Maryland
Department of the Environment

GGRA Approach Beyond 2030

Mitigation Work Group Meeting

August 18, 2020

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Agenda

1. Welcome and Introduction from Secretary Grumbles (5 Minutes)
2. Public Comment (20 Minutes)
3. Looking Beyond 2030 – The GGRA Framework (15 mins)
4. Looking Beyond 2030 – Emerging Technologies (45 Minutes)
5. Looking Beyond 2030 – Discussion of Potential Goals and Future Policies (30 Minutes)
6. Other Business (5 Minutes)

Goal for Today

Discuss long-term (post-2030) approaches:

- Long-term goals
- Flexible/technology-neutral policies
- Role of goals & future policies in GGRA plan, in light of GGRA requirements

Relevant Provisions in GGRA Law

2-1205

(c)(3) The plans shall be developed in recognition of the finding by the Intergovernmental Panel on Climate Change that developed countries will need to reduce greenhouse gas emissions by between 80% and 95% from 1990 levels by 2050.

Relevant Provisions in GGRA Law

2-1206

In developing and implementing the plans…the Department shall:

> (8) Ensure that the greenhouse gas emissions reduction measures implemented in accordance with the plans:
>
> > (vi) Produce a net economic benefit to the State's economy and a net increase in jobs in the State.

Iterative Process in GGRA Law

2022: Independent Study on Manufacturing Impacts

2022: MDE Progress Report
Progress toward both 2030 goal and "reductions needed by 2050 in order to avoid dangerous anthropogenic changes to the Earth's climate system"

After those: General Assembly may "maintain, revise, or eliminate" the 2030 goal and consider whether to continue manufacturing provisions.

Long Term Challenges

- Availability and cost of technologies in future is extremely uncertain.
- The GGRA requires positive economic impact despite current high estimated cost of future technologies.
- MDE tries to specify future policies as much as possible in GGRA; very tenuous beyond 2030.
  - Broader long-term goals without specified policies yet can play a positive role in long-term planning.

Discussion today: Long-term Goals

Example: Recent Medium and Heavy Duty Zero-Emissions Vehicles Memorandum of Understanding (MHD ZEV MOU)

- Technology is becoming more widely available. (https://globaldrivetozero.org/tools/zero-emission-technology-inventory/)
- Coming down in cost: total cost of ownership for most MHD ZEVs will be lower than diesel within 5-10 years; policy support can accelerate that. (https://caletc.com/wp-content/uploads/2019/12/ICF-Truck-Report_Final_December-2019.pdf)
- 15 states + DC set sales goals for 2030 (30%) and 2050 (100%); six month timeframe for action plan.

Extra Slides

2019 MDE Analysis: 80 by 50 (excerpt)

Full materials at:
https://mde.maryland.gov/programs/Air/ClimateChange/MCCC/Pages/MWG.aspx (12/17/19 meeting)

Policy Scenario 2 Measures

Compared to The Draft Plan ("PS4")

Near Complete Electrification:

