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Status Report

Draft 40 by 30 Plan



Brian Hug
Maryland Commission on Climate Change
April 24, 2018

Presentation Overview



- Progress to date
- 40 by 30 Basics and Schedule
- Next Steps



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On Track for Continual Progress

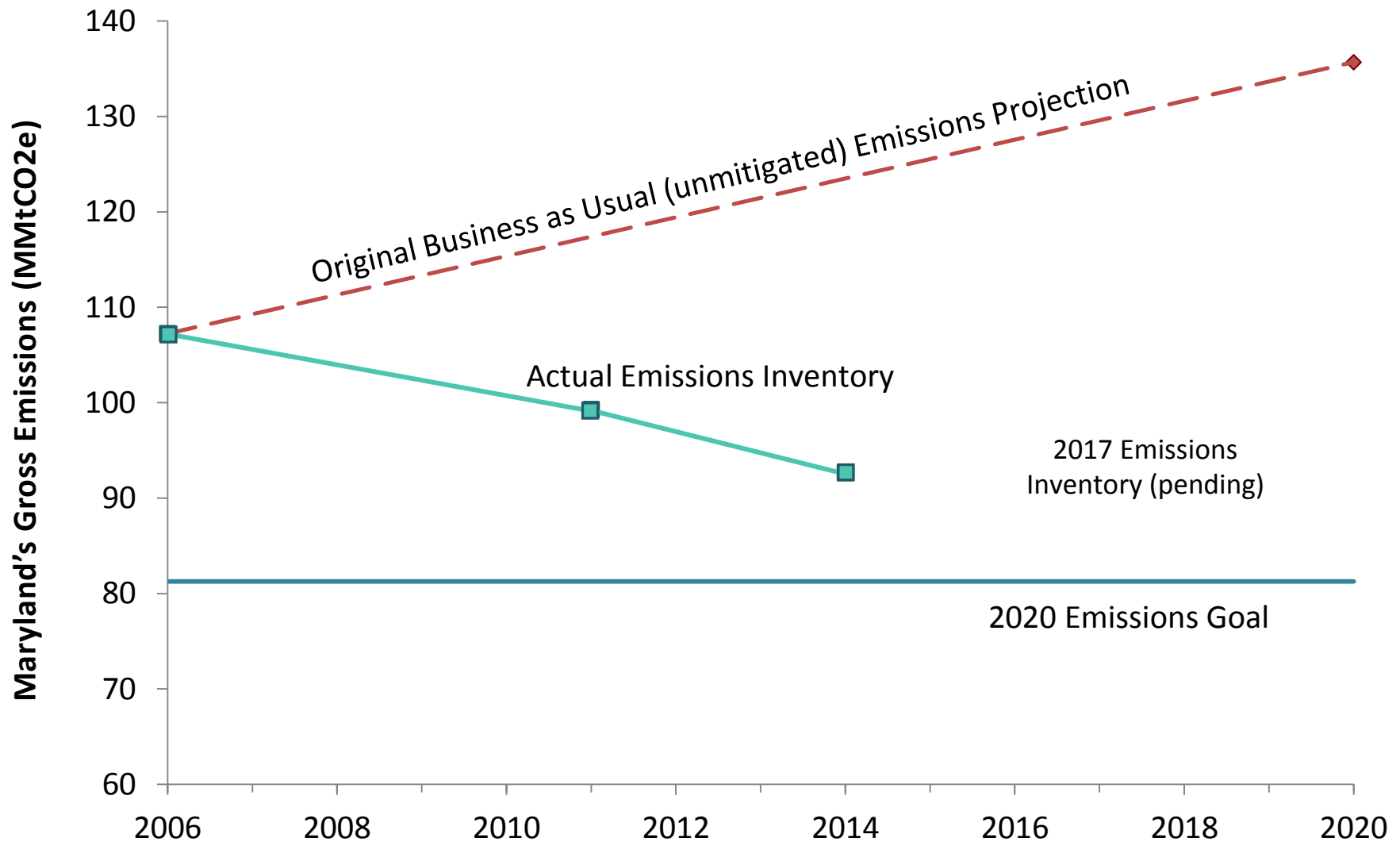
Maryland has always been a leader in tackling climate change. We are on track to meet or exceed existing goals, and well positioned to continue this progress and maintain our leadership role into the future.

