



Maryland
Department of
the Environment

2019 Greenhouse Gas Emissions Reduction Act Draft Plan

Sustainable Growth Commission
November 18, 2019



The 2019 GGRA Draft Plan

- MDE has proposed the *2019 GGRA Draft Plan*
 - In coordination with other state agencies and stakeholders
 - Must achieve Maryland's goal of reducing greenhouse gas (GHG) emissions by **40 percent** by 2030 from a 2006 baseline
 - More ambitious than the Paris Climate Accord goal of 26% to 28% reduction by 2025
 - Must also benefit the State's economy and creates jobs
- *Sets Maryland on a path to achieve the States ambitious GHG emissions reduction goal for 2030 and to achieve much deeper reductions in the 2040 to 2050 time frame*
- *Serves as an example for the nation showing how state action can reduce the threat of climate change while growing the economy and creating jobs*



Key Results - Quick Snapshot

- Comprehensive suite of over 100 measures that provides a plan, which if fully implemented:
 - Will achieve **GHG reductions greater than 40 percent ... about 44% by 2030**
 - **Puts the State on a path to achieve significantly deeper reductions by 2050**
 - **Will achieve as much as \$11.54 billion in increased economic activity and over 11,000 new jobs by 2030**
 - **Drive investments in energy efficiency and clean and renewable energy**
 - **Advance widespread adoption of electric vehicles**
 - **Supports new industries and technologies**
 - **Improve management of forests and farms to sequester more carbon in trees and soils**
- That said ... this is a draft ... there is still work to be done
 - Programs can still be added, modified and improved
 - Adjustments to the entire plan can still be made, if needed



Outreach and Stakeholder Input

- Before finalizing the 2019 GGRA Plan, Maryland will be undertaking a significant stakeholder process to ensure that opportunities exist for the interested parties to provide additional input on the Draft Plan
- Maryland invites comment on:
 - The measures that are being counted on to reduce emissions
 - Potential new programs
 - The emissions and economic analyses
 - Opportunities to better address social equity issues
 - Other aspects included within the Draft Plan
- Maryland will consider these comments in the development of the final 2019 GGRA Plan

A bright sun is shining in a clear blue sky, with several white, fluffy clouds scattered across the scene. The sun is positioned in the upper right quadrant, creating a lens flare effect. The clouds are more concentrated in the middle and lower parts of the frame.

What's in the Plan?



The Plan in General

- Over 100 regulations, strategies, programs, and initiatives are included in the Draft Plan
- Some strategies are already being fully implemented, others are in an earlier phase of the implementation process, while others are still being adopted
- All inventory sectors
 - Energy/Electricity ... Transportation ... Agriculture and Forestry ...
The Built Environment ... Waste ... and more
- Broad Public, Private and Federal, State and Local Partnerships
 - Underserved communities, state universities, local government, Port of Baltimore, etc.



Major Programs

Electricity Supply

Clean and Renewable Energy Standard
Continued RGGI Geographic Expansion

Transportation

Numerous MDOT Investments (e.g., transit)
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
State Building Efficiency EO

