



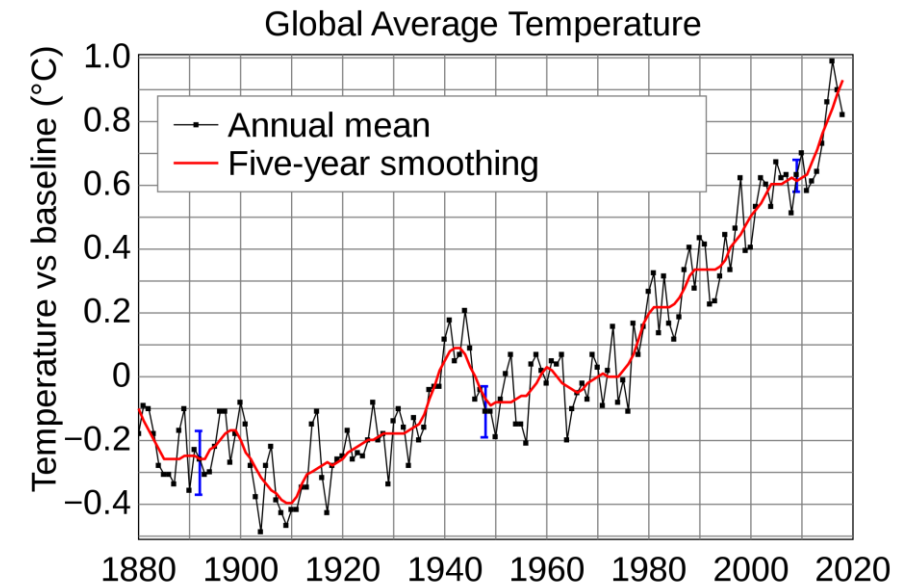
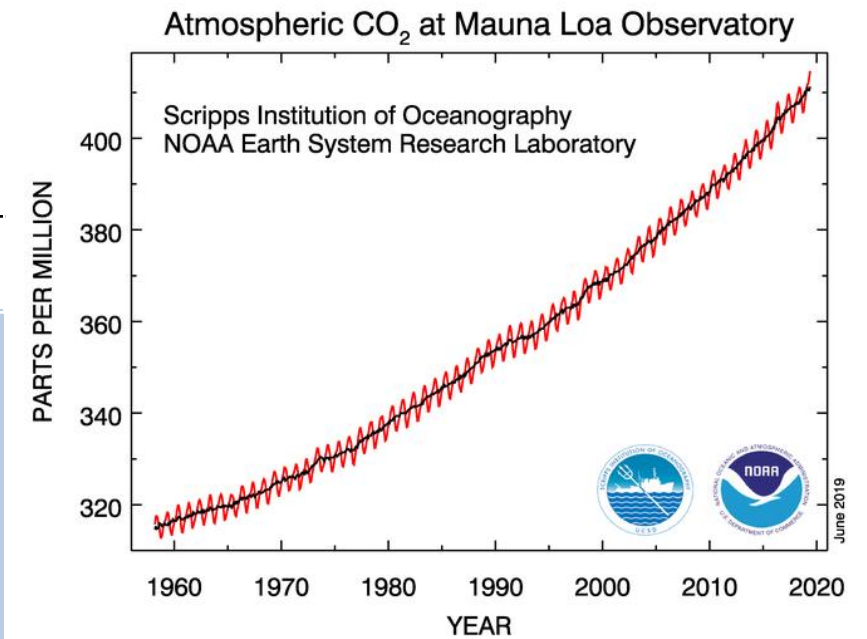
CLIMATE CHANGE AND BUILDING OWNERSHIP: *WHAT YOU NEED TO KNOW*

Michael Powell
mpowell@gfrlaw.com
410.576.4175

Max Cooke
mcooke@gfrlaw.com
410.576.4141

Climate Impacts

- The IPCC and the Global Carbon Project predict the 1.5°C threshold will be surpassed in the 2030s at the 2021 rate of emissions.
- On this trajectory of observed emissions, a 2.7°C increase in temperature can be expected by 2100.
- By comparison, the earth was 5°C cooler during the last ice age.
- Maryland: One to two degrees increase in the last century, sea rise of one inch every seven to eight years. Faster increases forecast.
- 2020 (Covid)
 - 6% reduction in GHG emissions
- 2021 (Post Covid)
 - 5% increase in GHG emissions



