Maryland
Department of the Environment

Closing the Emissions Gap between the GGRA Plan and 60x31 & the MWG's 2022 Work Plan

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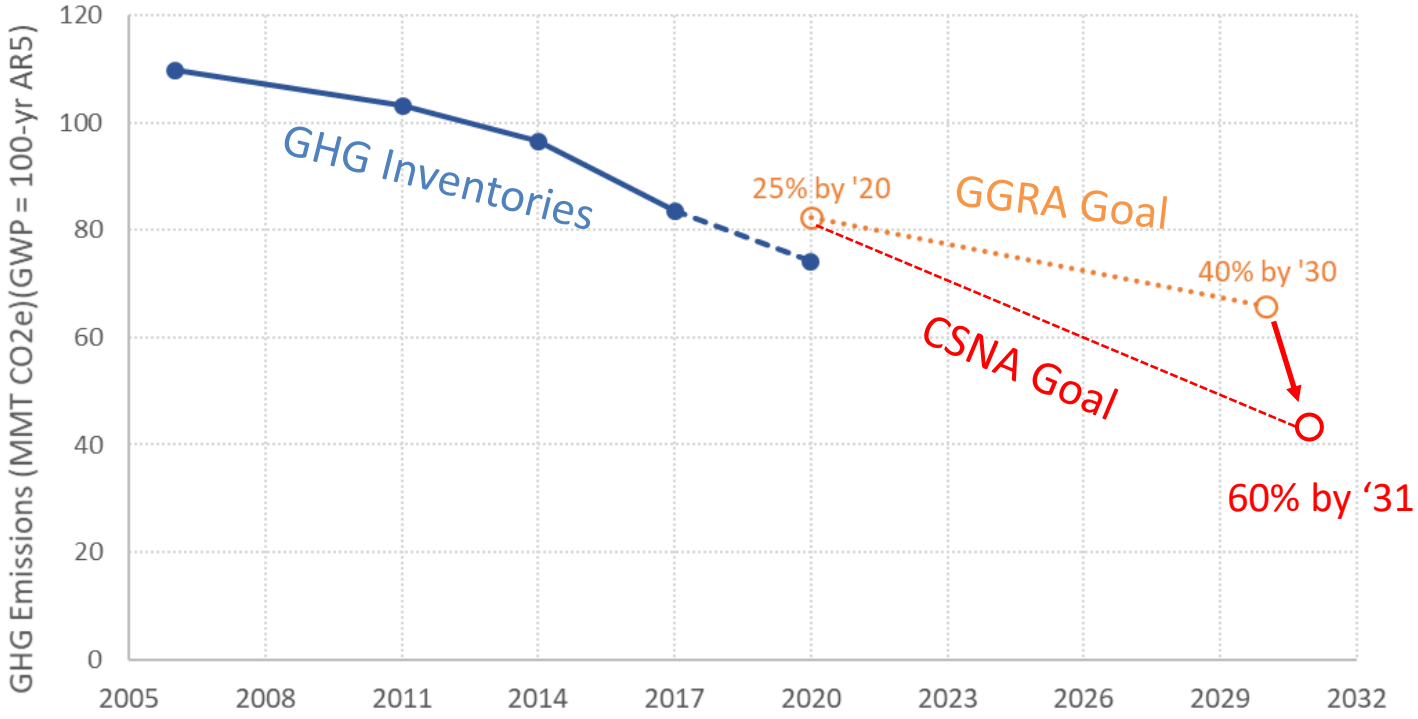
Presentation Outline

- Part 1: Closing the Emissions Gap
  - GGRA Plan Measures
  - Emissions Gap between the GGRA Plan and 60x31
  - GGRA Plan “Optimistic Scenario” Measures with GHG Impacts by Sector
  - Emissions Gap between the Optimistic Scenario and 60x31
  - The Path Ahead
- Part 2: The MWG’s Work Plan
  - Activities for the rest of 2022

