.1	Combined food preparation and serving workers, including fast food Waiters and waitresses Cooks, restaurant Cooks, fast food Hotel, motel, and resort desk clerks
Other services (except public administration)	3.6	Hairdressers, hairstylists, and cosmetologists Automotive service technicians and mechanics Laundry and dry-cleaning workers First-line supervisors/managers of mechanics, installers, and repairers Maintenance and repair workers, general
Real estate and rental and leasing	2.8	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.8.9 Title V Permits for GHG Sources—Investment Phase

Professional, scientific, and technical services	4.1	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Information	1.1	Computer software engineers, applications Computer support specialists Customer service representatives Network and computer systems administrators Telecommunications equipment installers and repairers, except line installers
Administrative and support and waste management and remediation services	0.4	Janitors and cleaners, except maids and housekeeping cleaners Security guards Landscaping and grounds keeping workers Laborers and freight, stock, and material movers, hand Office clerks, general
Public administration	0.4	Executive, Legislative, and Other General Government Support Justice, Public Order, and Safety Activities Administration of Human Resource Programs Administration of Environmental Quality Programs Administration of Housing Programs, Urban Planning, and Community Development
Construction	0.1	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers

Sources: BLS, RESI

Appendices C through E to Economic Impact Analysis for the GGRA 2012 Plan

Final Draft

RESI of Towson University

3.8.9 Title V Permits for GHG Sources—Operation Phase

Public administration	1.2	Executive, Legislative, and Other General Government Support Justice, Public Order, and Safety Activities Administration of Human Resource Programs Administration of Environmental Quality Programs Administration of Housing Programs, Urban Planning, and Community Development
Professional, scientific, and technical services	0.3	Lawyers Accountants and auditors Management analysts Architectural and civil drafters Market research analysts
Construction	0.2	Construction laborers Carpenters Electricians Operating engineers and other construction equipment operators Construction managers
Retail trade	0.2	Retail salespersons Cashiers Stock clerks and order fillers First-line supervisors/managers of retail sales workers Customer service representatives
Real estate and rental and leasing	0.2	Counter and rental clerks Real estate sales agents Property, real estate, and community association managers Real estate brokers Maintenance and repair workers, general

Sources: BLS, RESI

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