- The Greenhouse Gas Emissions Reduction Act (GGRA) of 2009 and 2016 set goals for 25% reduction in GHG emissions by 2020, and 40% by 2030
 - On track for 25 by 20
 - Many programs will continue to provide reductions towards 40 by 30
- Leading in the implementation and continued success of the Regional Greenhouse Gas Initiative (RGGI), with a strong commitment to expansion and future pollution reduction
- Joining our colleagues in the U.S. Climate Alliance to collaborate on aggressive but balanced climate action



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Progress Towards 25% by 20



The Greenhouse Gas Emissions Reduction Act (GGRA)

- Original GGRA adopted in 2009
 - Reauthorized and enhanced in 2016
- Core elements of the law
 - 25% reduction by 2020 (2009 law)
 - 40% reduction by 2030 (2016 law)
 - Must produce a net economic benefit to the State's economy and a net increase in jobs in the State
 - Many other safeguards



Photo by Matt Rath/Chesapeake Bay Program



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Key Safeguards in the GGRA

- Manufacturing sector not included in the Plan unless required by a federal rule
- Mid-Course status report from MDE on greenhouse gas emission reductions, jobs and the economy
- Mid-Course reaffirmation of goals by the General Assembly
 - Or the law sunsets

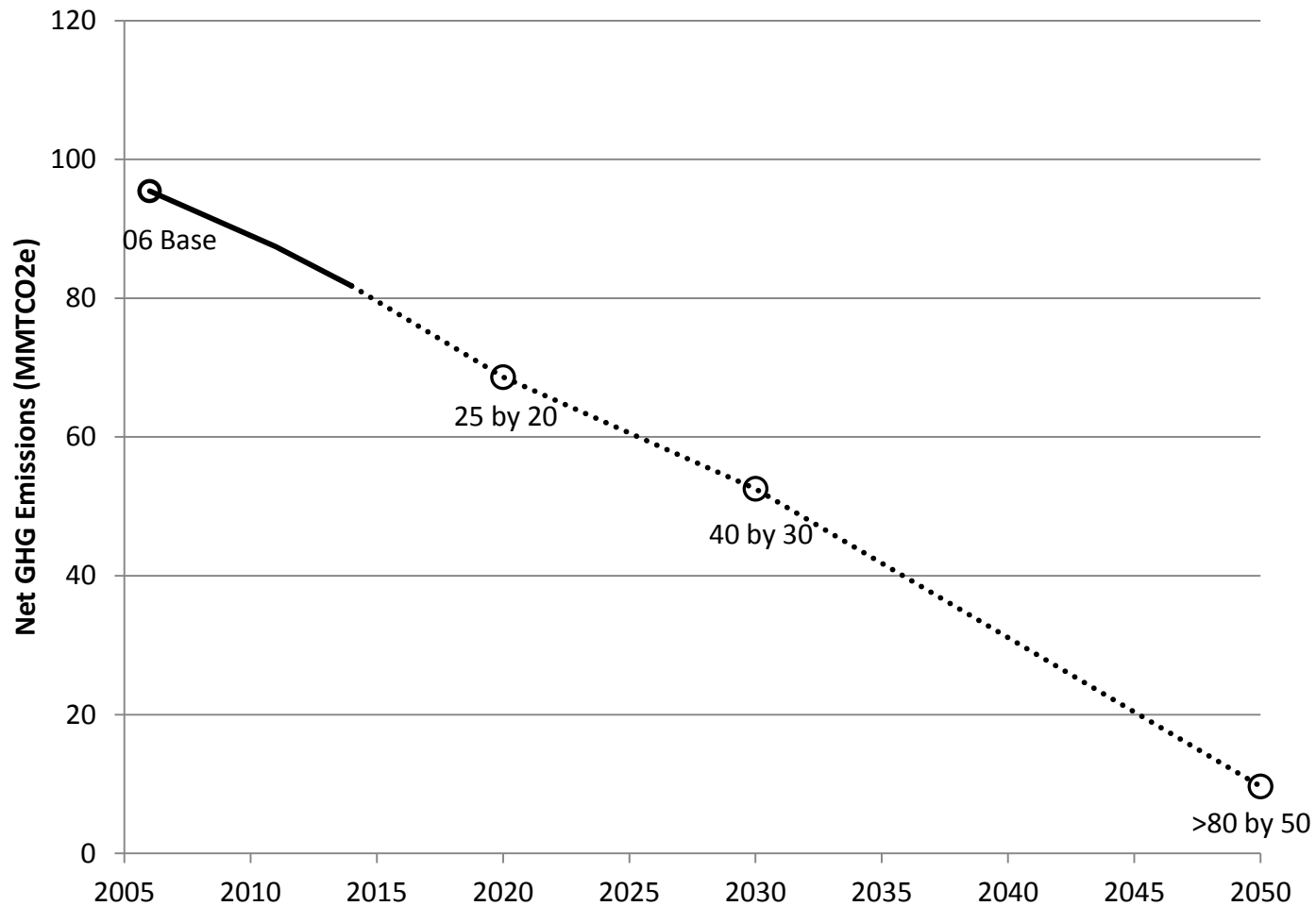


Jane Hawkey, IAN/UMCES
(ian.umces.edu/imagelibrary)



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GGRA Goals



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Programs in 2020 Plan

Program	Projected 2020 GHG Emission Reductions (MMtCO ₂ e) Revised for 2015	Sector
EmPOWER Maryland	7.24	Electricity
The Maryland Renewable Energy Portfolio Standard (RPS)	4.13	
The Regional Greenhouse Gas Initiative (RGGI)	3.60	
Other Energy Programs	0.14	
Transportation Technologies	6.88	Transportation
Public Transportation	1.85	
Pricing Initiatives	1.99	
Future or Developing Programs	0.02	
Forestry and Sequestration	4.55	Agriculture & Forestry
Ecosystems Markets	0.68	
Building and Trade Codes in Maryland	3.15	Building Energy Use
Leadership-By-Example	1.78	
Zero Waste	1.48	Waste
Land Use Programs	0.64	Land Use
Maryland's Innovative Initiatives	0.21	Various
Outreach and Public Education	0.03	
Total Reductions	38.37	



Federal Programs