EVOLVING STANDARDS

REDUCTIONS COMPARED TO 2006 BASELINE

2009 GGRA

25% REDUCTION
BY 2020

2016 AMEND.

25% REDUCTION
BY 2020 AND
40% BY 2030
GOAL
OF **80-95%**
BY 2050

2020 MCCC

25% REDUCTION BY
2020 AND
50% BY 2030 AND
NET 100% BY 2045

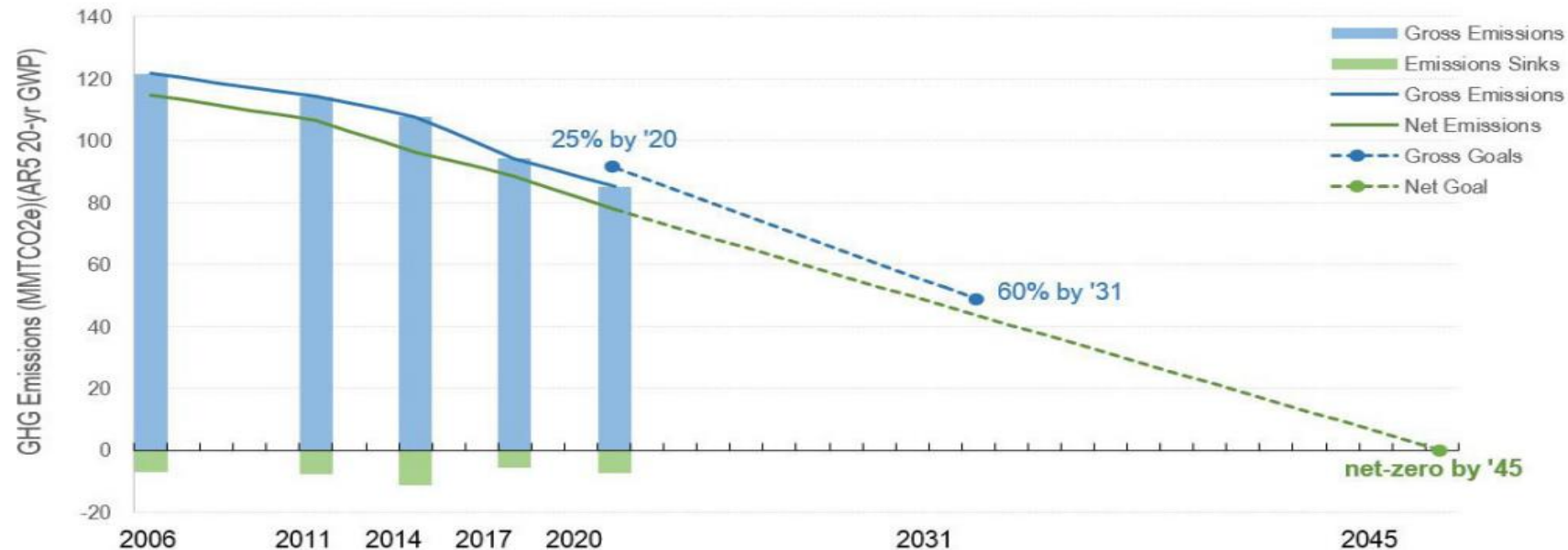
2022 CSNA

60% BY 2031 AND
NET 100% BY 2045

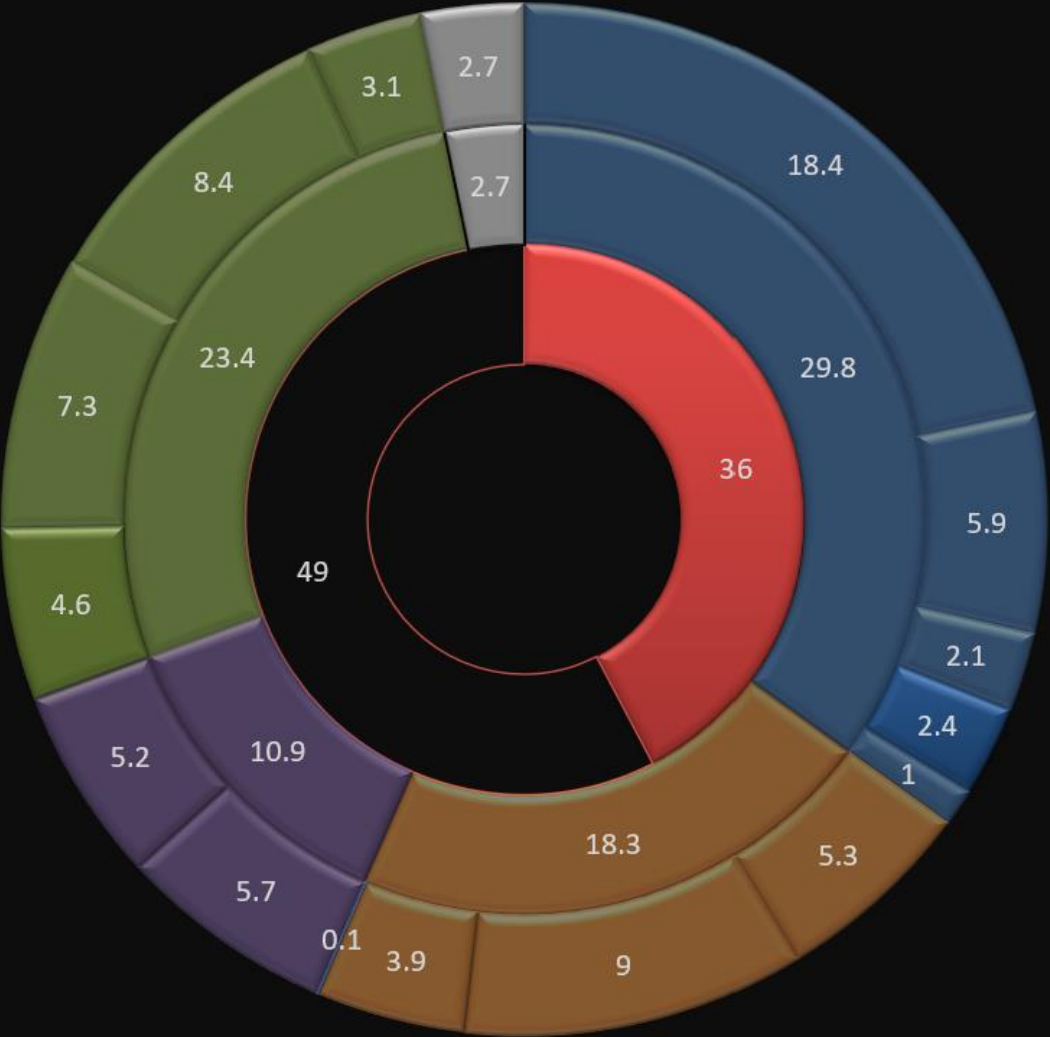
CLIMATE SOLUTIONS NOW ACT

60% REDUCTION BY 2031, NET ZERO BY 2045

Figure 1. Maryland's historic GHG and sinks (bars), and CSNA goals (lines)