Part 1: Closing the Emissions Gap

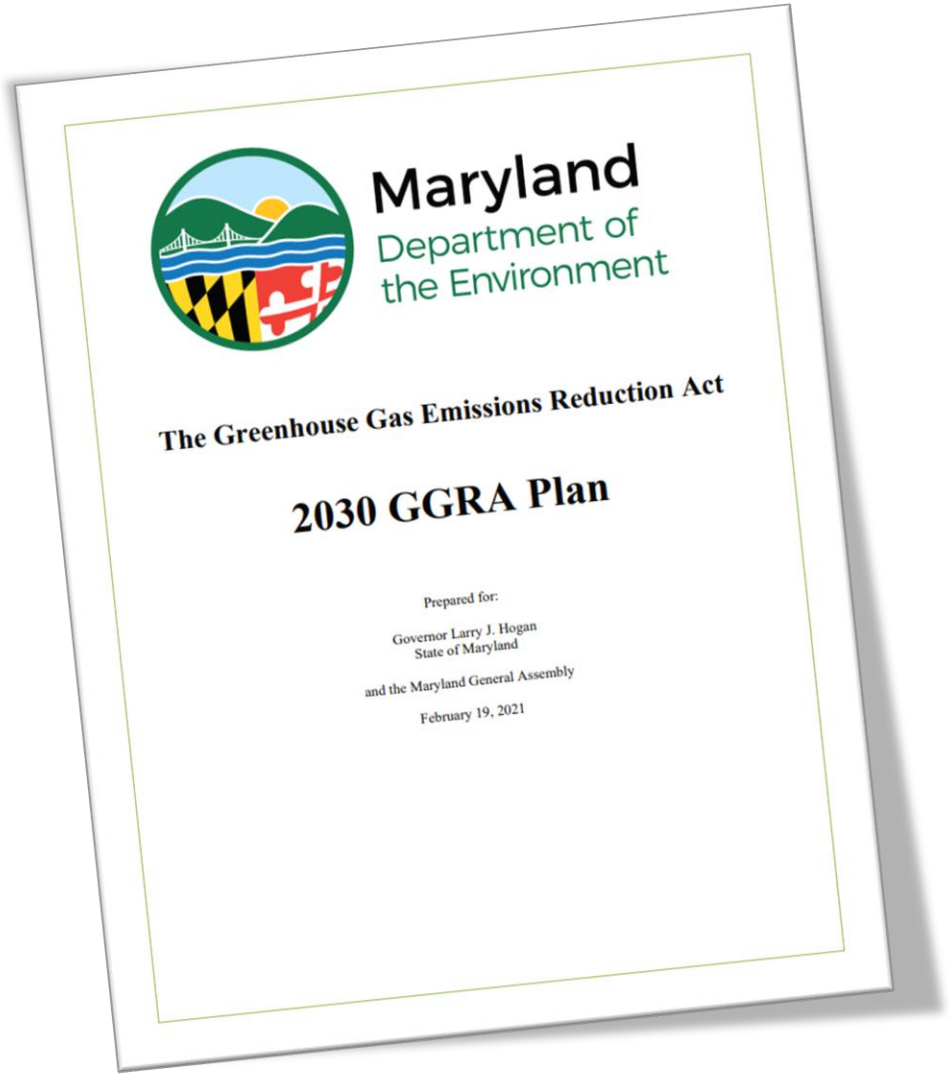
Climate Solutions Now Act of 2022 (CSNA)

Maryland now has the most ambitious near-term goal in the U.S.: **60% by ’31**



Long-term goal: **net-zero emissions by 2045**, consistent with other leaders

Starting Point for 60x31: The 2030 GGRA Plan



- Published in February 2021
- Dozens of programs and initiatives
- Multiple policy scenarios modeled
- Nearly a 50% reduction in GHGs by 2030
- Net economic and jobs benefits for MD