- There is still a great deal of uncertainty regarding what will happen at the Federal level
- Many State and regional programs that Maryland participates in place us in an excellent position to meet our goals regardless



However...

- MDE will update assumptions as information becomes available, and keep the Commission up-to-date
- Some key programs include:
 - The Clean Power Plan
 - Vehicle Emissions Standards
 - The California Car Program
 - Methane requirements
- Maryland is pushing back on potential federal actions that could impact the GGRA reduction goals



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GGRA Schedule

- 2018 - MDE, other State agencies, MWG and stakeholders research and build 40 by 30 plan
- December 31, 2018 - Draft Plan due
- December 31, 2019 - Final Plan due
- October 1, 2022 – Two studies due
 - Independent study by institution of higher education on the economic impact of requiring GHG reductions from manufacturing sector
 - Towson University Regional Economic Studies Institute (RESI)
 - Update from MDE on progress towards achieving required reductions and reductions needed by 2050
- December 31, 2023 – Law terminates if not reauthorized
- October 1, 2027 – MDE owes second progress report if the law is reauthorized



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40 by 30: What Do We Know?

Many of the control programs in the 25 by 20 plan will continue to generate deeper reductions as they are implemented through 2030

- Mobile source measures will be critical as fleets “turn over”
- Energy sector reductions should also continue to increase



Photo by Will Parson/Chesapeake Bay Program

Other factors should also be helpful in getting to 40 by 30

- As we continue to improve reduction estimates, we appear to be exceeding the 25 by 2020 goal with the current plan
- Energy demand, natural gas, and travel trends continue to be interesting



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Well on our Way with Existing Policies

- Many existing programs and policies will generate reductions through 2030. Major programs include:
 - 25% by 2020 RPS goal
 - ZEV mandate and CAFE standards
 - Energy efficiency goals
- Some programs are designed to get deeper reductions as time passes
 - Most obvious in the transportation sector, as the vehicle fleet turns over and average fuel economy improves