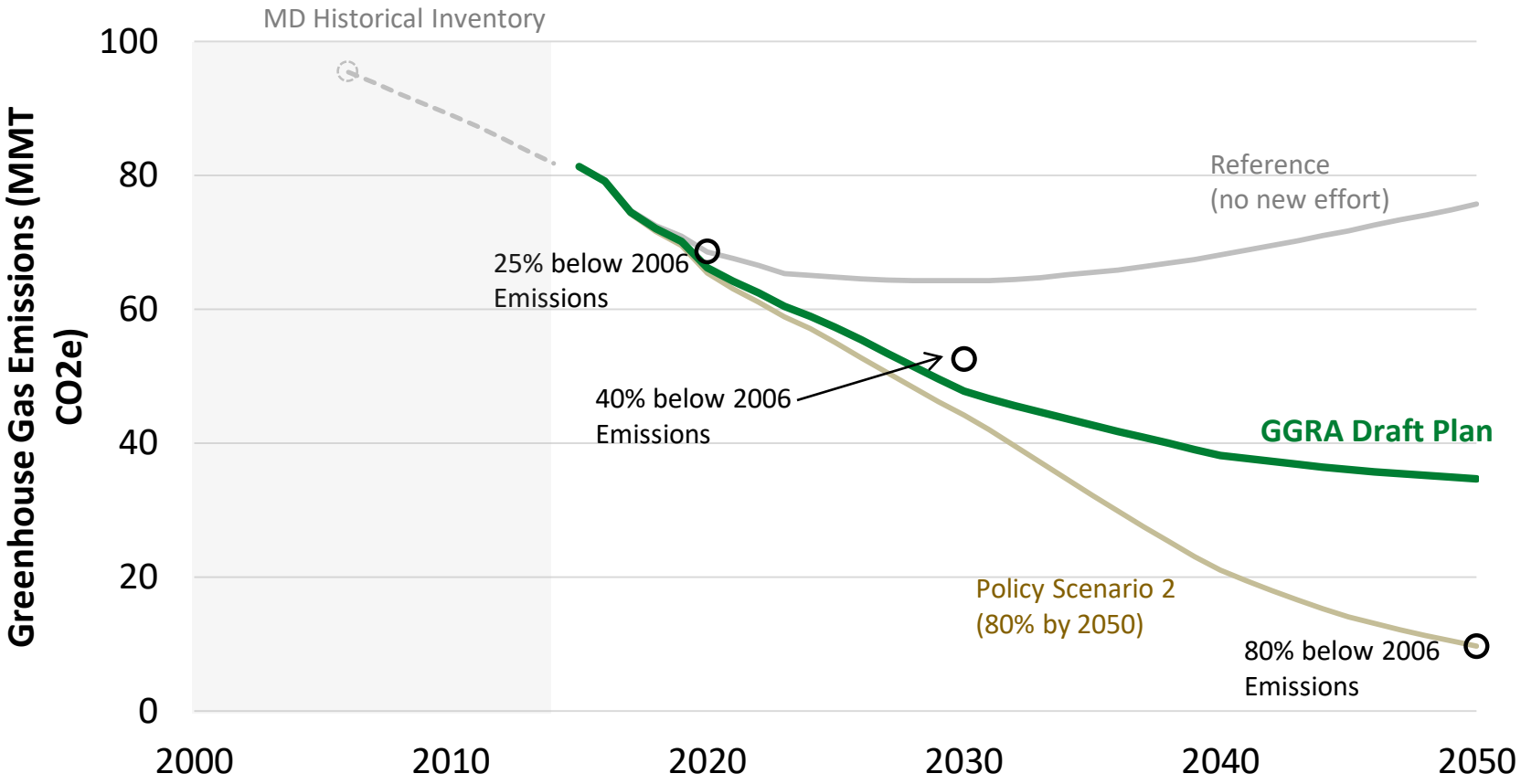
- Accelerated light duty ZEV sales by 2030 (same 100% by 2050 as PS4)
- Accelerated heavy duty EV and Diesel Hybrid Sales (95% by 2050)
- Electrification of non-road vehicles (50% construction EVs by 2050)
- Aggressive building electrification (95% Heat Pump sales by 2050)

Near Complete Decarbonization:

- Continued RGGI cap decline through 2050 (90% reduction 2020-2050)
- Aggressive deployment of renewable natural gas and advanced biofuels (25% biomethane by 2050 and 63% renewable diesel by 2050)
- More aggressive energy efficiency (100% efficient appliance sales by 2030; additional savings in industrial sector)

