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Greenhouse Gas Reduction Act

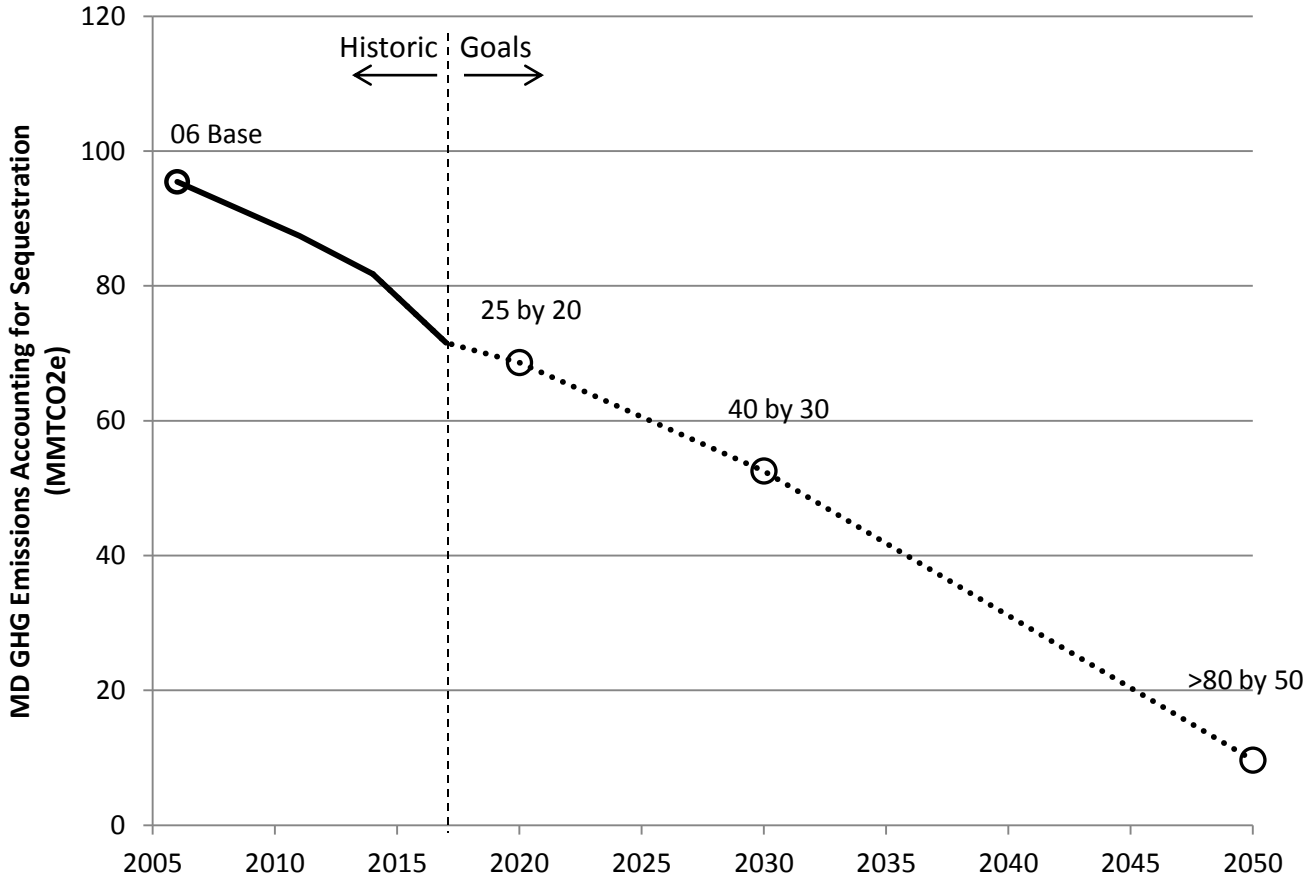
40-By-30 Goal

Draft Plan Overview

June 20, 2019

The Greenhouse Gas Reduction Act

Requirement: Publish a plan to reduce GHGs by 25% by 2020, and 40% by 2030.