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On-the-Books and On-the-Way

OTB/OTW Programs that will drive post 2020 reductions

OTB/OTW Mobile Source Programs

The Maryland Clean Cars Program

**Federal Light Duty Fuel Economy Standards
(2012 to 2016)**

**Federal Tier 3 Vehicle and Fuel Standards
(2017 to 2025)**

**Federal Phase 1 Medium and Heavy Duty GHG
Standards (2014 to 2018)**

Federal Renewable Fuel Standards

**Federal Phase 2 Medium and Heavy Duty GHG
Standards (proposed)**

**Federal GHG Reductions from Aircraft
(just starting)**

OTB/OTW Energy Sector

Regional Greenhouse Gas Initiative (RGGI)

Empower Maryland

Renewable Portfolio Standard

OTB/OTW Other Sectors

Forestry and Sequestration

Building Codes and Trade Codes

Leadership by Example

Emerging New and Enhanced Programs

Emerging Efforts - Potential Enhancements

**Methane (3 MDE Initiatives and Fracking Ban)
and Black Carbon (Clean Diesel)**

**Electric and Zero Emission Vehicle Initiatives - VW Settlement
(and other MDOT/MDE/MEA initiatives)**

Grid-of-the-Future Proceedings (PSC)

Healthy Soils Initiative (MDA)

Other Sequestration Efforts (DNR)

Waste Diversion and Recycling Efforts (MDE)

**ECO Climate Ambassadors/Climate Champion Initiative
and other Enhanced Partnerships**

**Multi-State Transportation and Climate Initiative (TCI) including
market based policies for transportation and fuels**

Three Steps to 40 by 30

1. What will 2030 look like with On-the-Books programs only?
 2. What additional reductions are required to meet the 40 by 30 goal?
 3. How will On-the-Way programs and emerging strategies close the gap?
- What about longer term goals?
 - The 40 by 30 Plan will also identify initiatives that will be critical to continued progress past 2030



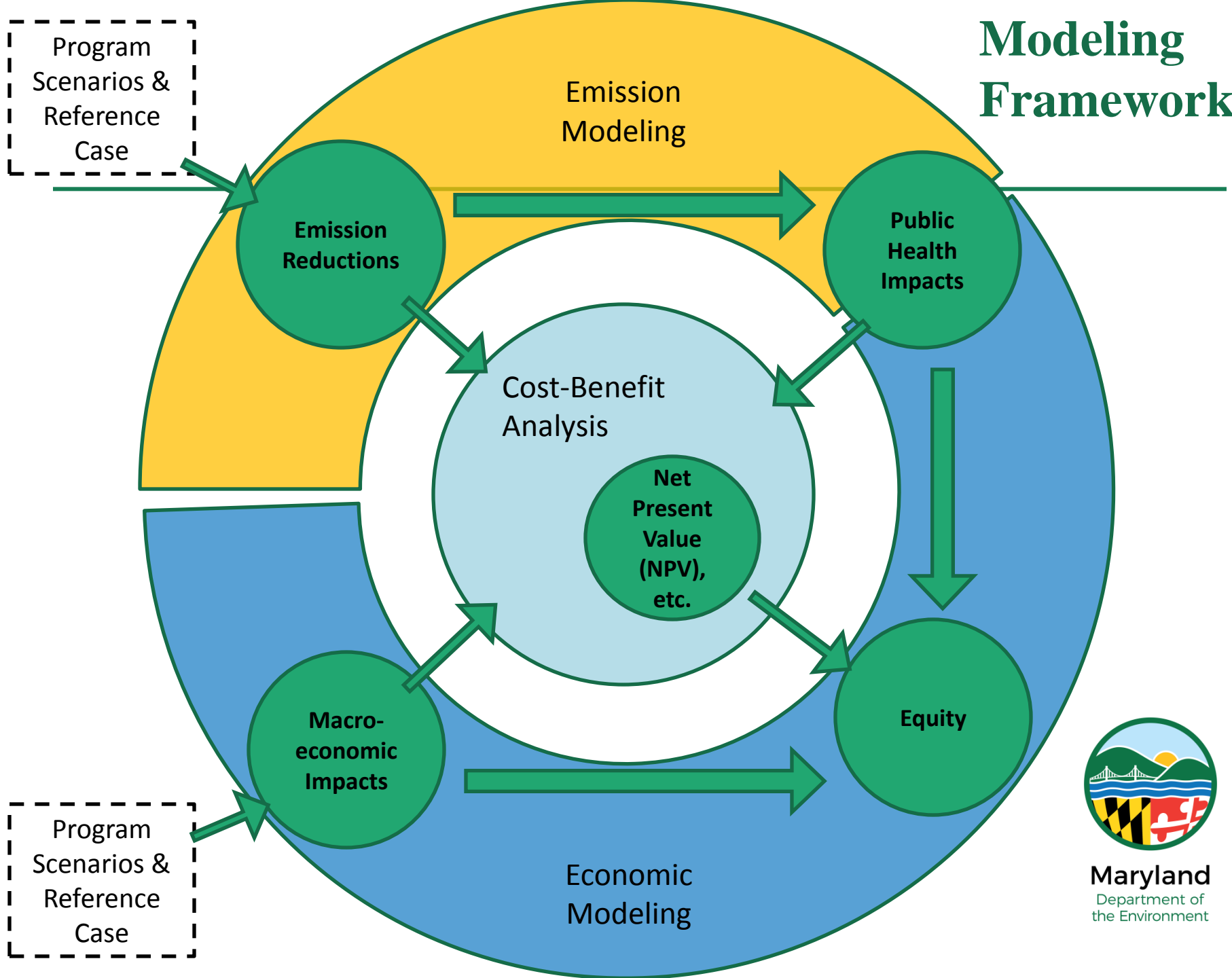
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Enhanced Analysis Tools