Long Term Goals

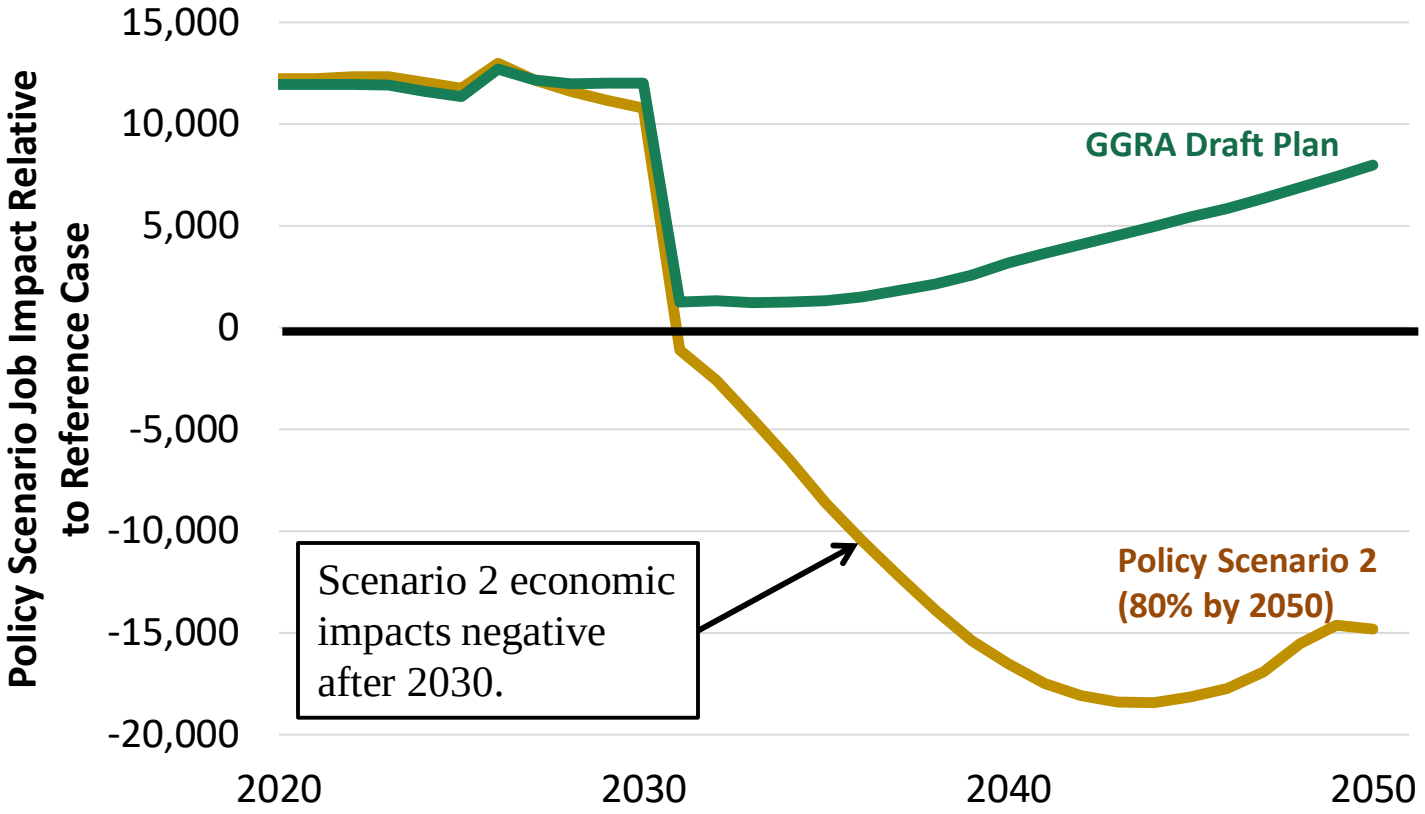
MDE analyzed a scenario that achieves 80% reduction by 2050 ("Scenario 2")



Important long-term measures included: renewable natural gas, other advanced biofuels, electric or other zero-emission heavy trucks and non-road vehicles.

Long Term Challenges

Scenario 2 identified important long-term measures that should be re-evaluated as technologies mature, but are currently expensive.



These measures may be necessary for deeper reductions, and may be cost-effective when the time comes. In the meantime, the Draft Plan focuses on measures necessary for 2030.