2022 INVENTORY AND REDUCTIONS NEEDED BY 2031 (APPROXIMATE MILLION METRIC TONS)



By 2031, need to cut 36 MMT out of 85 MMT

2031 Allowance 49

TRANSPORTATION 29.8

Onroad Gasoline 18.4

Onroad Diesel 5.9

Nonroad 2.1

Aviation 2.4

Other 1

ELECTRICITY GEN. 18.3

Natural Gas 5.3

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BUILDINGS 10.9

Residential 5.7

Commercial 5.2

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Fossil Fuel Industry 4.6

Industrial Processes and Product Use 7.3

Waste Management 8.4

Agriculture 3.1

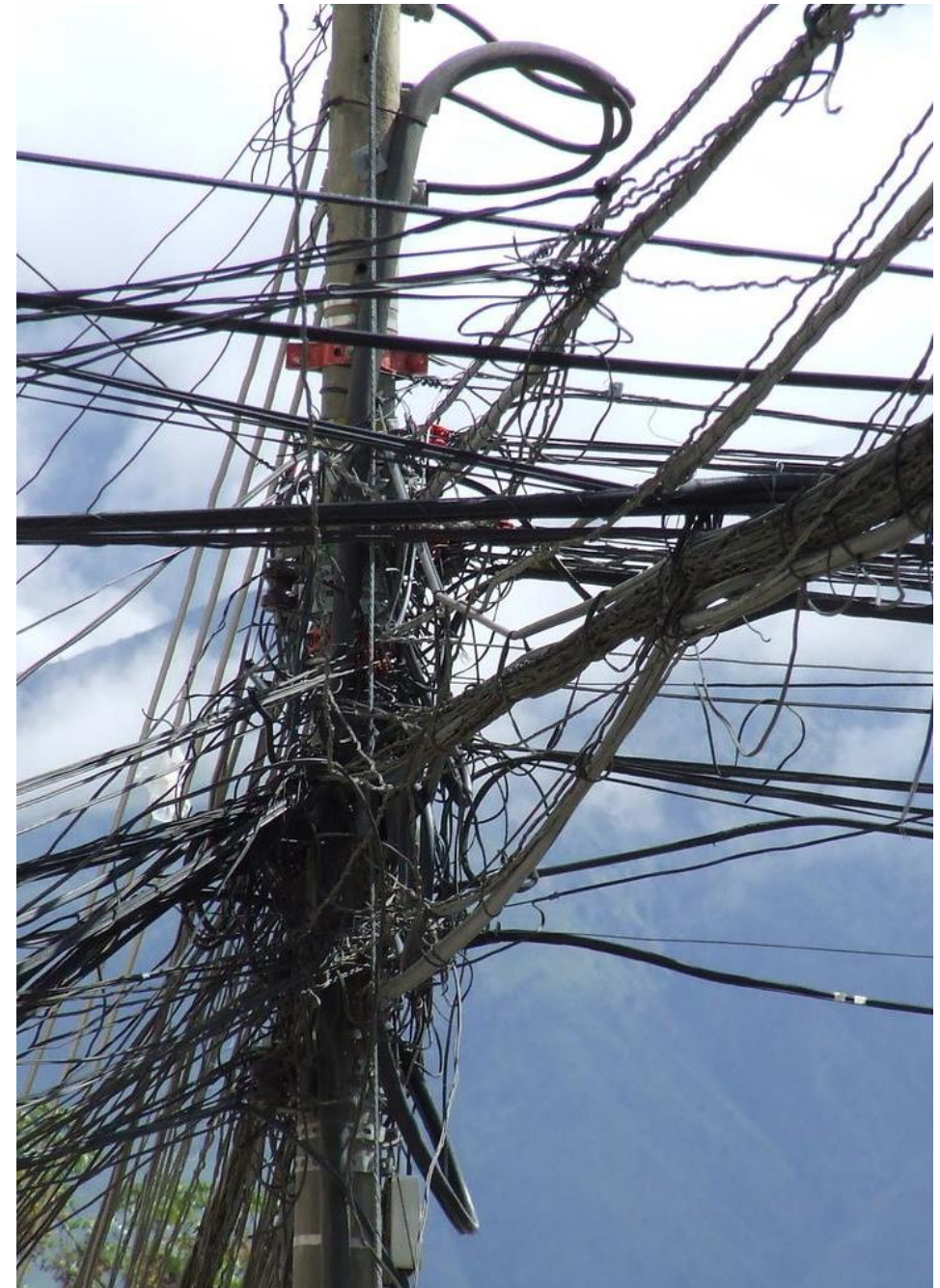
INDUSTRY 2.7

CLIMATE SOLUTIONS NOW ACT OF 2022

ELECTRIFY EVERYTHING

The Act sets out an overall plan that can be summarized simply:

- Substitute electricity for fossil fuel consumption.
- Replace fossil fuel electric generation with “clean” energy (solar, wind, nuclear, hydro).
- Meet a very difficult transition milestone in eight years (by 2031).
- Eliminate (or offset) *all* fossil fuel use and, instead, generate all energy by renewable electricity within 23 years (by 2045).



BUILDING PERFORMANCE STANDARDS

NEW BUILDING CODES AND TWO KINDS OF REQUIREMENTS FOR EXISTING BUILDINGS

- New buildings will be subject to building codes that largely mandate electric heating and water heating.
- Existing buildings will be pushed to retrofit by:
 - Direct Greenhouse Gas reduction requirements and
 - Energy Use Intensity (EUI) mandates.
- MDE proposed a draft regulation on May 15th. Initial comments were originally requested by June 5th, but comments are still being submitted. Publication and adoption expected by the end of the year.
- The proposals, especially the EUI mandates, are very controversial and subject to possible challenges.



NEW BUILDING CODES

THE STATE MUST ADOPT CURRENT IGCC CODES



- The Building Code Administration must stay current with new versions of the International Green Construction Code.
- The Building Code Administration must also develop recommendations for “*an all-electric building code*” for the state during 2023 (interim by January, final by December).
- The recommendations may include “appropriate exemptions” for
 - “particular industries, including life sciences”
 - “local conditions” and
 - “sectors vital to natural security as identified by the US Department of Homeland Security.”
- Must include a report to the Public Service Commission on the projected electric loading impacts; and consider the use of renewable, low-carbon biofuels.

BUILDING PERFORMANCE STANDARDS

DESIGNED TO REDUCE “NET DIRECT GREENHOUSE GAS EMISSIONS”

- Only “Covered Buildings” are included
- The regulations will require:
 - Reporting of Direct Emissions starting in 2025,
 - Achieving 20% Reductions by January 1, 2030, and
 - Net zero emissions by January 1, 2040 (unless the Assembly sunsets the requirement)
- “Direct Greenhouse Gas Emissions” are emissions produced on site.
- “Net” is not defined in the statute.
- MDE proposed a draft regulation on May 15th. Initial comments were requested by June 5th, publication and adoption expected by the end of the year.