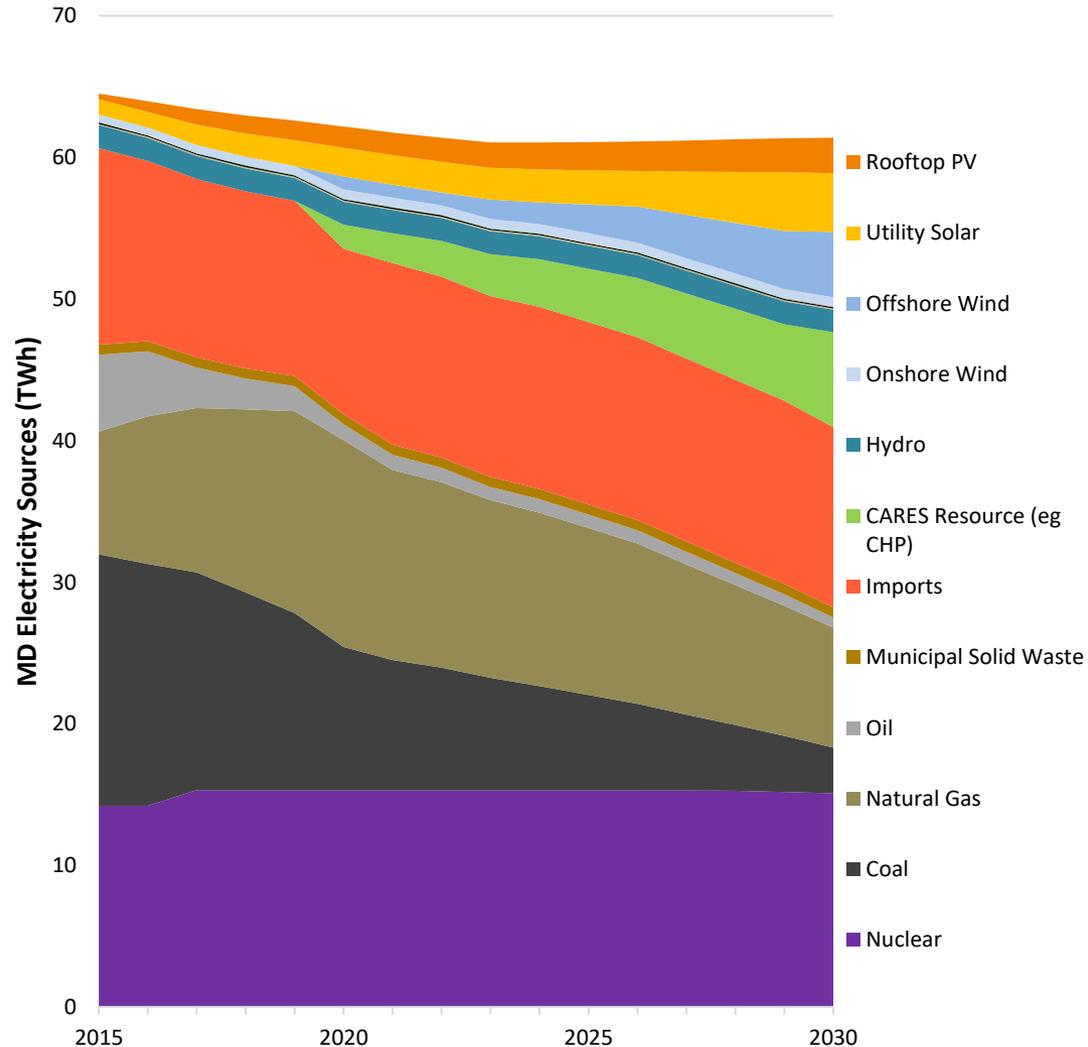
Other

HFCs



Electricity Supply Programs

- CARES
 - Still under development; example impacts in the *2019 GGRA Draft Plan*
 - 100% Clean Electricity by 2040
- RGGI Expansion
 - RGGI participation in more nearby states will reduce emissions from imported power.
 - New Jersey recently renewed participation, Virginia promulgated a regulation (on hold), and Pennsylvania announced rulemaking.



*Analysis assumes no new nuclear or carbon capture before 2030



Transportation Programs

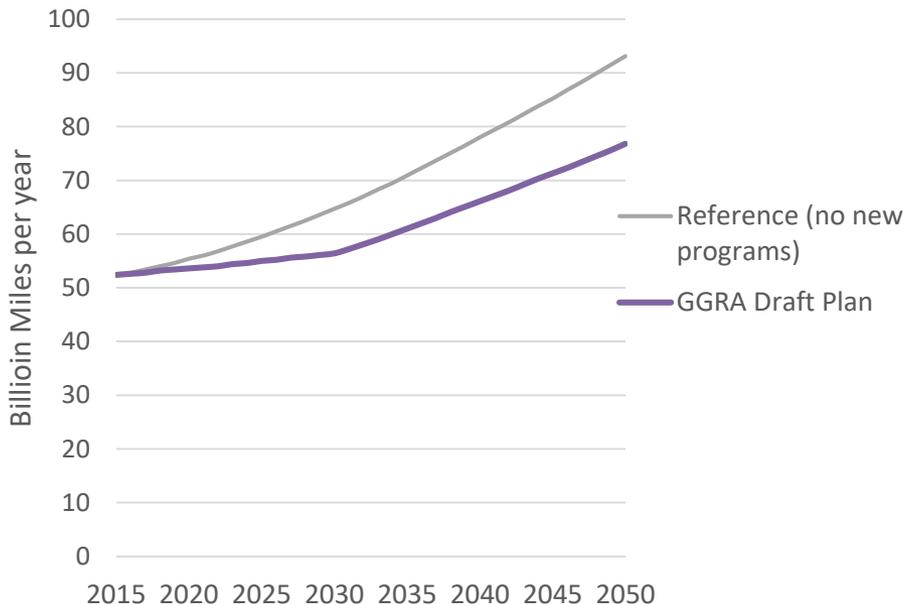
- Reducing Vehicle Miles Traveled:

- Transit Capacity & Operations
- Intercity Transportation
- Active Transportation (e.g., bike lanes)
- Compact Development

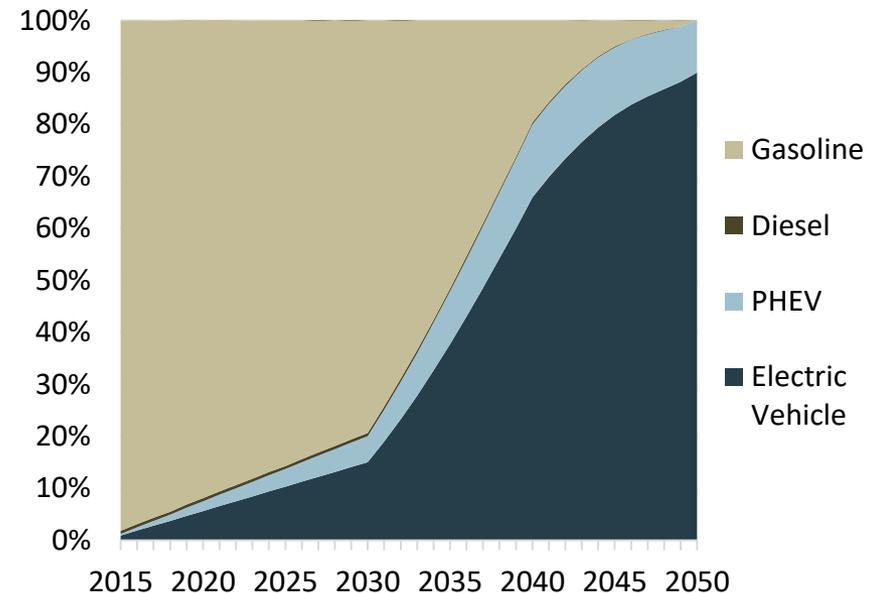
- Deploying electric and other Zero Emission Vehicles:

- Clean Cars Program
- 50% ZEV Transit Buses by 2030
- Transportation and Climate Initiative