2030 GGRA Plan Measures (1 of 2)

	2030 GGRA Plan: Emissions drivers *(and proposed policy/program changes)*
Clean Electricity	**75% clean electricity by 2030, 100% by 2040** *(proposed Clean and Renewable Energy Standard)*
Energy Efficiency	**Continue EmPOWER's current level of efficiency gains** *(proposed EmPOWER extension)*
Building Code	**Improved building shells for all new construction and 25% of existing buildings by 2030** *(existing code improvement & proposed thermal efficiency via EmPOWER)*
Building Electrification	**50% of heating system sales in 2030 are heat pumps** *(proposed broadening of EmPOWER)*

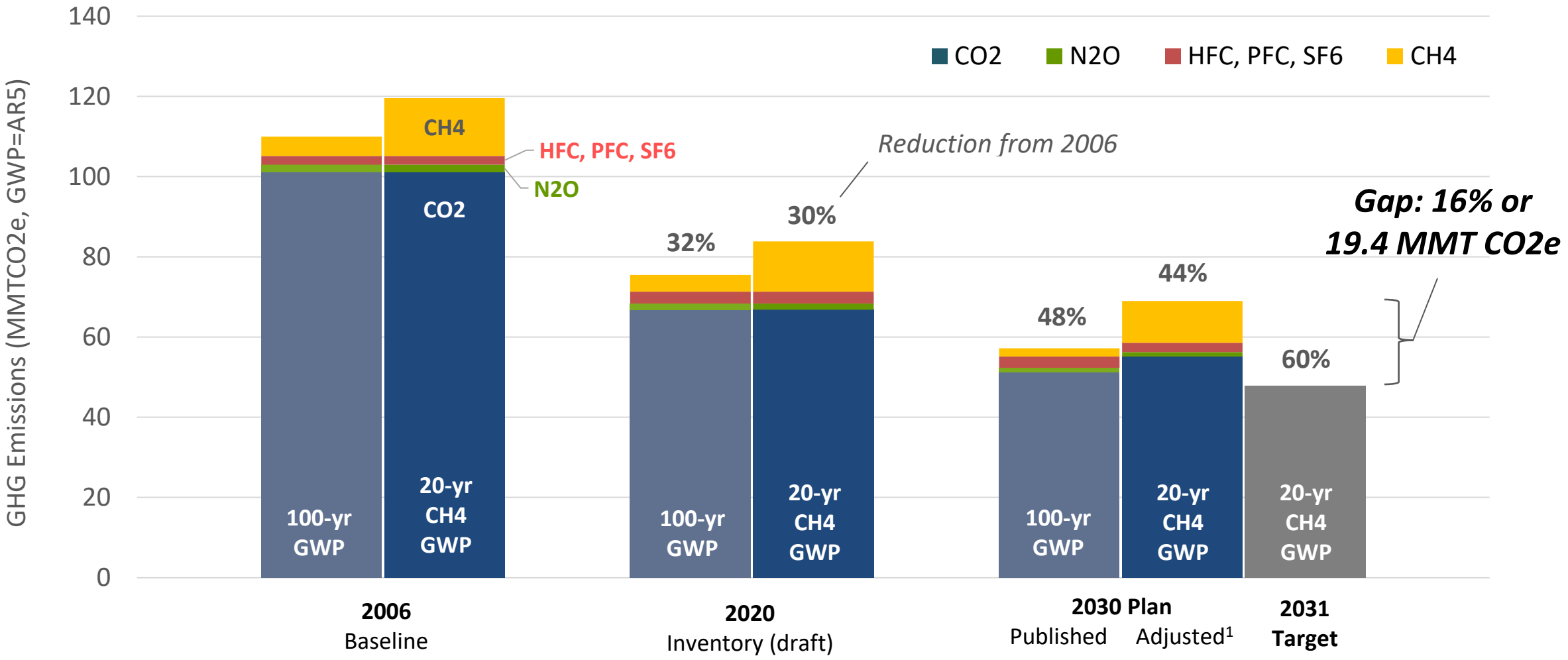
2030 GGRA Plan Measures (2 of 2)