COVERED BUILDINGS

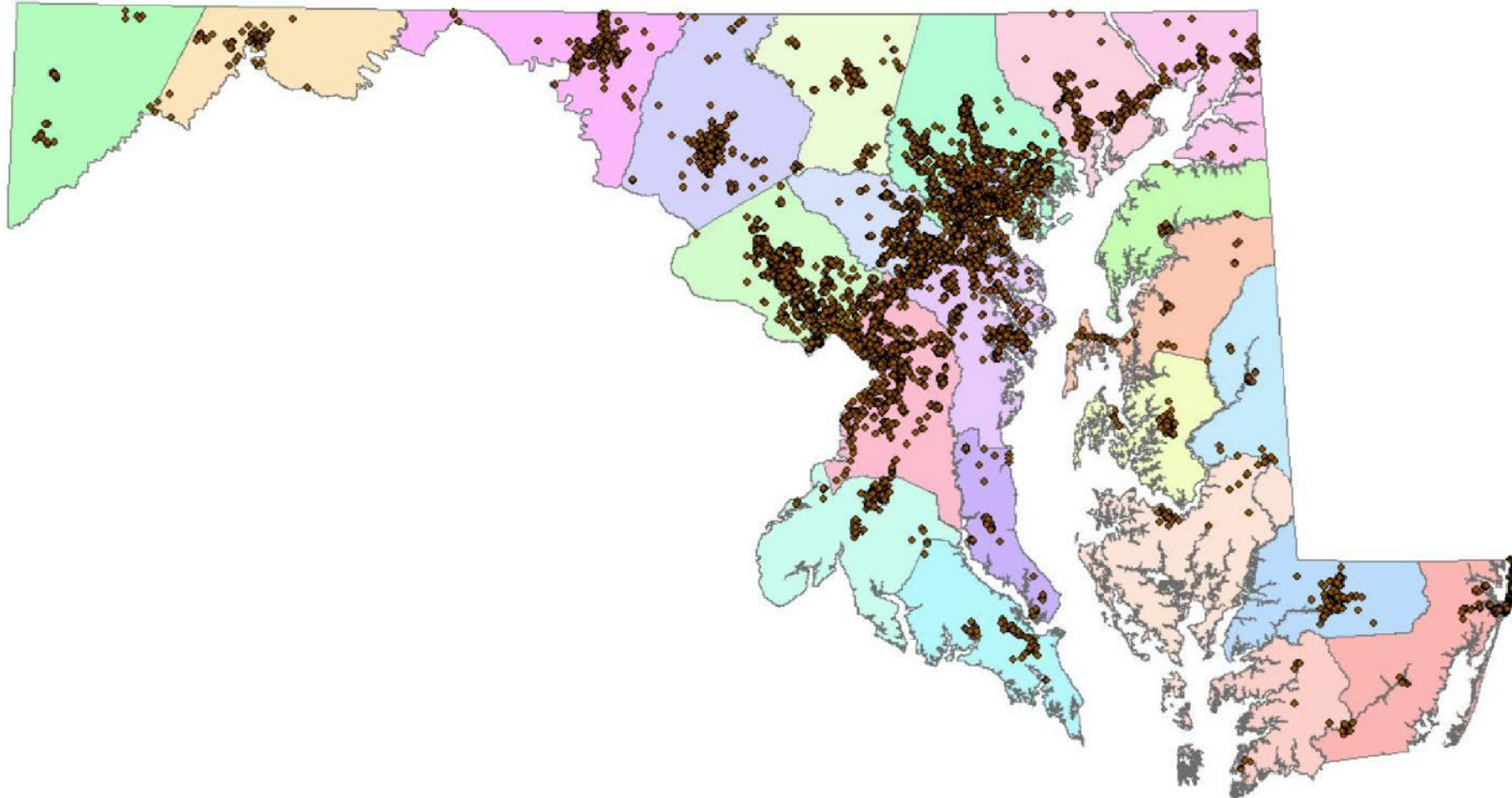
THE NEW STANDARDS WILL APPLY TO BOTH NEW AND *EXISTING* BUILDINGS.

- New standards will be applicable only to “covered buildings” which means:
 - It is a commercial or multi-family building (or is owned by the state); and
 - It has a gross floor area (excluding parking garage) of 35,000 sq. ft. or more.
- Excluded from the definition are:
 - Historic properties
 - Schools
 - Manufacturing buildings
 - Agricultural buildings
- Emissions from a tenant food service facility engaged in commercial cooking and water heating are not counted.
- *About 9,000 Maryland buildings.*



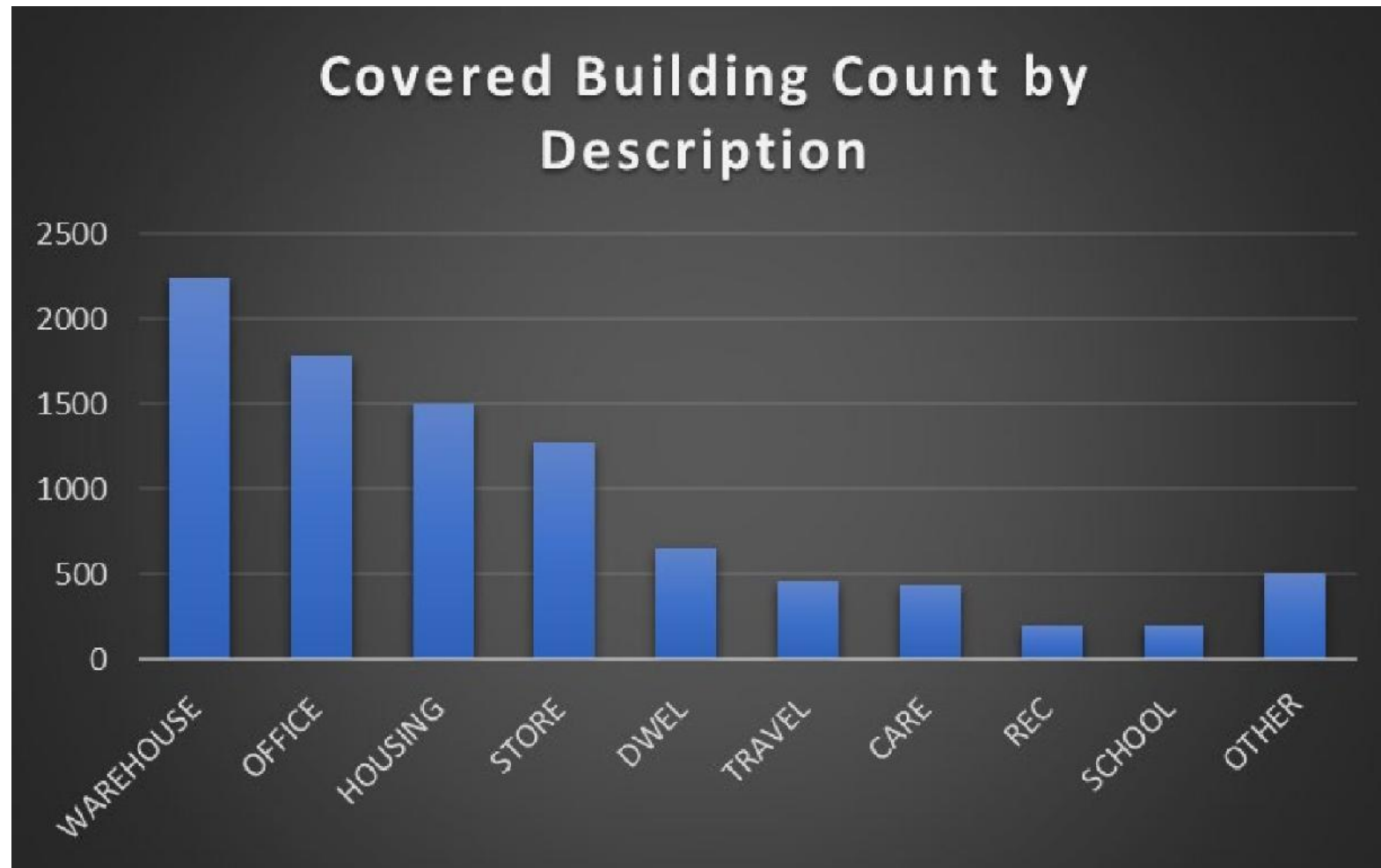


Location of Covered Buildings





Distribution of Covered Building Types



COMPLIANCE FEE



BASED ON “SOCIAL COST OF CARBON”