Light Duty Vehicle Miles Traveled



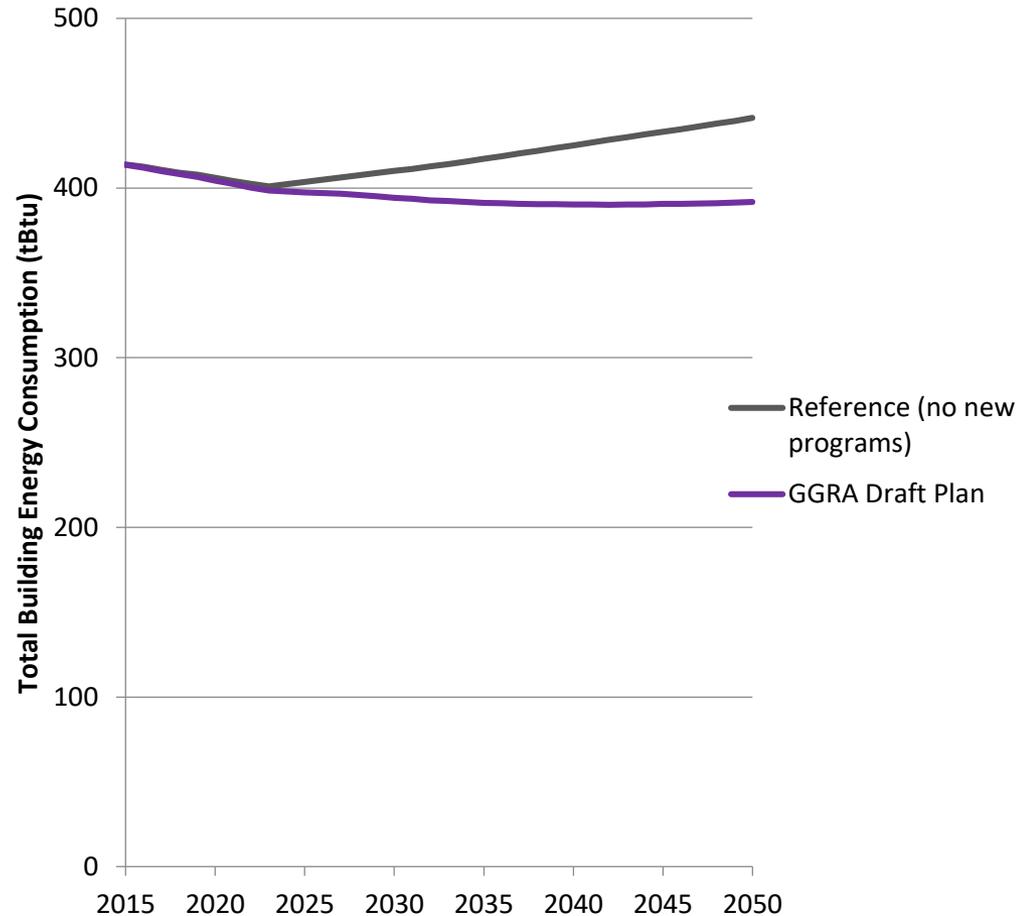
Light Duty Auto Sales





Buildings Programs

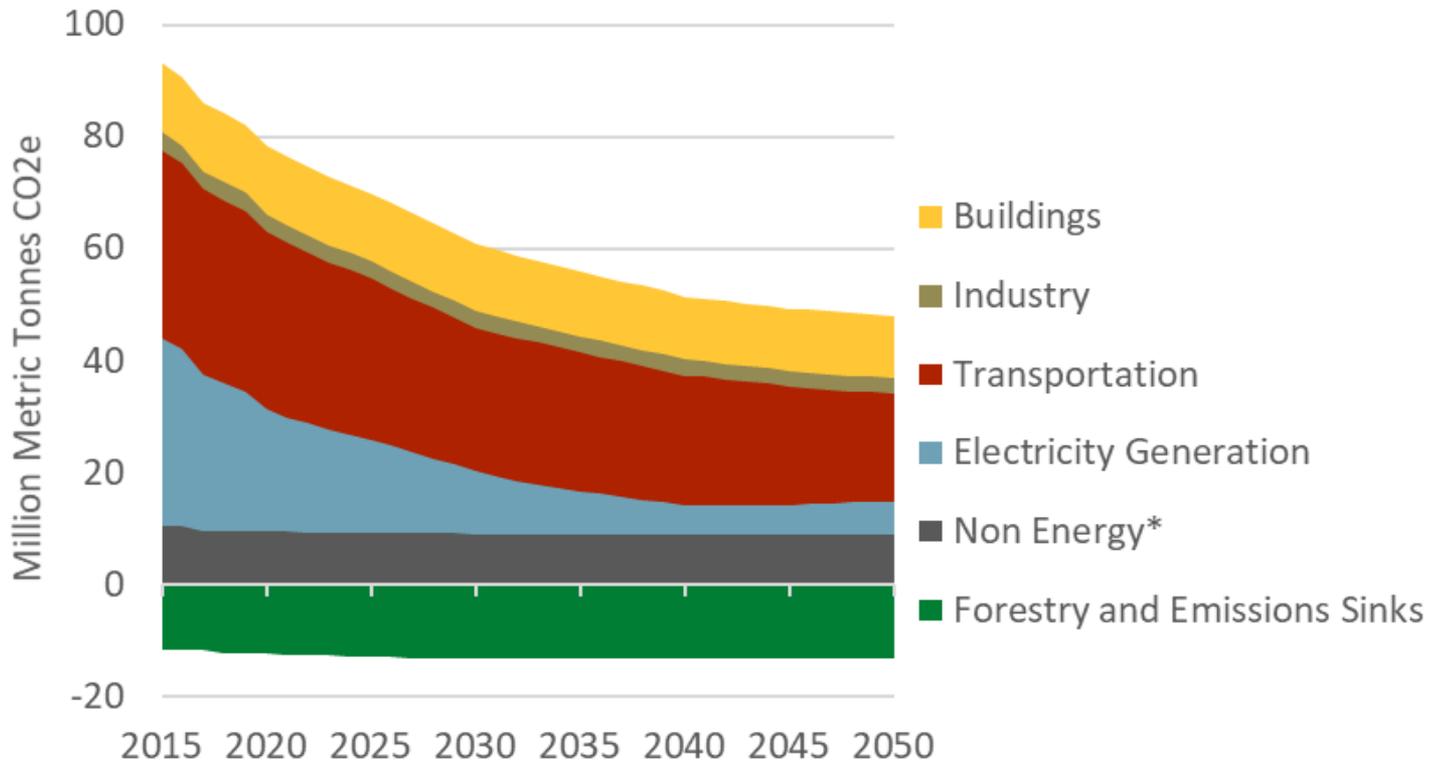
- Prioritize energy efficiency to counteract growth:
 - Continue EmPOWER beyond 2023
 - Achieve State Building Efficiency Goal
 - Achieve Compact Development Goal
- Begin to convert heating systems to efficient heat pumps that run off increasingly clean electricity.