	2030 GGRA Plan: Emissions drivers *(and proposed policy/program changes)*
Fuel Economy Standards	**Extension of Federal CAFE standards for LDVs** *(success of state suit and advocacy for new standards)*
Zero Emission Vehicles	**46% ZEV LDV sales in 2030 (65% of cars and 25% of trucks); 35% ZEV MHDV sales in 2030** *(proposed TCI-P and finalized MHDV MOU)*
Biofuels	**Existing ethanol and biodiesel blends** *(no assumed changes)*
Other	**Reduced methane emissions from natural gas system** *(finalized MDE regulation on transmission and storage)* **Reduced HFC emissions from particular products** *(finalized MDE regulation)*

Switching to the 20-year GWP for Methane

- Global Warming Potentials (GWPs) are units of measurement that allow comparisons of the global warming impacts of different gases.
- Specifically, GWP is a measure of how much energy the emissions of 1 ton of a gas will absorb over a given period of time (ex. over 20 years or 100 years), relative to the emissions of 1 ton of CO2.
- MDE historically used the 100-year GWPs in its GHG Inventory and GGRA Plan, consistent with national and international standards, and used the 20-year GWP for methane for rulemaking and supplemental analyses.
- CSNA requires MDE to use the 20-year GWP for methane, which amplifies the impact of methane in the State's GHG accounting.

The Gap between the GGRA Plan and 60x31



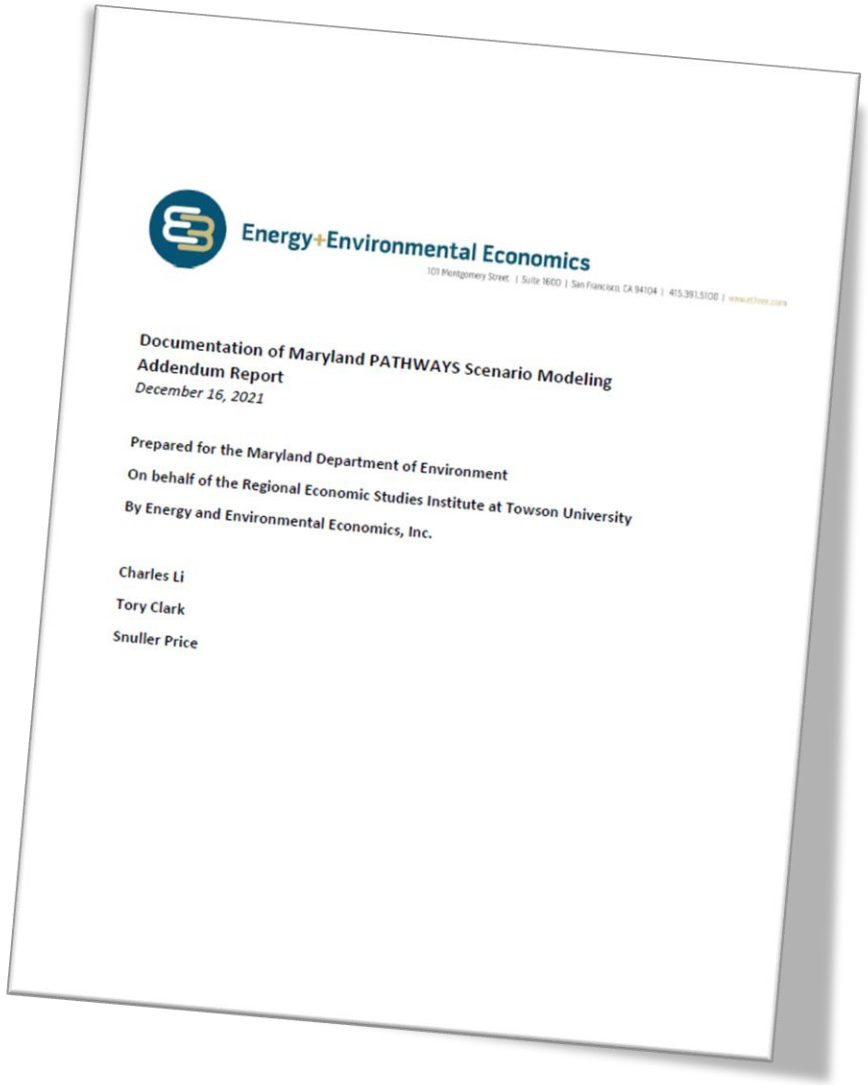
[1] *Reflects updated estimates for landfills, jet fuel, and ODS substitutes and 20-yr GWP for methane*