Conclusions from 2050 Analysis in GGRA Draft Plan

- Identified several measures and technologies to monitor as they become available & economical.
- Many should be deployed in the future.
- Many policies cannot be precisely specified multiple decades out.
- Difficult to demonstrate positive economic impacts with new or speculative technologies, whose cost is very high, and very uncertain.

2020 MWG Scenario (excerpt)

Assumptions established by MWG. Full materials at https://mde.maryland.gov/programs/Air/ClimateChange/MCCC/Pages/MWG.aspx (6/18/20 meeting)

MWG Scenario Policies and Measures

+ Electricity Generation

- 50% RPS by 2050, 75% RPS and 100% zero-emissions electricity by 2040
- All in-state coal-fired power plants are retired by 2030
- No new natural gas power plants built after 2020
- Increased net metering cap to 3 GW by 2030
- Accelerated RGGI cap (50% reductions by 2030, 100% reductions by 2040, vs. 2020)

+ Transportation

- CAFE Standards improving through 2026
- Aggressive zero-emission vehicle sales
- Low LDV VMT growth rate (0.6% per year)

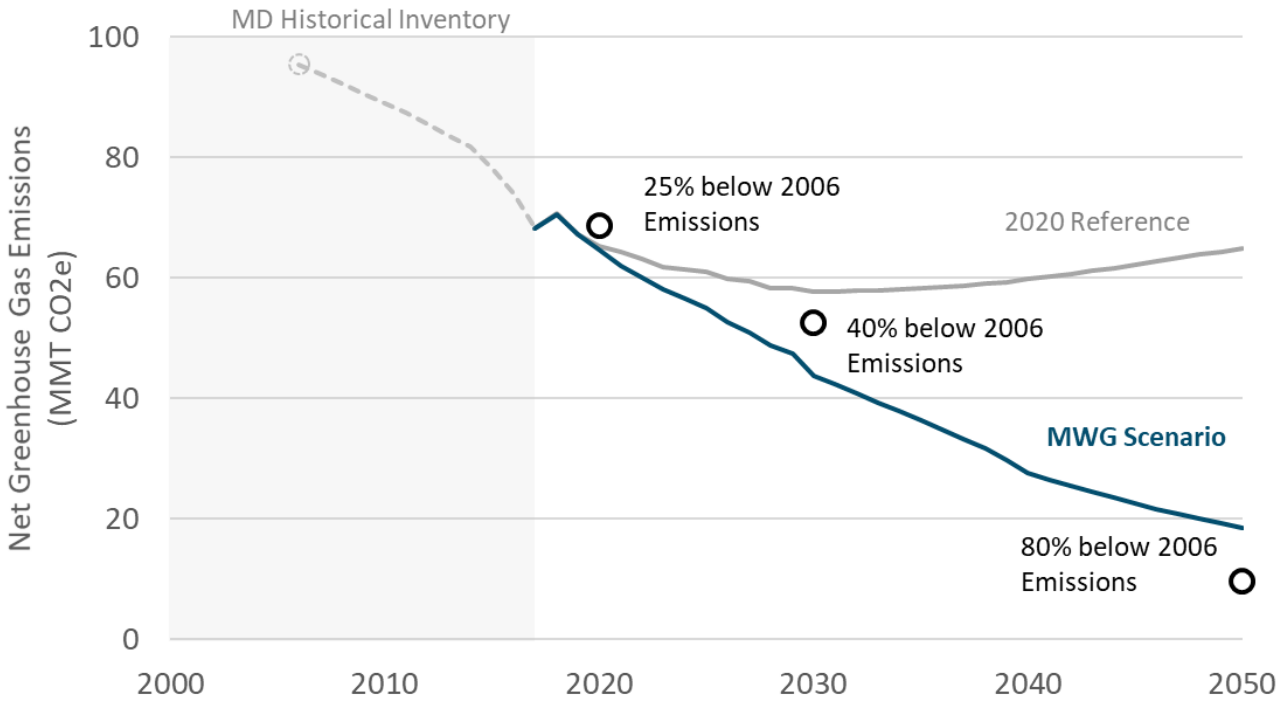
+ Buildings and Industry

- Increased EmPOWER efficiency goals by 2023 and beyond
- Aggressive building electrification for new construction and retrofits