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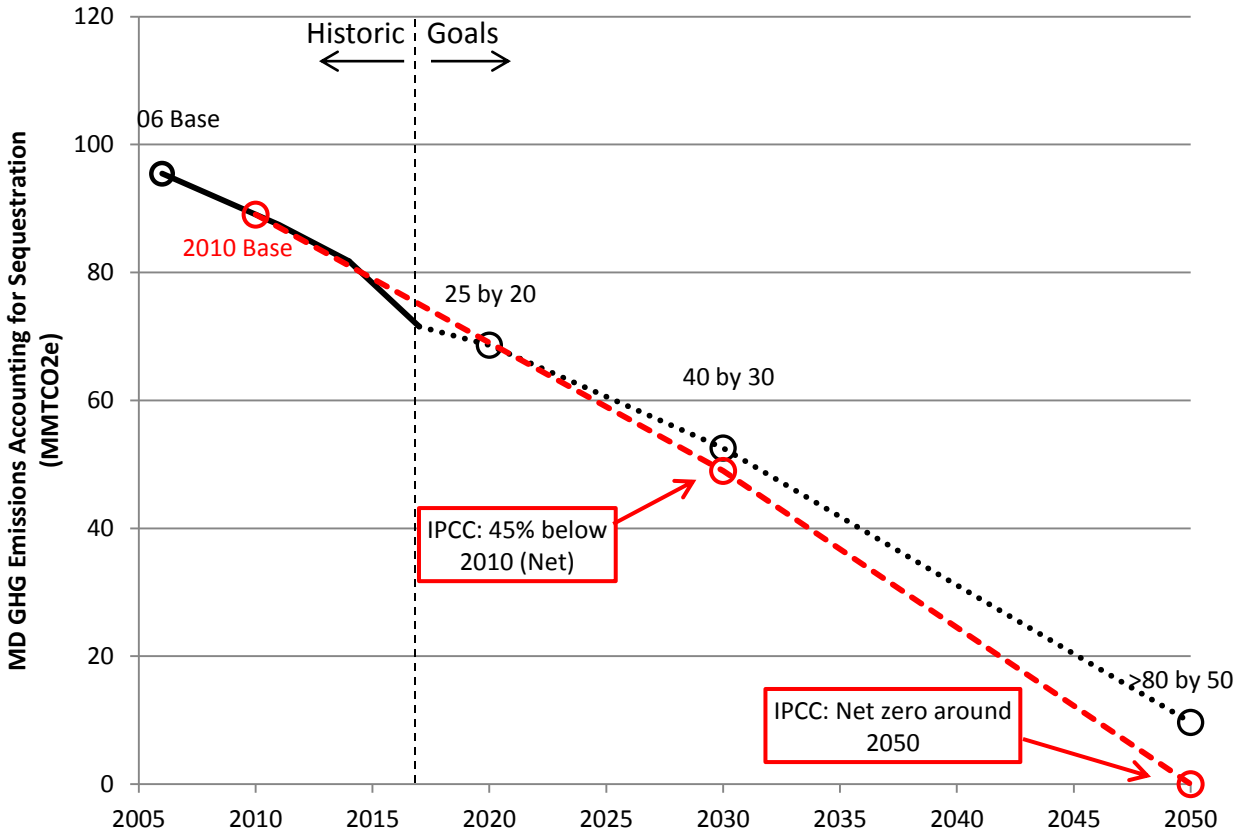
Increasing Urgency of Climate Change

Recent findings from the IPCC, the National Climate Assessment, and UMD point to increasing urgency to reduce emissions, even beyond GGRA Goals.