Sequestration Programs

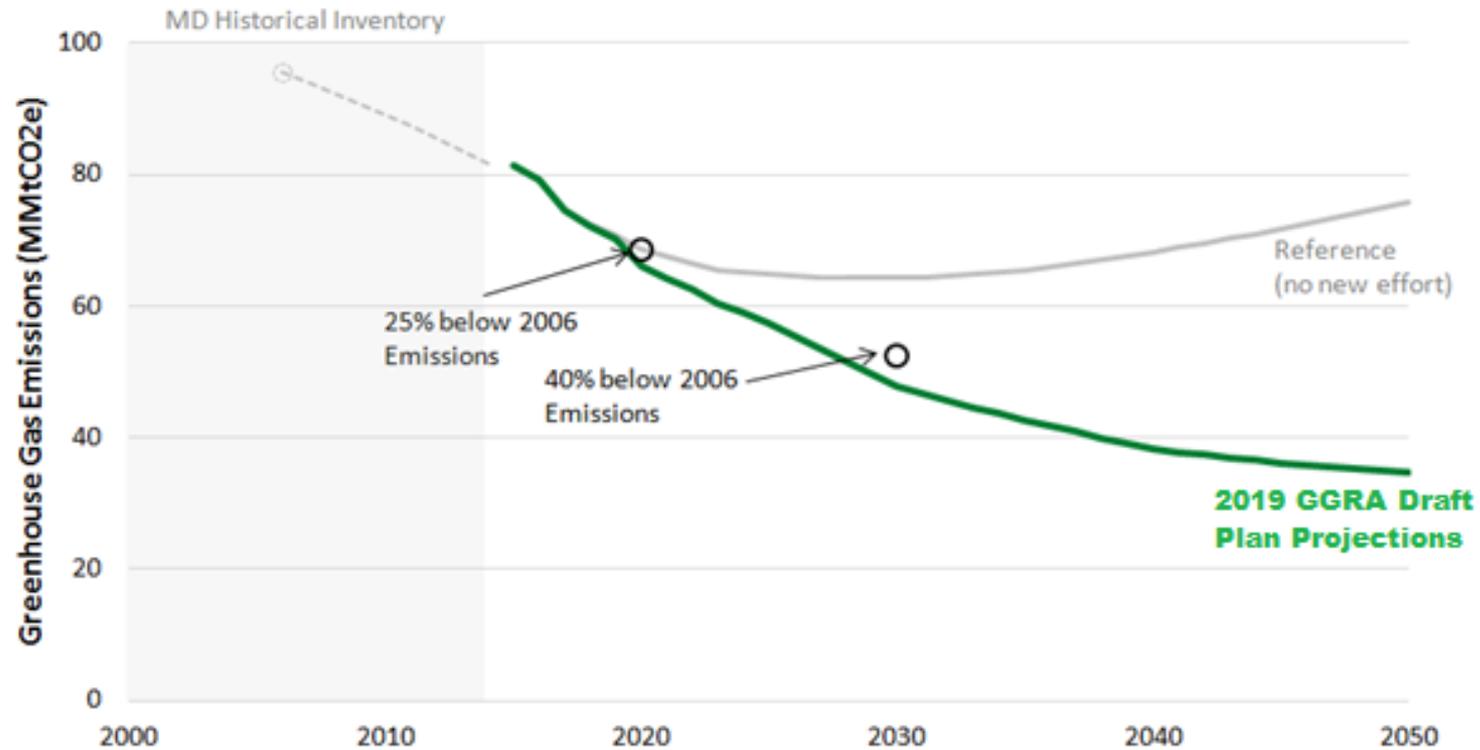
Forest management, tree planting, and Healthy Soils programs accelerate carbon sequestration in forests and agricultural soils, adding benefit on top of emission reduction programs.



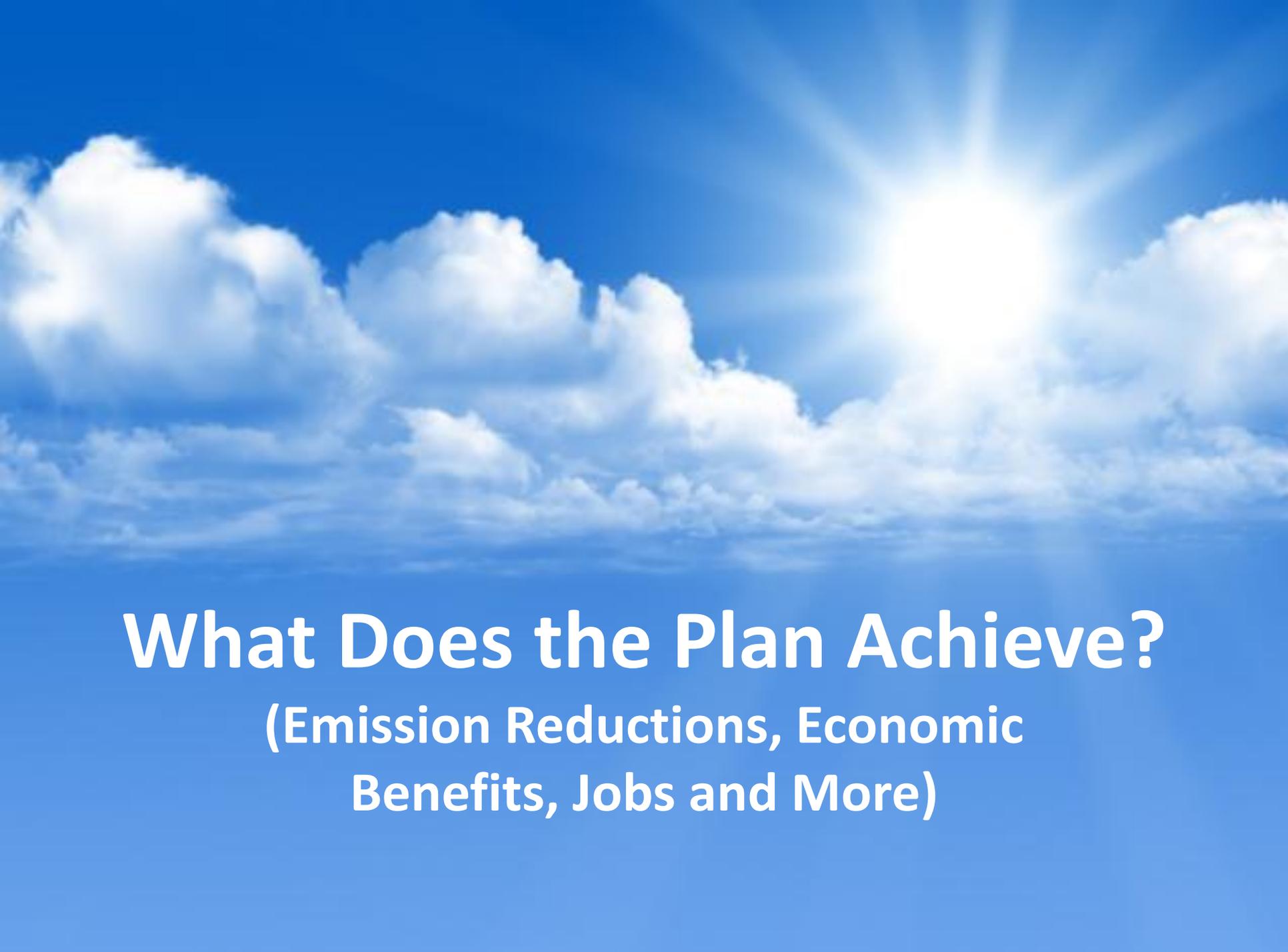
*Non Energy includes Agriculture, Waste Management, Industrial Process and Fossil Fuel Industry.