+ Other

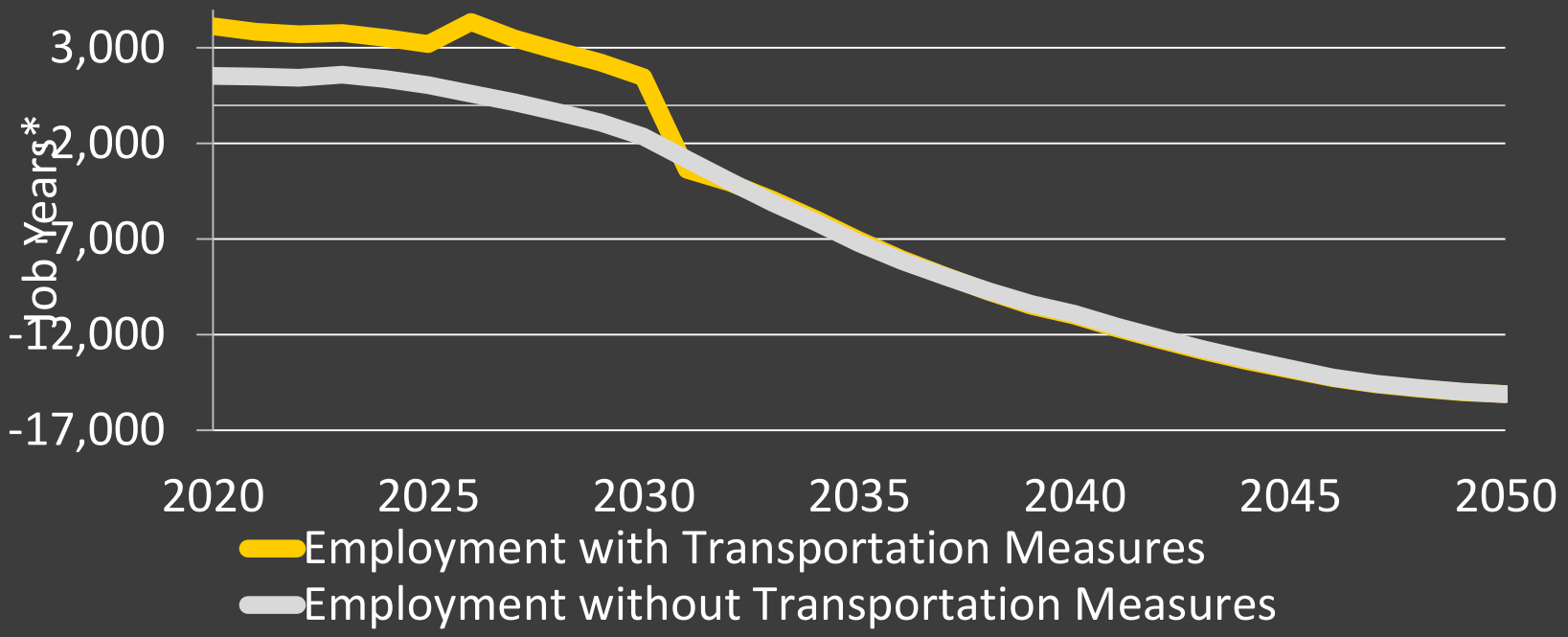
- Methane measures in manure management and enteric fermentation
- Increased forestry sinks by 10% by 2030 (vs. 2017)

Total Net GHG Emissions



- The MWG scenario overachieves the near-term GHG targets and is close to meeting the 2050 GHG target.
- It overachieves the **2020 GHG target by 3.9 MMT CO2e**, and **the 2030 GHG target by 8.7 MMT CO2e**
- It gets close to the **2050 GHG target**, but there is still **a gap of 8.9 MMT CO2.**

Without the transportation measures, employment remains positive at 575 jobs



*Difference between the MWG Scenario and reference case