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Maryland's Strides in Climate

- On track to meeting our 25% by 2020 goal and in final stages of developing draft 40% by 2030 plan
- Leadership in RGGI: cutting emissions in half, generating $3 billion in proceeds, expanding membership and environmental strength
- Early and active member of US Climate Alliance, including initiative to ban super polluting HFC refrigerants
- Leadership in Transportation and Climate Initiative: Designing regional strategies to reduce carbon pollution

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GGRA Plan Requirements

Must achieve the 40-by-30 Goal

ALSO

- "Be developed in recognition of" need for 80% to 95% reduction by 2050
- "Produce a net economic benefit to the State's economy and a net increase in jobs in the State"
- Consider impacts to low-income, low-to-mid-income, minority, and rural communities; any other particular class of ratepayers; the agricultural sector; the manufacturing sector.
- Do not "decrease the likelihood of reliable and affordable electrical service and statewide fuel supplies"

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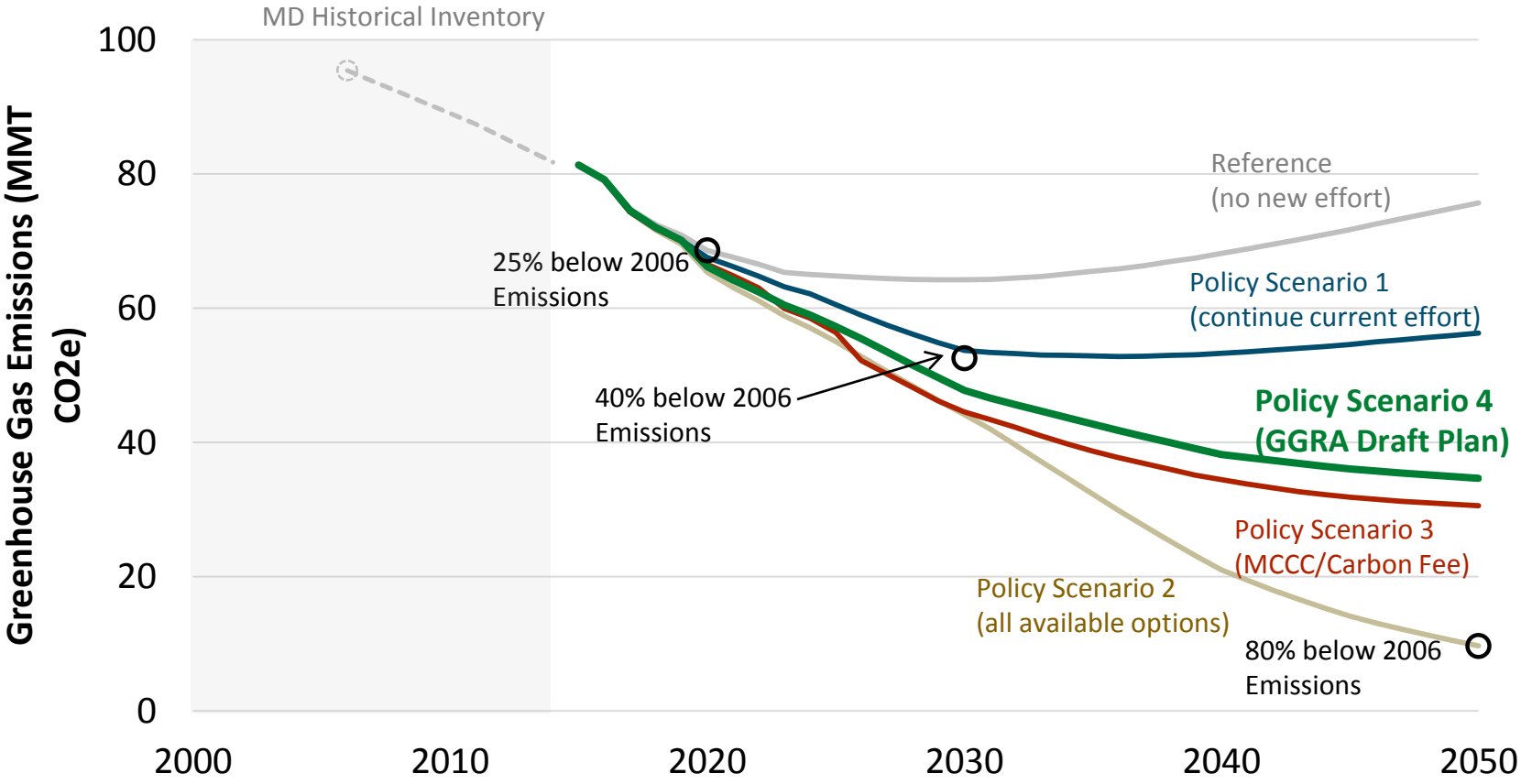
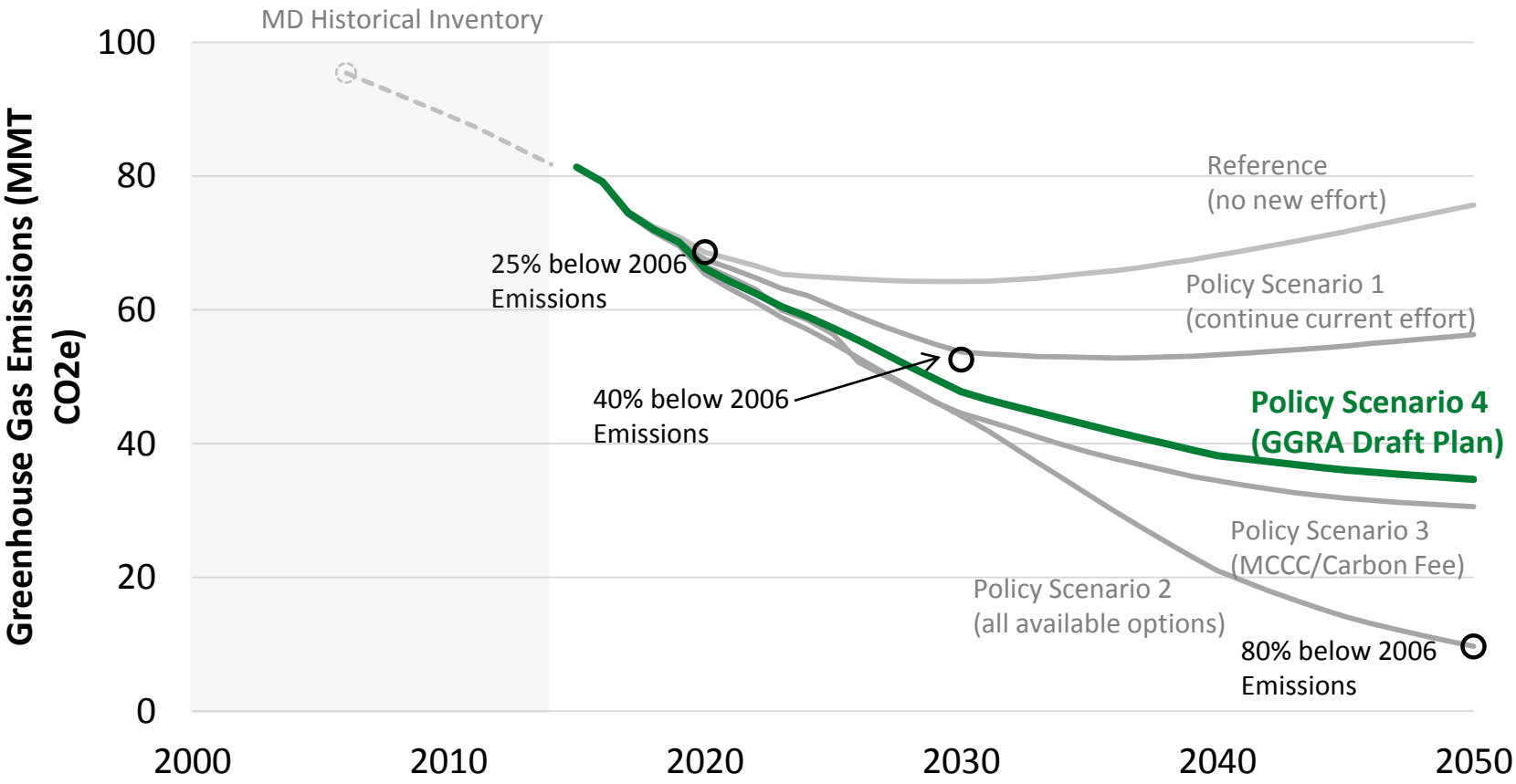
Good News

We have found multiple pathways to meet and excel beyond the 40-by-30 goal and benefit the economy.