Net Emissions



The GGRA Draft Plan reduces emissions by 44% by 2030 (extra 4.5MMTCO₂e)

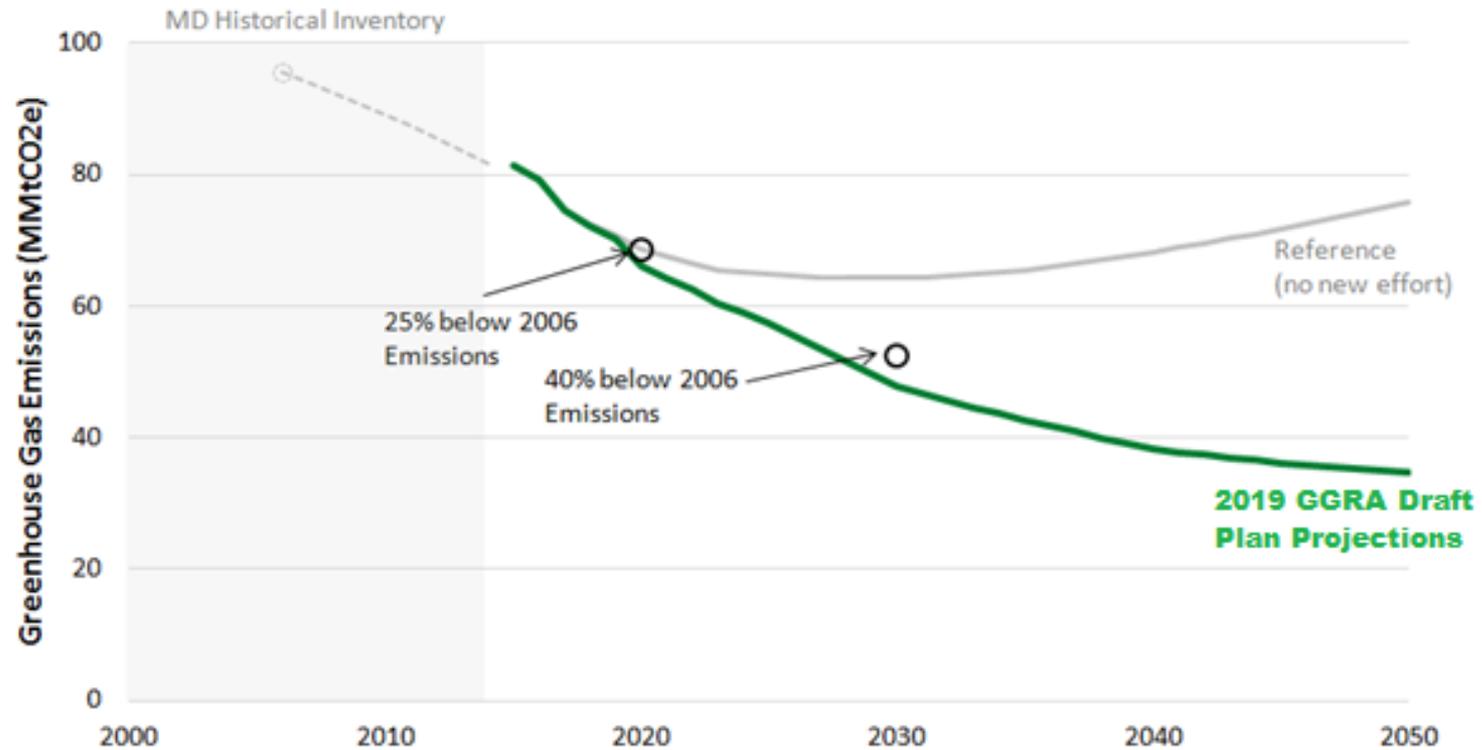
A bright sun shining through a blue sky with white clouds. The sun is positioned in the upper right quadrant, casting rays across the sky. The clouds are scattered and fluffy, adding texture to the background.

What Does the Plan Achieve?

(Emission Reductions, Economic Benefits, Jobs and More)



Net Emissions



The GGRA Draft Plan reduces emissions by 44% by 2030 (extra 4.5MMTCO₂e)



Economic Impacts

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 job-years	+ 6,703 job-years
GDP Impact**	+ \$ 11.54 billion	+ \$ 18.63 billion
Personal Income Impact**	+ \$ 10.04 billion	+ \$ 15.67 billion
Avoided Mortality**	+ \$ 0.74 billion	+ \$ 4.79 billion
Avoided Climate Damages**	+ \$ 4.30 billion	+ \$ 27.11 billion