Draft results. Numbers are subject to change.

Optimistic Scenario Can Inform the 60x31 Approach

After MDE released the 2030 GGRA Plan, E3 modeled the impact of two additional scenarios:

- Optimistic Scenario – additional federal investments allow MD to exceed specific GGRA Plan measures
- Pessimistic Scenario – lack of federal investments hinder MD's ability to achieve specific GGRA Plan measures


Energy+Environmental Economics

Documentation of Maryland PATHWAYS Scenario Modeling
Addendum Report
December 16, 2021

Prepared for the Maryland Department of Environment
On behalf of the Regional Economic Studies Institute at Towson University
By Energy and Environmental Economics, Inc.

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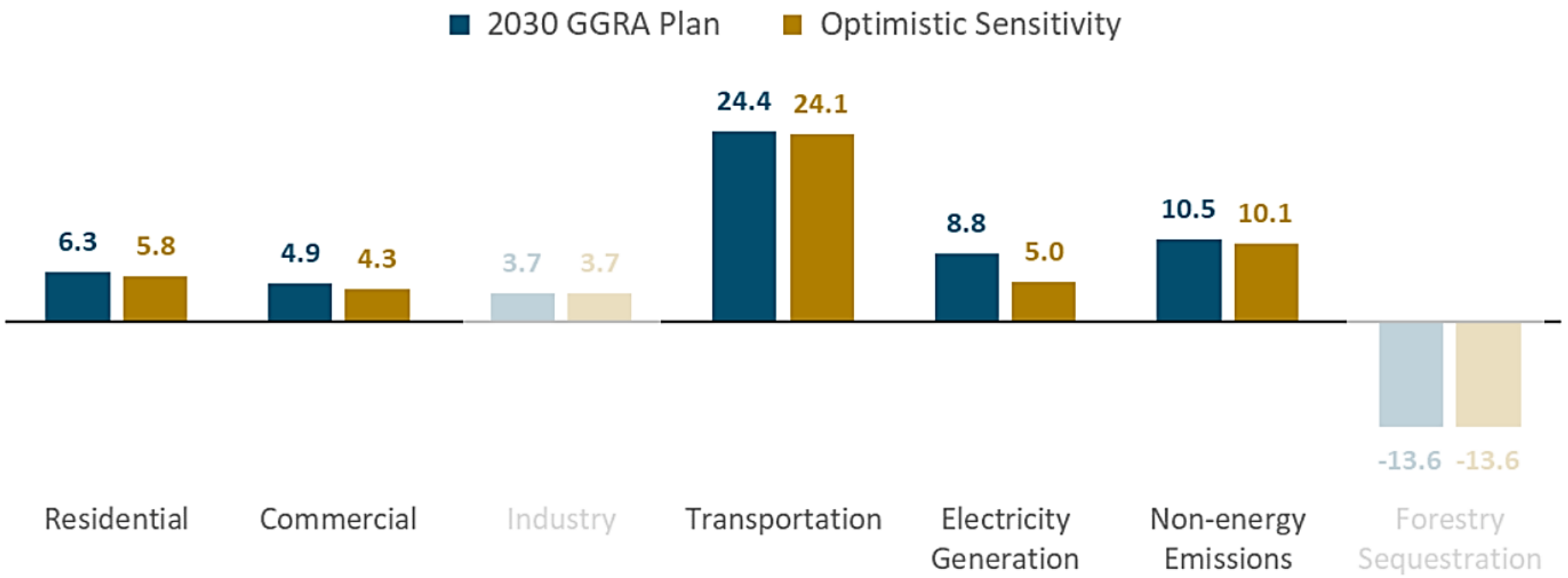
Optimistic Scenario Measures (1 of 2)