Good News - Emissions

The GGRA Draft Plan achieves the 2030 goal with cost-effective policies.



Good News - Economics

The GGRA Draft Plan achieves the 2030 goal with significant benefit to the state's economy.

MD impact relative to Reference Case	Through 2030	Through 2050
Average job impact*	+ 11,649	+ 6,703
GDP Impact**	+ $ 11.54 billion	+ $ 18.63 billion
Personal Income Impact**	+ $ 10.04 billion	+ $ 15.67 billion
Avoided Mortality**	+ $ 0.60 billion	+ $ 3.68 billion
Avoided Climate Damages**	+ $ 4.38 billion	+ $ 27.55 billion

* Average number of job-years created or sustained each year.

** 2018 Dollars, Cumulative, Net Present Value using 3% discount rate.

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Policy Scenario Modeling

1. Reference Case: "Business-as-usual" scenario incorporating effects of major policies as they currently exist on the books.

2. Policy Scenario 1: Extension of current program framework (e.g. EmPOWER extension, 50% RPS).

3. Policy Scenario 2: New programs and changing program frameworks. Long-term measures to reach 2050 goal.

4. Policy Scenario 3: Climate Commission scenario: Carbon Price and complementary policies (including 50% RPS).

5. Policy Scenario 4: GGRA Draft Plan, drawing upon state agency determined cost-effective measures from prior scenarios, including the basics of a Clean and Renewable Energy Standard (CARES).

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GGRA Draft Plan (Policy Scenario 4)

Major Programs:

Electricity Supply
Clean and Renewable Energy Standard
Continued RGGI Geographic Expansion

Transportation
Numerous MDOT Investments
Clean Cars / ZEV Mandate
50% ZEV Transit Buses
Compact Development
Transportation and Climate Initiative (TCI) could fund & enable other measures.

Carbon Sequestration
Enhanced Forest Management
Enhanced Healthy Soils Incentives

Building Energy Use
Extended EmPOWER
Heat Pump Incentives
Compact Development

Other
HFCs

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Clean and Renewable Energy Standard (CARES)

- Incorporates low- and zero-carbon resources that are not renewable.
- Utilities turn in certificates from renewable sources (RECs) and “clean energy” sources (CECs).
- Broader competition lowers costs.

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CARES Goals

- Get to 100% Clean Electricity by 2040.
- Build upon the RPS using homegrown clean energy.
- Use an all of the above strategy that significantly reduces carbon emissions by:
  - Increasing the strategic use of zero- and low-carbon clean and renewable energy sources;
  - Recognizing the clean and safe aspects of nuclear energy;
  - Supporting hydropower, coupled directly with maintaining environmental stewardship;
  - Advancing emerging technology for carbon capture and storage; and
  - Utilizing the role of energy-efficient combined heat and power.

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CARES Benefits

- It is not possible to get to 100% clean electricity using current technology.
  - The CARES is flexible, so will deploy more renewables if that changes.
  - CARES takes advantage of CCS and modular nuclear, if those technologies mature.
- Allowing all low/zero-carbon resources to compete based on cost will get to 100% at lowest cost.
- Complements the RPS

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CARES Benefits

- Additional clean and renewable energy is necessary to meet Maryland's climate change goals.
- CARES relies on homegrown energy to move beyond the current RPS.
- 100% Clean Electricity by 2040 is among the most ambitious goals in the country.