- Buildings which exceed the emission targets for that type of building will pay a fee.
- The fee cannot be less than the “social cost of carbon” established by the U.S. EPA.
- The calculated cost is a hypothetical estimate of the economic impact of a metric ton of carbon. Past estimates have varied from \$1 (Trump Admin.) to \$245 (United Nations IPCC).
- MDE has proposed penalties of \$230 a ton escalating to \$270 by 2040 – adjusted for inflation.
- One million BTUs of natural gas produces about 120 pounds of CO₂.
- All benchmarking reports must be verified by third parties.

ENERGY USE INTENSITY REQUIREMENTS

DESIGNED TO FORCE BUILDINGS TO USE LESS ENERGY

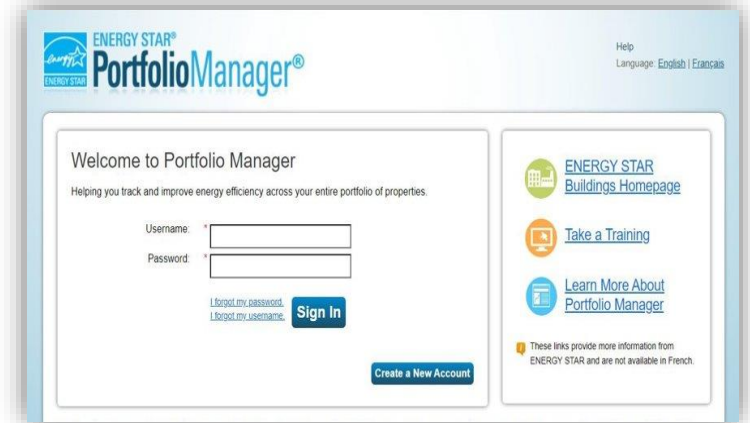


- Site Energy Use –The big differences between EUI and Direct Greenhouse Gas Emissions:
 - EUI includes energy generated on site (either by electric generation or fossil fuel consumption) **as well as** electricity delivered to the site from the grid. Direct Greenhouse Gas Emissions only includes fossil fuels consumed on site.
 - EUI includes electricity used for purposes excluded by the direct greenhouse gas regulations – in particular, energy used to charge vehicles or commercial kitchens.
 - Direct Greenhouse Gas Emissions can be avoided by paying a compliance fee. EUI failures are subject to potentially very large penalties.
- A primary practical impact is to resistance heating – which does not generate direct greenhouse gas emissions but is less efficient than heat pumps.