- The Commission has pushed for MDE and the MWG to continuously improve our modeling and other analytical tools
- We have done that:
 - Emissions
 - Economic impacts
 - Jobs
 - Social equity
- Our newest tool ... PATHWAYS
 - State -of-the-art climate change model
 - Being used in other leadership states
- Just a quick snapshot today
 - Detailed discussions at MWG



Modeling Framework



Emissions Model: PATHWAYS



Energy+Environmental Economics

- E3's PATHWAYS model
 - Used by CA & NY for 2030 goal planning
- Representation of energy consuming stock across economic sectors
 - Captures emissions from most inventory categories, but not all



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Energy Demand in PATHWAYS

Residential	Commercial	Transportation
12 subsectors, including: <ul style="list-style-type: none">• Water Heating• Air Conditioning• Cooking	10 subsectors, including: <ul style="list-style-type: none">• Refrigeration• Ventilation• Office Equipment	12 modes of transport, including: <ul style="list-style-type: none">• Cars, Trucks, Buses• Passenger Rail• Aviation
Industrial	Non-Fuel, Non-Energy GHGs	Forestry, Land use change
<ul style="list-style-type: none">• Sector-Level Energy Demand Only	<ul style="list-style-type: none">• Sector-Level GHGs Only, with reduction measures by GHG type consistent with MDE inventory categories (e.g. non-CO2 emissions from agriculture, methane from waste and manure, F-gases, etc.)	<ul style="list-style-type: none">• Not currently explicitly modeled