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

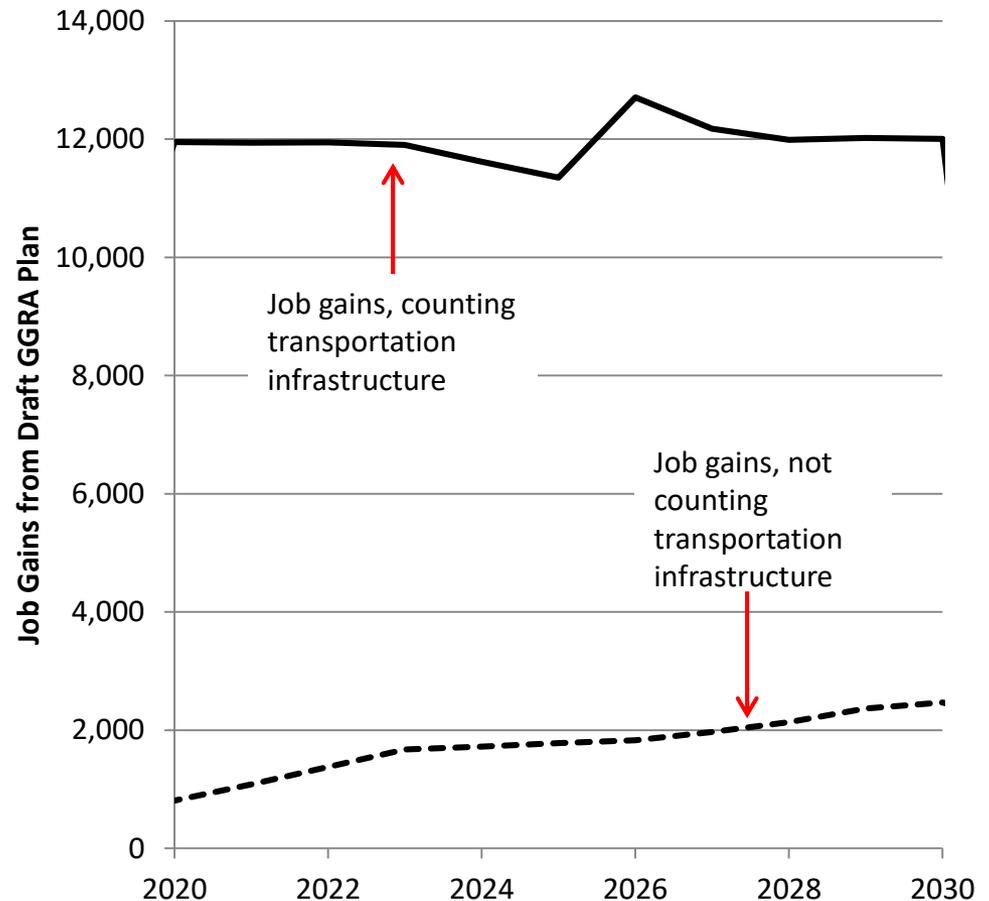
** 2018 Dollars, Cumulative, Net Present Value using 3% discount rate.

Climate damage evaluated using Federal Social Cost of Carbon (2015 Update)



GGRA Draft Plan Employment Results

- The 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.



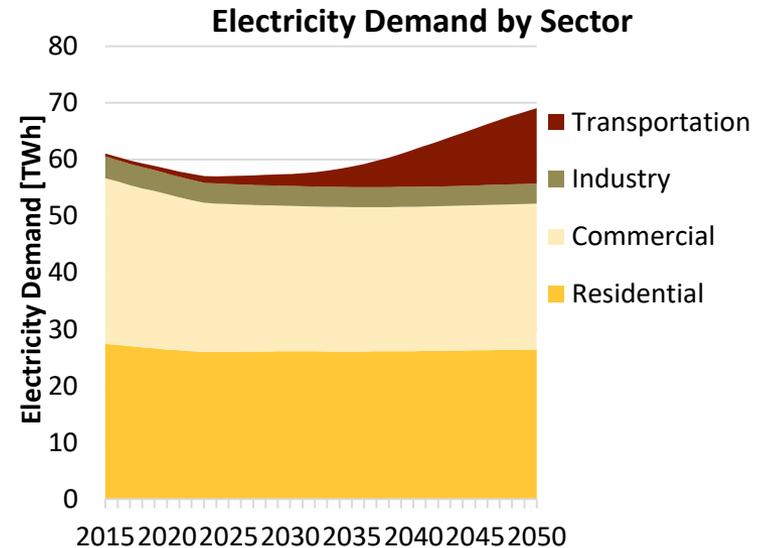
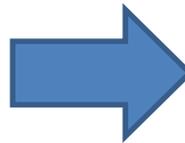
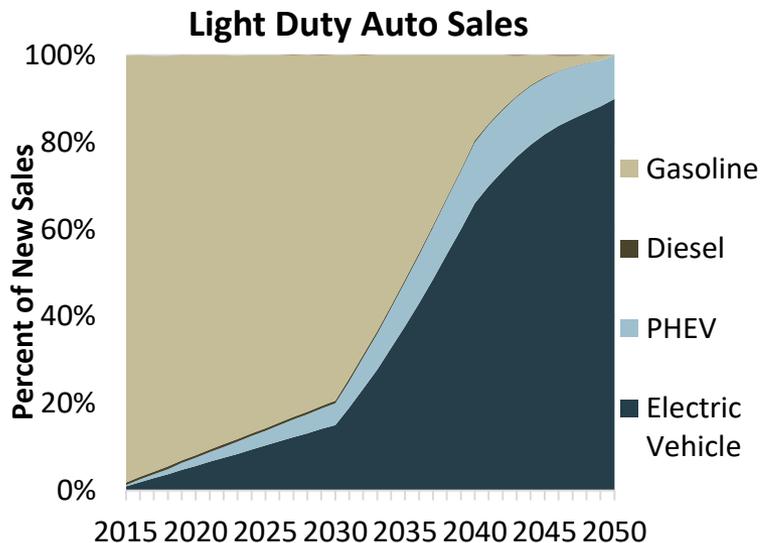
Large transportation projects drive substantial job gains in the near-term; investments in in-state clean energy and fuel-saving measures provide more modest underlying gains. (Transportation gains dependent on Federal funding)



Analysis Tools: GHG Emissions

E3's PATHWAYS tool, customized for Maryland

- Model of all energy consuming stock in the state
- Captures interactions among programs and sectors:

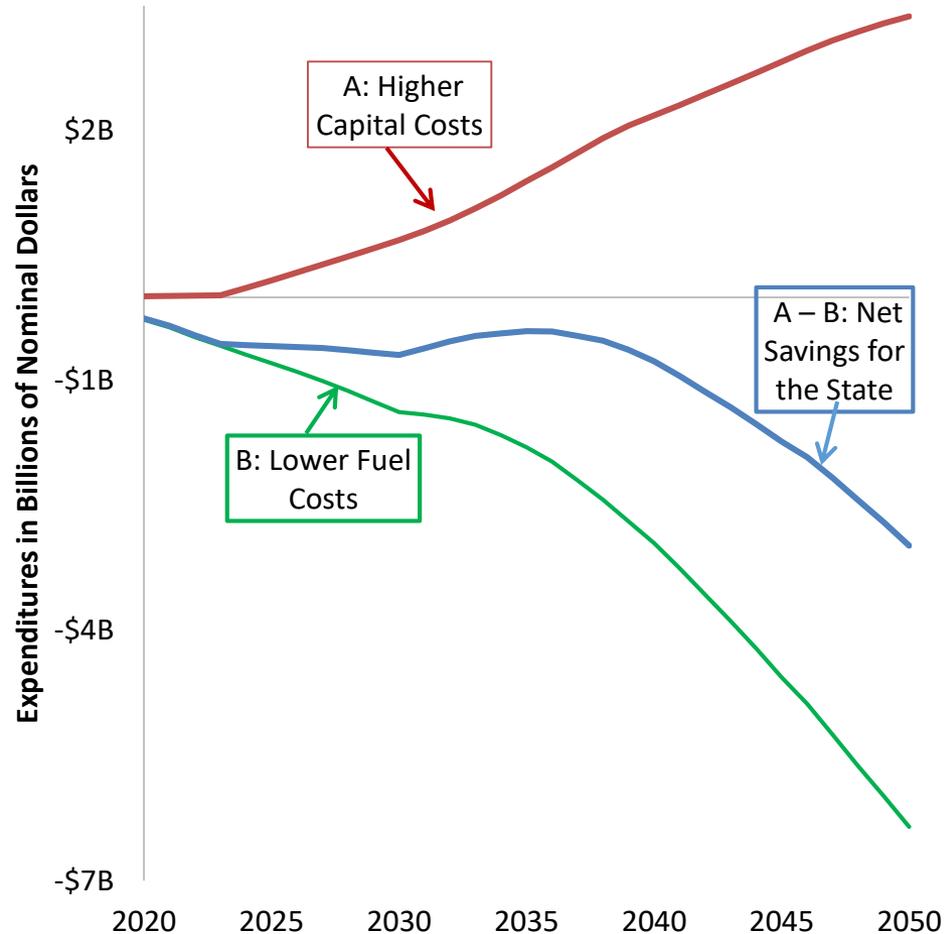




Analysis Tools: Economic Impacts

REMI model, run by Towson's
Regional Economic Studies
Institute

- Captures effect on Maryland's economy from:
 - Up-front capital costs from programs and measures;
 - The savings enjoyed by consumers and businesses from energy efficiency, EVs, and other clean energy measures;
 - Transportation and clean energy infrastructure projects; and
 - Improvements in public health.

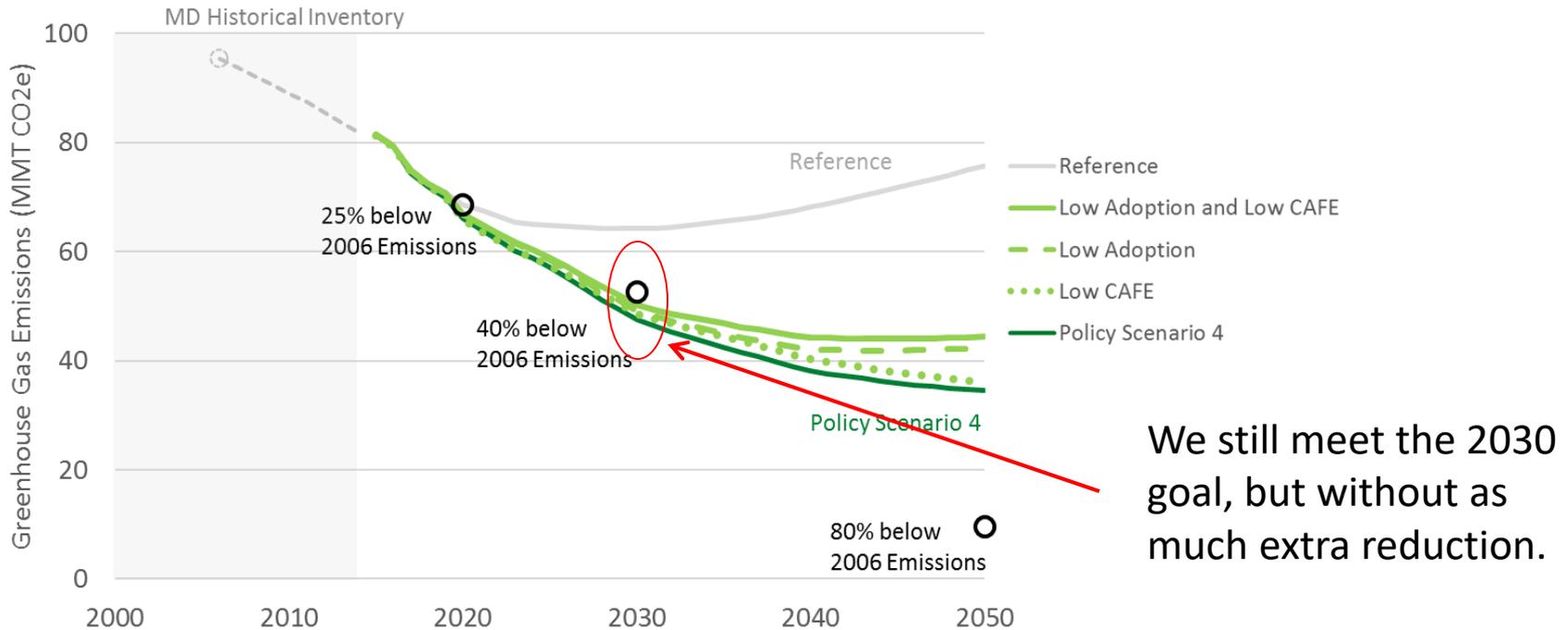


Modeling documentation in Appendix G



Sensitivity Analyses

- What if:
 - The Federal government rolls back vehicle standards?
 - Consumer adoption of EVs is half of what we modeled?
 - Consumer adoption of efficient appliances is half of what we modeled?
 - All of those things happen at once?