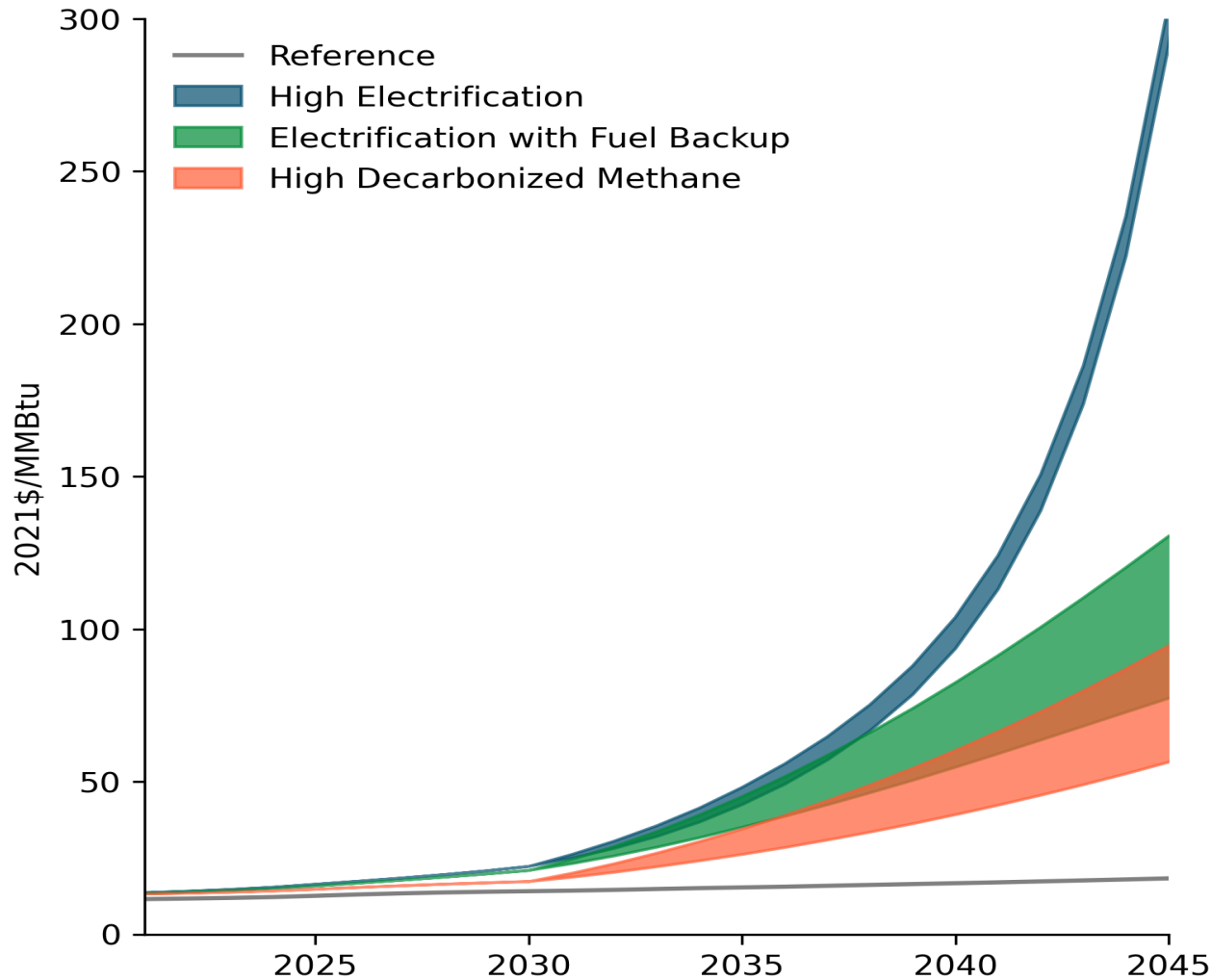
EACH BUILDING TYPE HAS AN EUI STANDARD

STANDARDS FOR 2030-2034, 2035-2039 AND 2040 AND BEYOND

- EUI is calculated by dividing total energy consumed per calendar year by the gross floor area of the building. The results are reported as a value of a thousand British thermal units (kBtu) per square foot.
- The calculation is done through the EPA Energy Star Portfolio Manager:
<https://portfoliomanager.energystar.gov/>
- For example, the standards for “offices” are 0.22 from 2030 to 2034, 0.11 for 2035 to 2039 and zero thereafter. For hospitals, the equivalent standards are 6.10, 3.05 and zero.
- Except for restaurants (which are exempt), all covered building types must reach zero EUI by 2040.
- Failure to meet the standards are subject to potential administrative penalties of up to \$10,000 per day and judicial penalties of up to \$25,000 per day.



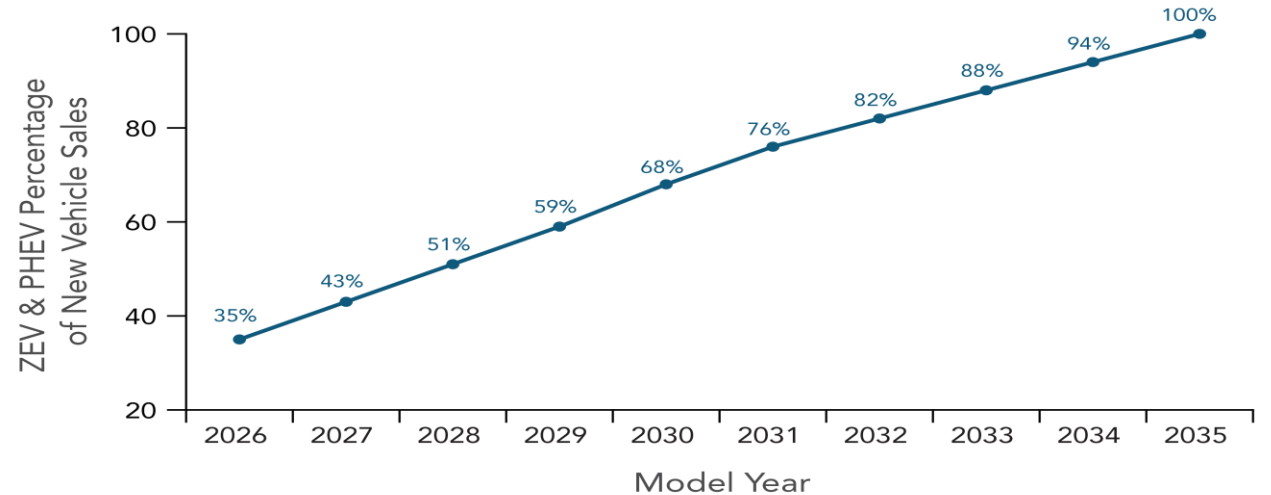
WHAT WILL THIS DO TO NATURAL GAS PRICES?



- Chart models Residential natural gas rates (in 2021 equivalent dollars per MMBtu) for Commission recommendations.
- Gas prices soar in high electrification scenario as a result of limited customers.
- Gas prices increase even in decarbonized methane scenario because of production cost increases.
- Limiting customers while maintaining distribution systems will increase delivery costs.
- Electricity cost impacts depend on whether significant additional (renewable) capacity and storage can be built as well as the cost of grid upgrades.

CALIFORNIA CARS

ADOPTED IN 2023



- Adoption is required by existing Maryland law.
- In 2027, 43% of each manufacturer's new car sales must be ZEV, Hydrogen, or PHEV ("Clean cars").
- In 2030, 68% of new car sales must be Clean Cars.
- In 2036, 100% of new car sales must be Clean Cars.
- Only 20% of the quota may be PHEV (plug in Hybrids) and only PHEV with at least 50 miles of battery-only range qualify.
- 17 states plan to adopt the rule. EPA Standards for remaining states may also force EVs.

ELECTRIC VEHICLES

NEW BUILDING CODES



- New Residential Units with separate garages, carports or driveways must include at least one “EV-Ready” or “EVSE-Installed” parking space. EV-Ready means that it has all of the required electrical service and receptacle but lacks the final vehicle charging equipment.
- Recommendations for EV charging at multifamily developments and retrofits to be developed by MEA and provided to the General Assembly by December 1, 2023.
- The study to include cost estimates for 10%, 25%, or 50% EV-Ready parking spaces for parking lots as well as underground and above ground parking garages.
- Legislation is expected to mandate two-way charging equipment at multi-family and perhaps commercial buildings.
- Local jurisdictions may set higher requirements.

MONTGOMERY COUNTY

COUNTIES ARE PERMITTED TO ENACT MORE STRINGENT REGULATIONS

- Montgomery County passed Bill 16-21 in 2022, which is the County's own version of BEPS legislation.
- The following groups are or will be required to benchmark emissions:
 - County and privately owned non-residential buildings 50,000 gross square feet and larger (currently covered);
 - County and privately owned non-residential buildings that are 25,000-50,000 gross square feet. It will include previously exempted commercial buildings of all sizes with at least 10% warehousing, self-storage, and manufacturing/industrial uses;
 - Multifamily buildings 250,000 gross square feet and greater; and
 - Multifamily buildings 25,000-250,000 gross square feet.
- These separate groupings were created to allow for smaller buildings to have more time to begin benchmarking.

MONTGOMERY COUNTY

FUTURE REGULATIONS

- Requirements for *new* building construction will be addressed through the building code process, not BEPS, which applies to existing building performance.
- These BEPS regulations will be implemented by December 31, 2023.
 - Site Energy Use Intensity Benchmarks and Numerical Performance Standards
 - Exemption details;
 - Alternative Measures (BPIPs)
- Every four years, buildings are evaluated against their interim or final standards. If the building's net site energy use intensity is at or below the target, the building will be considered in compliance.