	2030 GGRA Plan	Optimistic Scenario
Clean Electricity	75% clean electricity by 2030, 100% by 2040	**Nationwide 100% clean electricity by 2035**
Energy Efficiency	Continue EmPOWER's current level of efficiency gains	**Enhanced efficiency gains (100% of new electric appliances are high-efficiency models by 2030)**
Building Code	Improved building shells for all new construction and 25% of existing buildings by 2030	**Improved building shells for all new construction and 50% of existing buildings by 2030**
Building Electrification	50% of heating system sales in 2030 are heat pumps	**50% of heating system sales in 2025 are heat pumps**

Optimistic Scenario Measures (2 of 2)

	2030 GGRA Plan	Optimistic Scenario
Fuel Economy Standards	Extension of Federal CAFE standards for LDVs	**Same**
Zero Emission Vehicles	46% ZEV LDV sales in 2030 (65% of cars and 25% of trucks); 35% ZEV MHDV sales in 2030	**100% ZEV LDV sales in 2035; 100% ZEV MHDV sales in 2045**
Biofuels	Existing ethanol and biodiesel blends; no assumed increase	**Advanced biofuels blended into diesel and natural gas**
Other	Reduced methane emissions from natural gas system	**Same; also 10% of cement manufacturing emissions reduced through CCUS by 2030**