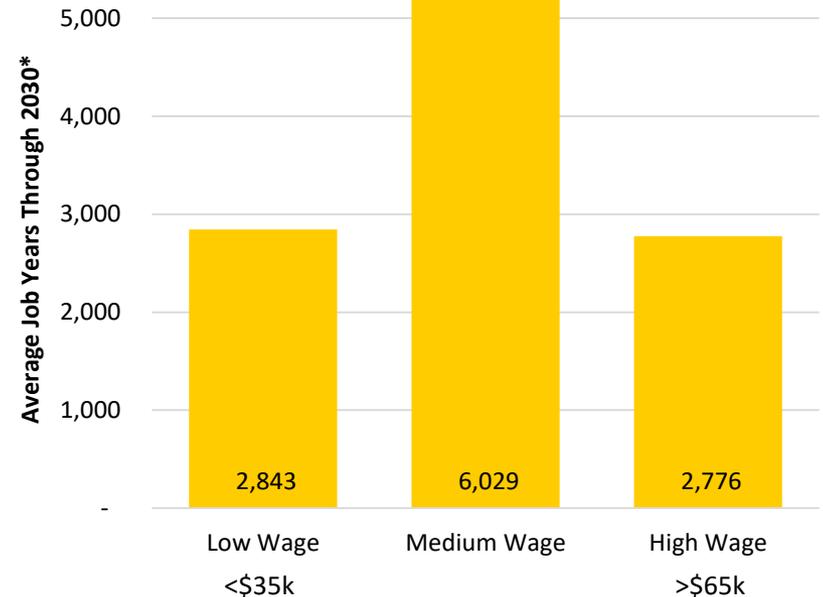
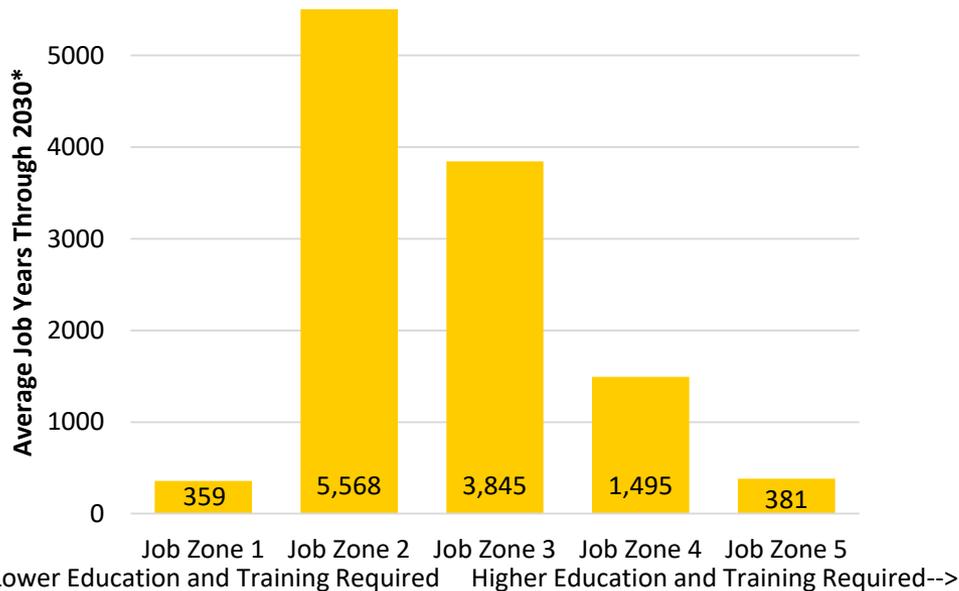
Equity in the *2019 GGRA Draft Plan*

- Full Chapter in the Draft Plan addressing social equity
- MDE, MDH, and DNR have all participated in multiple meetings with overburdened communities throughout 2017 and 2018.
 - MDE’s meetings have focused on mitigation strategies while DNR and MDH have addressed resiliency, and the public health implications of climate change.
- Draft Plan includes multiple efforts that help these communities. Examples include:
 - Low income ratepayer relief through RGGI, MEA and DHCD programs that provide low income support for energy efficiency and renewable energy, and more



Modeling and Analysis of Equity Issues

- Projected job creation mostly in professions requiring some education, but not advanced degrees.
- Projected job creation mostly in middle-income professions



Draft Plan also breaks down impacts by geography, industry, and ethnicity.



Just Transition

- The Draft Plan includes a Just Transition report:
 - Inventories fossil fuel-dependent jobs throughout Maryland
 - Identifies transition opportunities for dependent job categories that have:
 1. Similar skill sets
 2. Expected future growth
 - Estimates fiscal impact from fossil fuel dependent firm closures

Just Transition analysis in Appendix I



Conclusions

- *The 2019 GGRA Draft Plan is both ambitious and comprehensive.*
 - Includes over 100 important large and small initiatives to reduce GHG emissions in Maryland.
- When fully implemented, the *2019 GGRA Draft Plan* will:
 - Achieve **more than the 40 percent** by 2030 emissions reduction required by the GGRA of 2016 law;
 - Have a positive impact on Maryland's economy;
 - Create and maintain new jobs; and
 - Help Maryland protect public health and meet Chesapeake Bay and air quality goals.



Conclusions

- Progress made through implementation of the *2019 GGRA Draft Plan* will position the State to achieve longer term goals like reducing GHG emissions between **80 percent** and **95 percent** from 1990 levels by 2050.
- The State aims to incorporate:
 - Traditional strategies (e.g., energy and transportation), and
 - Non-traditional strategies (e.g., partnerships, healthy soils).
- *When combined with proposals for several bold new programs like CARES and TCI, the 2019 GGRA Draft Plan will result in great success for Maryland.*