MONTGOMERY COUNTY

Building Group	First Benchmarking Deadline	Baseline Years	Interim	Final BEPS 
County: County-owned buildings 50k+ gsf	June 1, 2015	2018-2022	12/31/28	12/31/33
Group 1: Non Residential >250k gsf	June 1, 2016	2018-2022	12/31/28	12/31/33
Group 2: Non Residential 50-250k gsf	June 1, 2017	2018-2022	12/31/28	12/31/33
Group 3 & 4: Non Residential 25 - 50k, Residential >250k gsf	June 1, 2023	2022-2024	12/31/30	12/31/35
Group 5: Residential 25-250k gsf	June 1, 2024	2023-2025	12/31/31	12/31/36

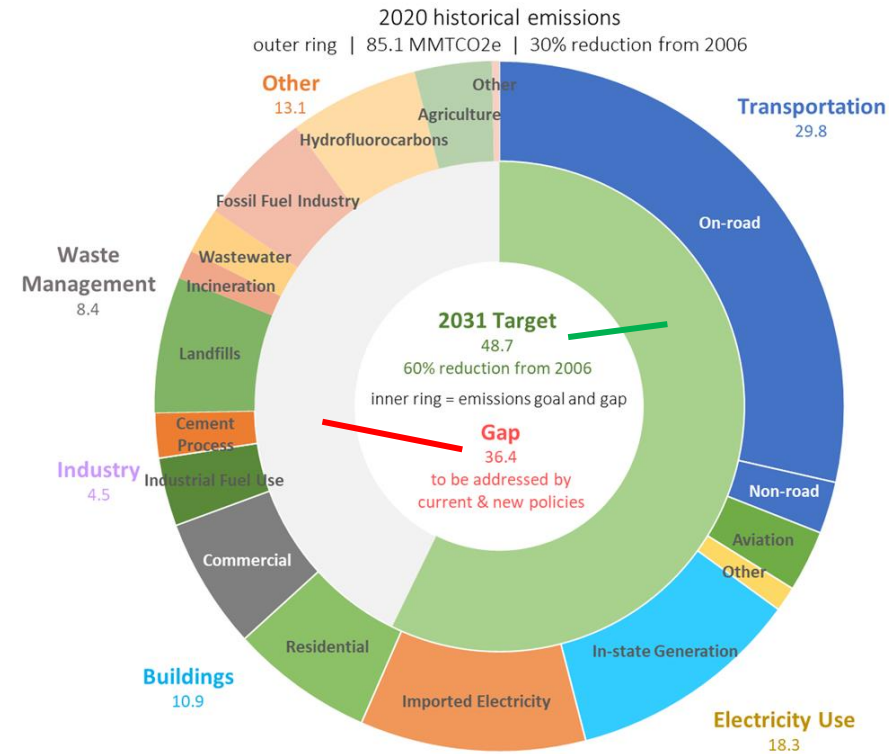
MONTGOMERY COUNTY

ADDITIONAL INFORMATION

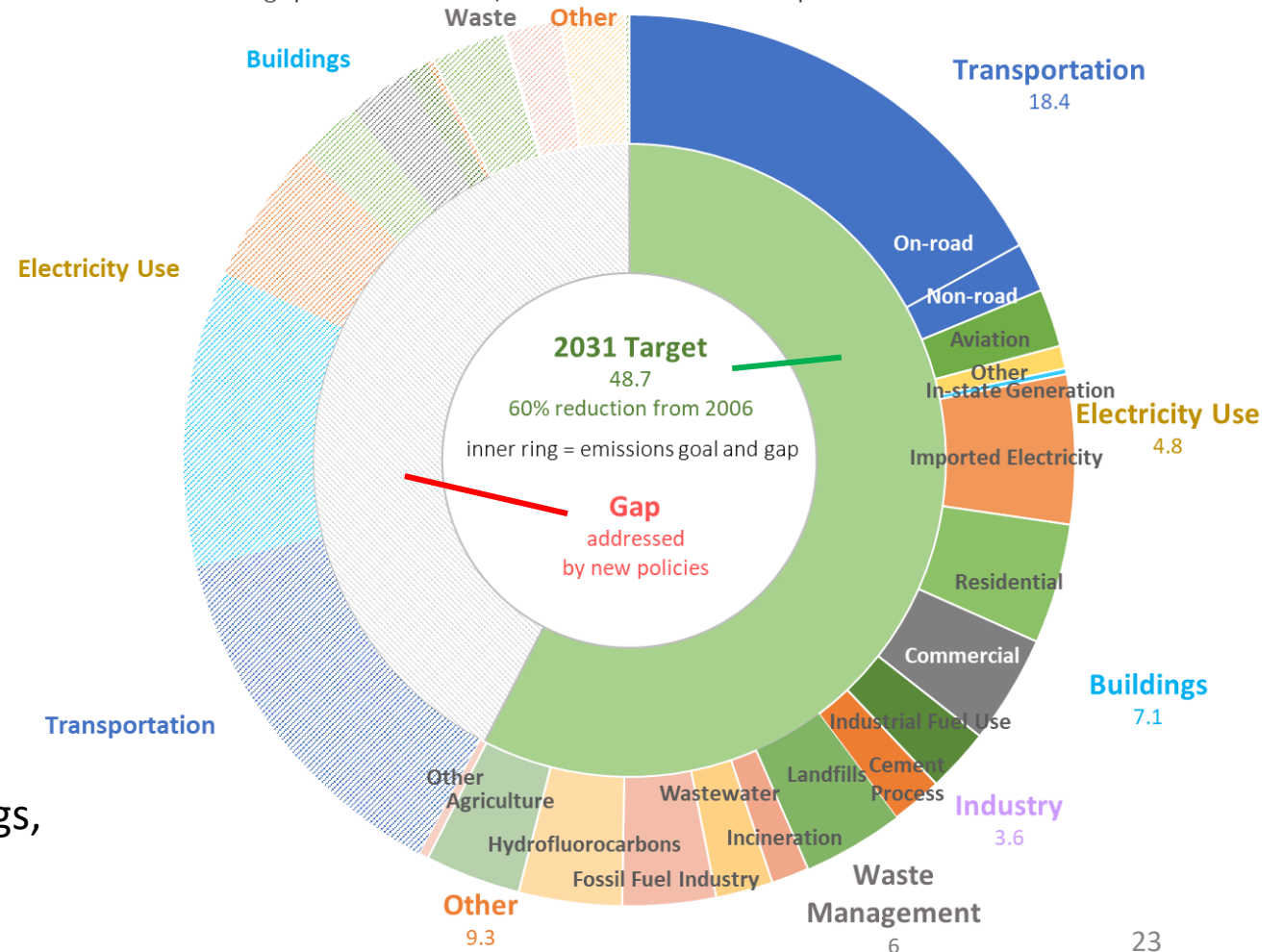
- New buildings must request an exemption/waiver by May 1st for the applicable reporting year.
- **Exempt?**
 - Benchmarking and BEPS requirements do not apply to a covered building for which more than 50% of the total gross floor area is used for:
 - public assembly in a building without walls;
 - industrial uses where the majority of energy is consumed for manufacturing, the generation of electric power or district thermal energy to be consumed offsite, or for other process loads; or
 - transportation, communications, or utility infrastructure.
- A building needs to have 12 full months of data post-occupancy to benchmark. If a building doesn't have a full year of CY 2022 data to report, then you'd be eligible for a one-year waiver, and the first year of reporting would be CY 2023 due June 1, 2024.