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State Agency Programs & Assumptions

MEA
CARES structure, CHP role & costs, rooftop solar assumptions

MDOT
Transportation infrastructure investment costs & benefits
EV deployment estimates

MDP
Compact development impacts in transportation & buildings

DNR
Forest management sequestration impacts

MDA
Healthy soils sequestration impacts

DHCD
EmPOWER low income & multifamily impacts

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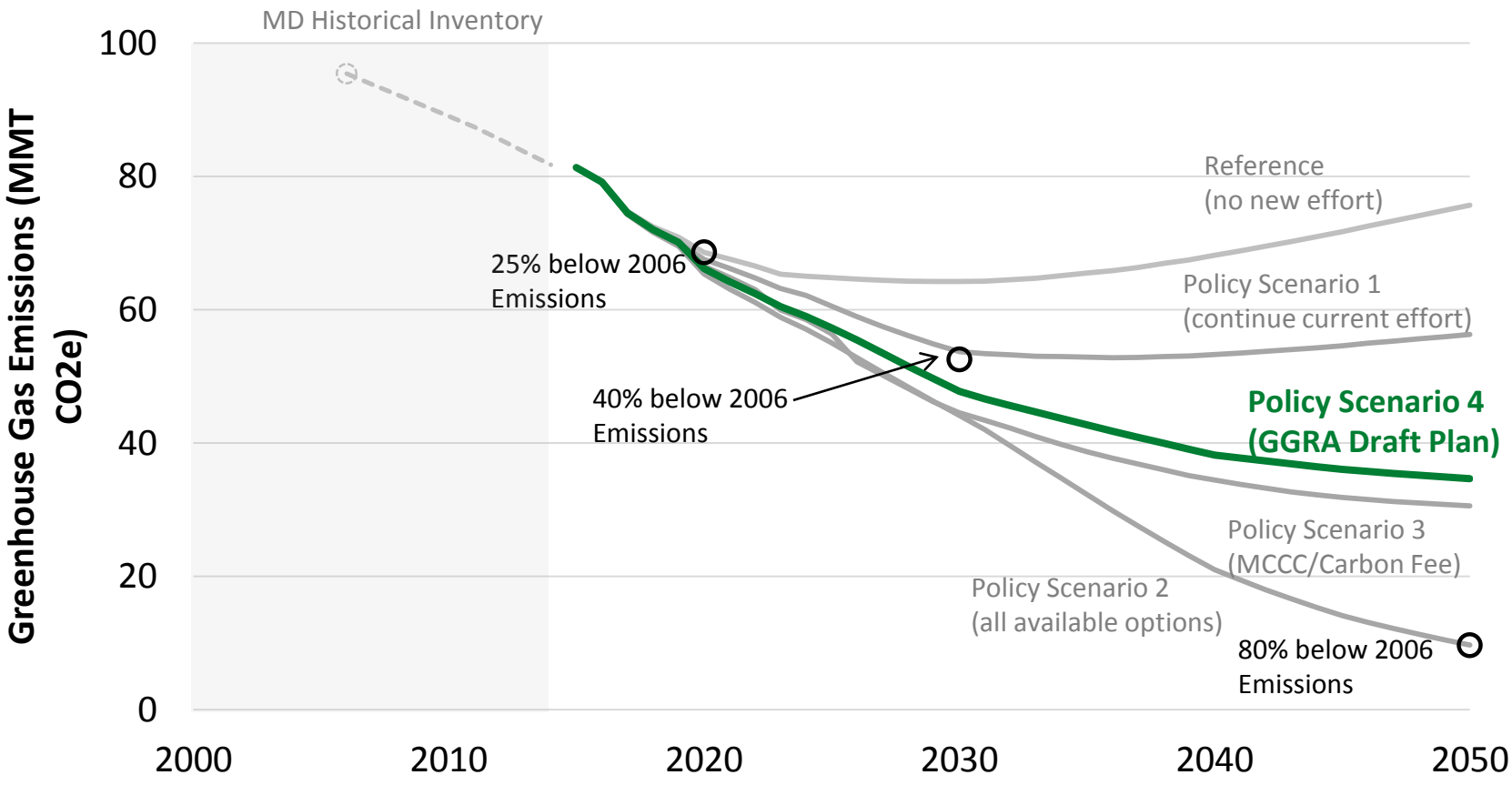
GGRA Draft Plan Emissions Results



PS4 Gap in 2020: -2.6 MMT (overachieved goal)
PS4 Gap in 2030: -5.1 MMT (overachieved goal)
PS4 Gap in 2050: 25 MMT