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Energy Supply in PATHWAYS

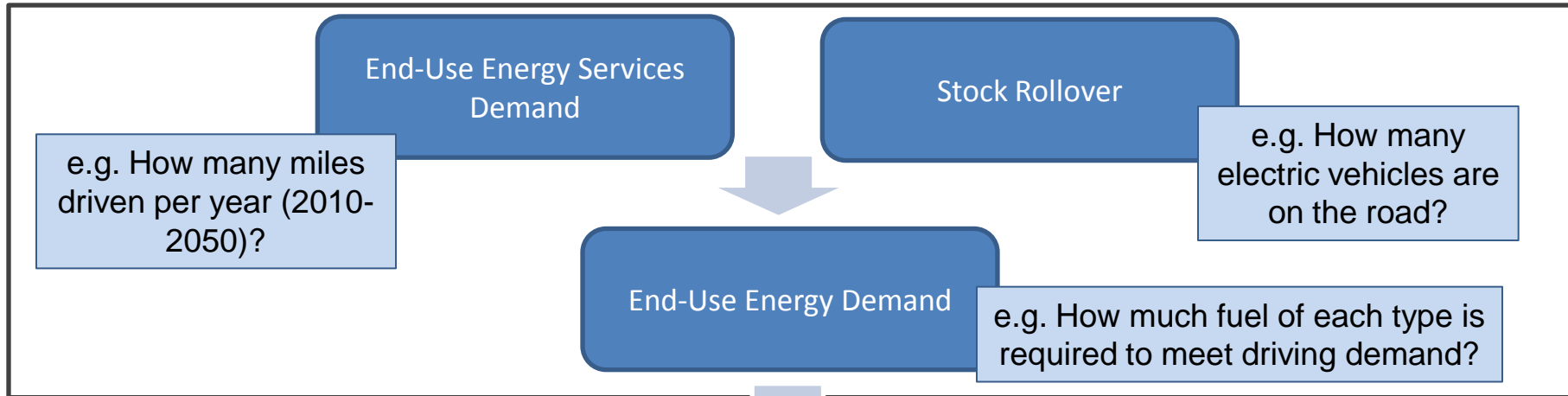
Electricity	Combined Heat & Power	Pipeline Gas	Liquid fuels	Other fossil fuels
<ul style="list-style-type: none">• Nuclear• Hydro• Coal• Geothermal• Wind• Solar PV• Solar thermal• Natural Gas• Biomass• Specified imports (various types)• Unspecified imports	<ul style="list-style-type: none">• Waste heat	<ul style="list-style-type: none">• Natural Gas• Hydrogen• Power to Gas• Biogas	<ul style="list-style-type: none">• Diesel• Gasoline• Renewable Diesel• Renewable Gasoline• Hydrogen• Kerosene-Jet Fuel	<ul style="list-style-type: none">• Coke• Refinery and Process Gas• Fuel Oil• Kerosene• LPG



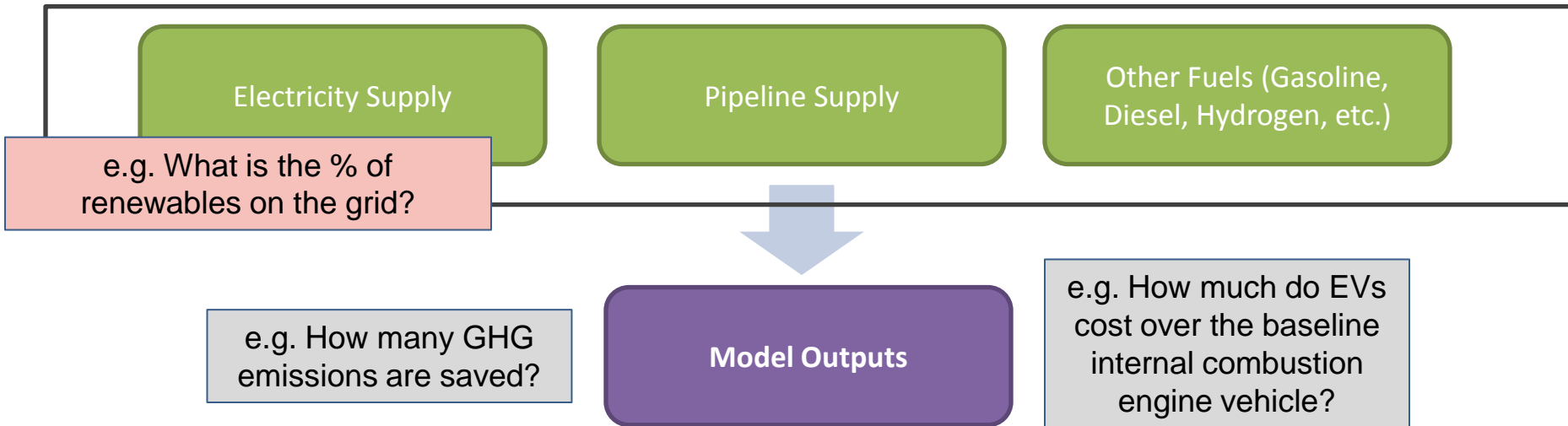
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PATHWAYS Energy Modeling Framework