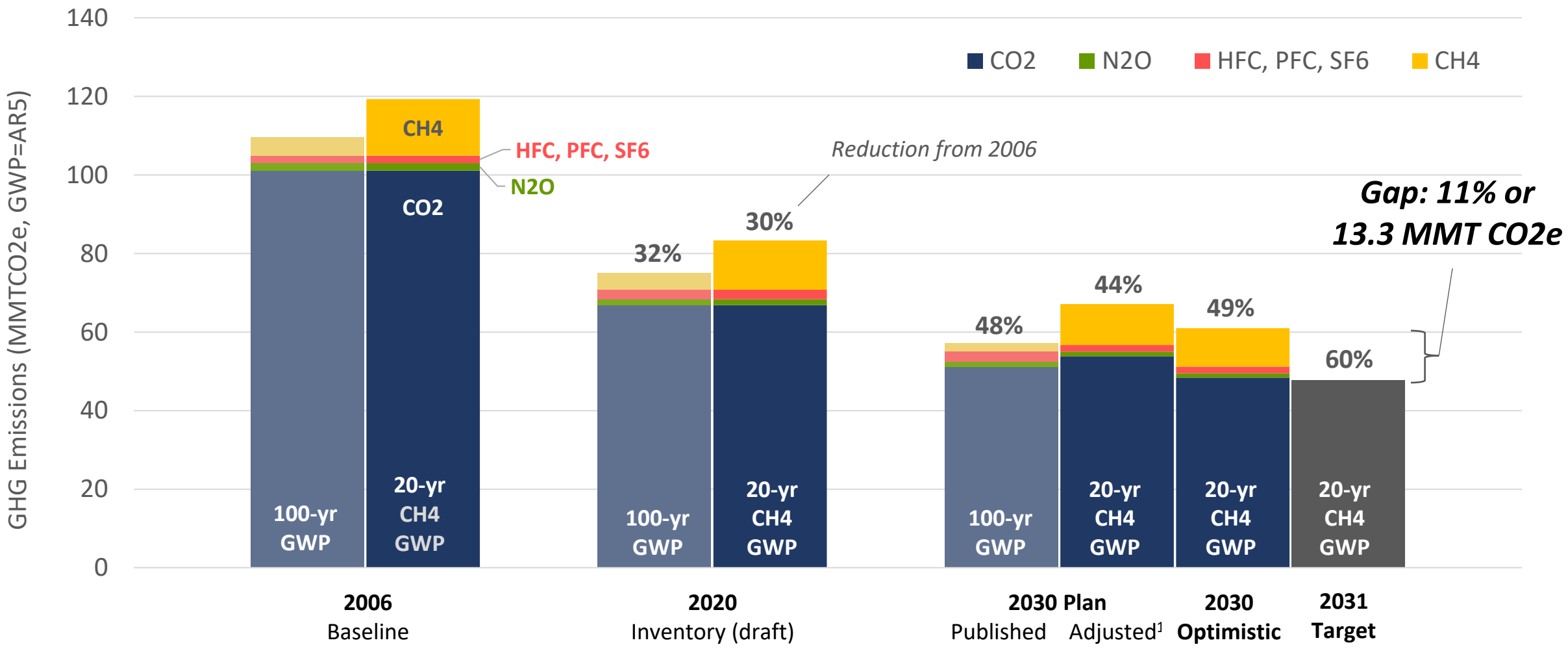
Projected Emissions by Sector in 2030



Source: Maryland PATHWAYS Sensitivity Scenarios. Presentation by E3 to the MCCC. June 21, 2021

Note: These projections use the 100-year GWP for methane, which does not match the new methodology required by the CSNA

The Gap between the Optimistic Scenario and 60x31



[1] *Reflects updated estimates for landfills, jet fuel, and ODS substitutes and 20-yr GWP for methane*

Draft results. Numbers are subject to change.

Emissions Gap Summary

If all **2030 GGRA Plan** measures are fully implemented, then Maryland would need to reduce GHG emissions by an additional **19.4 MMT CO2e** by 2031 (16% additional reduction)

If all **Optimistic Scenario** measures are fully implemented, then Maryland would need to reduce GHG emissions by an additional **13.3 MMT CO2e** by 2031 (11% additional reduction)

Draft results. Numbers are subject to change.

The Path to 60x31

Achieving a 60% reduction in GHG emissions by 2031 could require:

1) *Significantly* exceeding the following targets
   - 75% clean electricity by 2030
   - 100% high-efficiency electric appliance sales by 2030
   - High-efficiency shells for all new and 50% of existing buildings by 2030
   - 50% of heating system sales are heat pumps in 2025
   - 100% ZEV LDV sales in 2035; 35% ZEV MHDV sales in 2030
   - Advanced biofuels blended into diesel and natural gas
   - Reduced methane emissions from natural gas pipelines
   - Capturing and storing 10% of cement manufacturing CO2 emissions by 2030
2) Implementing additional measures that were not previously modeled

Rough Schedule for Developing the 60x31 Plan

- *Summer 2022:* Procure technical support and begin policy scenario design
- *Fall 2022:* Begin GHG and economic modeling
- *Fall 2022-Winter 2023:* Review modeling outputs and adjust policy scenarios
- *Winter-Spring 2023:* Develop the Draft Plan
- *Spring 2023:* Review of the Draft Plan by agencies and the Governor's Office
- *June 2023:* Release the Draft Plan to the public
- *Summer-Fall 2023:* Collect input from the public and develop the Final Plan
- *December 2023:* Release the Final Plan to the public

This schedule is subject to change

Part 2: The MWG's Work Plan

MWG's Work Plan for the Rest of 2022

- *May (today):* Light-duty vehicles – accelerating ZEV adoption
- *June:* Electricity – solar project siting, PPRP's 100% Study, etc.
- *July:* Buildings – taking stock of building policies after CSNA
- *Aug:* Heavy-duty vehicles – options for faster emissions reductions
- *Sept:* Industry – findings from the GGRA Manufacturing Study
- *Oct:* Finalize recommendations for the 2022 MCCC Annual Report
- *Nov/Dec:* Review modeling inputs/outputs for the 60x31 plan

This schedule is subject to change