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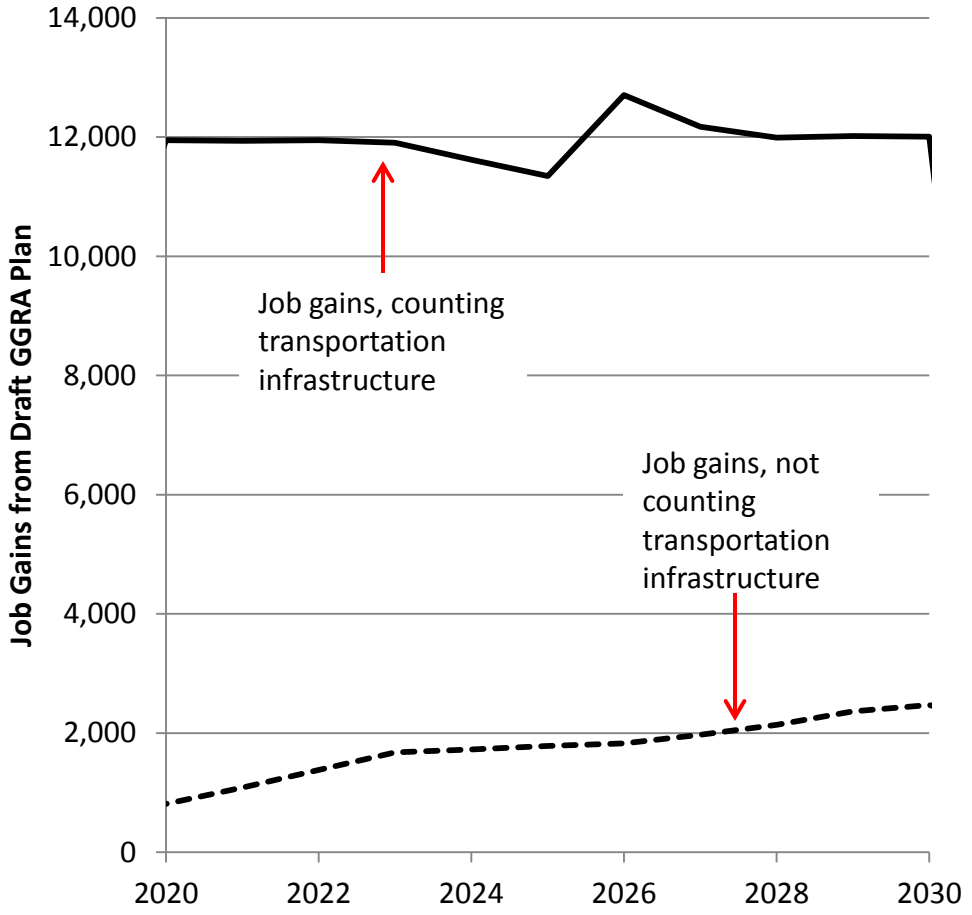
GGRA Draft Plan Employment Results