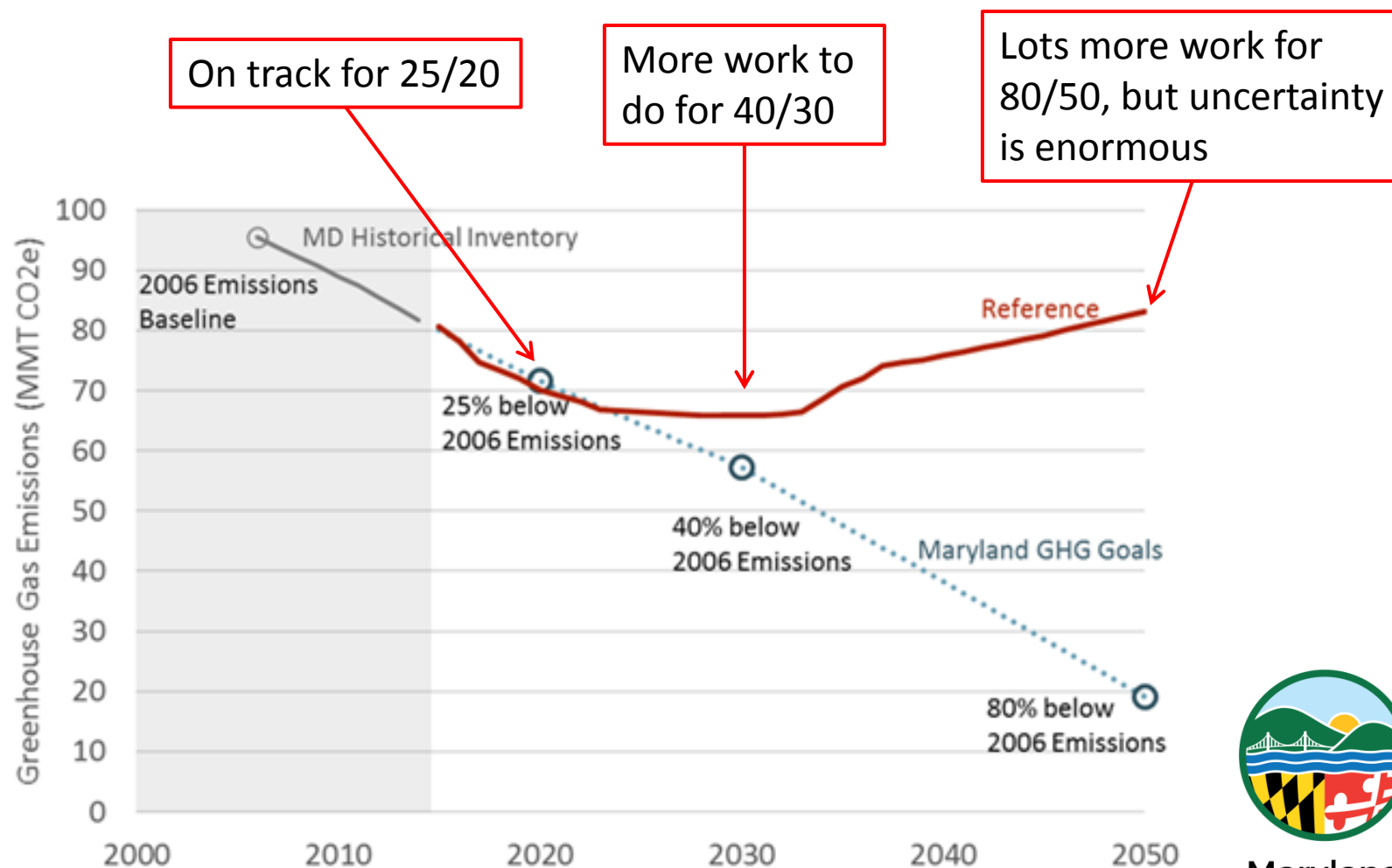
Demand Sectors



Supply Sectors



Example PATHWAYS Outputs

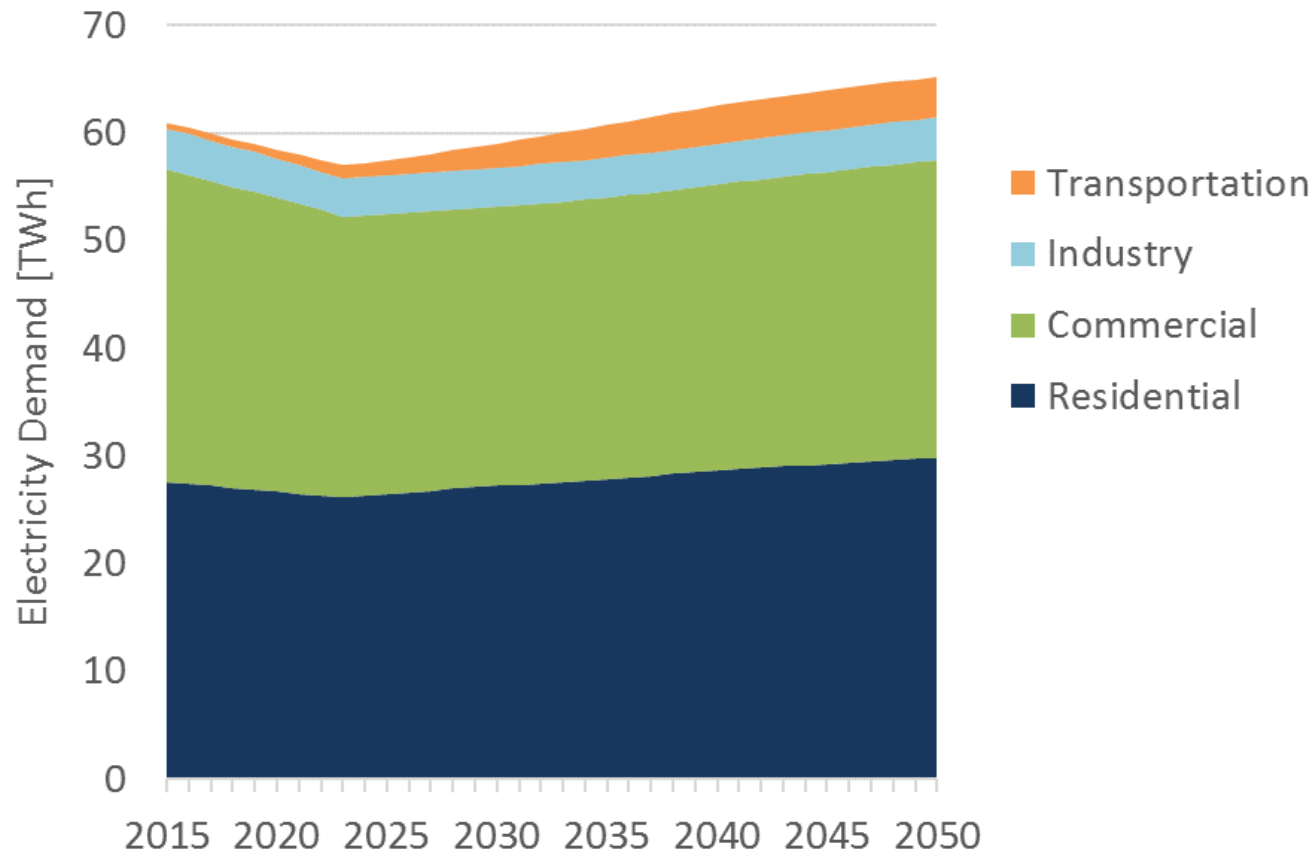


Net emissions in draft Business-As-Usual (no new controls) case



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Example PATHWAYS Outputs



Electricity demand by sector in draft Business-As-Usual (no new controls) case



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Current Status

Building the Business as Usual (BAU) Case

- Projects emissions to 2030 & 2050 under all programs currently on the books
 - This is not a “no policy” reference case
- All major programs together
 - Interactions automatically captured
 - This will not produce program-level reduction estimates
- Primary Question: How much work do we have to do to reach 40-by-30?



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Major Modeled Programs

Modeled in PATHWAYS

1. RGGI
2. EmPOWER
3. RPS
4. Clean Cars
5. Public Transportation
6. Land Use / Smart Growth
7. Green Buildings
8. Other transportation?
9. Grid of the Future?

NOT in PATHWAYS

1. All Agriculture
2. All Forestry/Sinks
3. Waste Reduction / Materials Management
4. Methane
5. Non-energy Land Use impacts

Current
Draft

Add'l
Work

Timeline

Late 2017: Build database and run BAU

Early 2018: Present BAU results, construct policy scenarios

Mid-2018: Run policy scenarios

Late 2018: Present policy scenarios, draft Plan

Macroeconomic impact modeling (REMI), non-energy GHG analysis, and public health analysis will occur concurrently & iteratively.



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Questions?



Photo by Southern Living Magazine



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