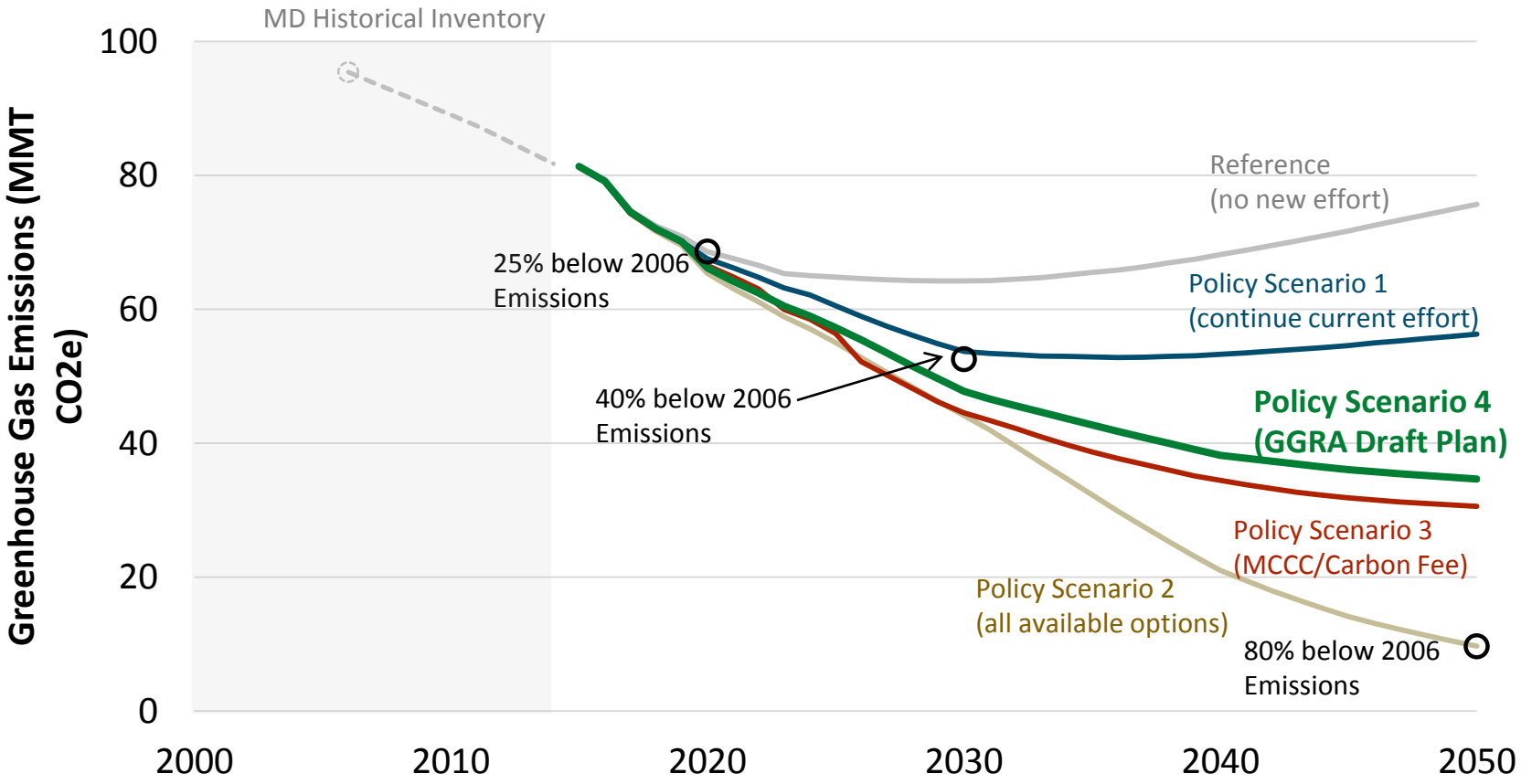
- Draft Plan drives substantial job gains.
- Almost all of MD's fossil fuel comes from out of state.
- Investments that reduce fossil fuel consumption drive positive impacts for MD's economy.



Large transportation projects drive substantial job gains in the near-term; investments in in-state clean energy and fuel-saving measures provide more modest underlying gains. (Transportation gains dependent on Federal funding)

Why Policy Scenario 4?

Policy Scenario 4 best balances economic and emissions benefits for 2030



Why Policy Scenario 4?

PS2 identified important long-term measures that should be re-evaluated as technologies mature, but are not cost-effective under current technology.

Some of the long-term technologies that were important to achieve the 2050 goal, but caused negative economic impacts under current technology were:
-Renewable Natural Gas
-Other advanced biofuels
-Electric heavy-duty trucks
-Electric non-road vehicles

These measures may be cost-effective over time. For now, the Draft Plan focuses on measures necessary for 2030.

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Next Steps

- Detailed modeling presentation at next MWG
  - Program-by-program assumptions
  - Emissions & other outcomes by sector
  - Employment by sector, by income, by education level, and other equity considerations.
- Full plan draft going through interagency review before release for comment.

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