Preliminary Preview: PATHWAY to 2031



2031 projected emissions under CSNA Pathway (*preliminary results*)
outer ring | 48.7 MMTCO₂e / 36 MMTCO₂e Reduction | 60% reduction from 2006



UMD scientists evaluating a pathway to our climate goals
Largest reductions from electric vehicles & electric buildings,
coupled with clean electricity expansion, but broader
reductions also essential

PATHWAY CALLS FOR ADDITIONAL CUTS

PATHWAY SEEKS TO NEARLY DOUBLE THE REDUCTIONS FROM BUILDINGS

The Pathway Model predicts that emissions will fall by 20% under current building policies.
New policies will reduce emissions by an additional 15%.

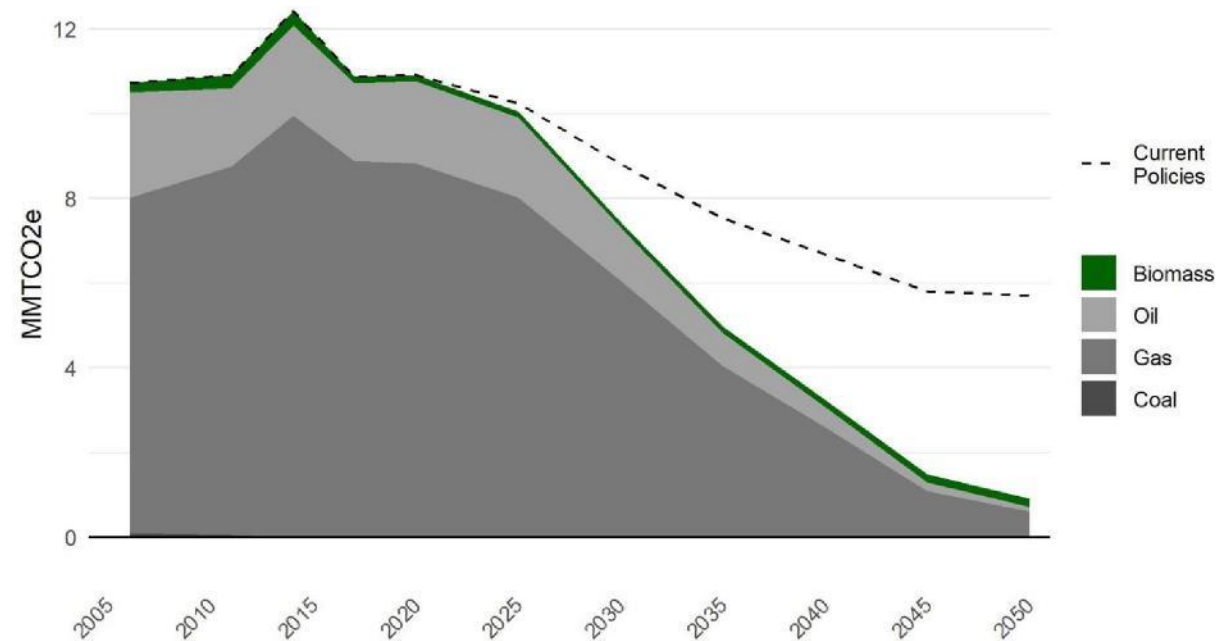


Chart from page 52
of Pathway Report

NEW BUILDING PROVISIONS IN THE PATHWAY REPORT

CLEAN HEAT AND ZERO-EMISSION APPLIANCES

- Zero-Emission Appliance Standard
 - Phased in between 2027 and 2030.
 - Covers space and water heating in residential and commercial buildings
- Zero-Emission Construction Standard
 - To be implemented in 2027 and cover all new residential and commercial buildings.
- Increased EmPower Energy Savings Goals
 - Starting in 2025 and increasing again in 2027.



ADDITIONAL PROPOSALS FROM THE PATHWAY REPORT

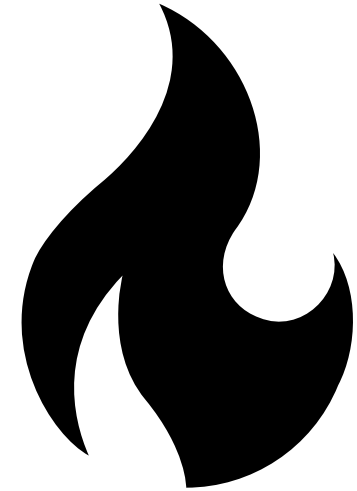
STILL IN DRAFT – BRIEFING / LISTENING SESSIONS UNDERWAY

- “Cap-and-Invest” – a Carbon tax with the proceeds spent on climate change and environmental justice projects.
- Expand Renewable Portfolio System to 100% clean electricity (including tax credits and payments for low-income communities).
- Shift the Regional Greenhouse Gas Initiative Target to net zero by 2040.
- Provide much larger incentives for electric vehicles and trucks as well as reductions in vehicle miles driven.
- Switch non-road use (lawnmowers, construction equipment, etc.) to electric alternatives.



POSSIBLE FUTURE PROVISIONS

NATURAL GAS RESTRICTIONS AND BANS



- PSC restrictions on new investment in natural gas.
- Local Building Codes banning new gas hookups.
 - New York banning new hookups in most buildings starting in 2026.
 - DC bans most new hookups starting 2026.
 - At least 20 Cities (mostly in California) have banned new gas hookups.
 - Maryland counties considering or enacting all-electric building codes.
 - However, there are legal challenges based on preemption arguments (CRA v. Berkley, 9th Circuit)
 - At least 20 states have passed state laws forbidding local bans on gas stoves.
- Clean Heat Standards.
- Air emission rules banning gas stoves?

CAN THE GRID HANDLE THE LOAD?

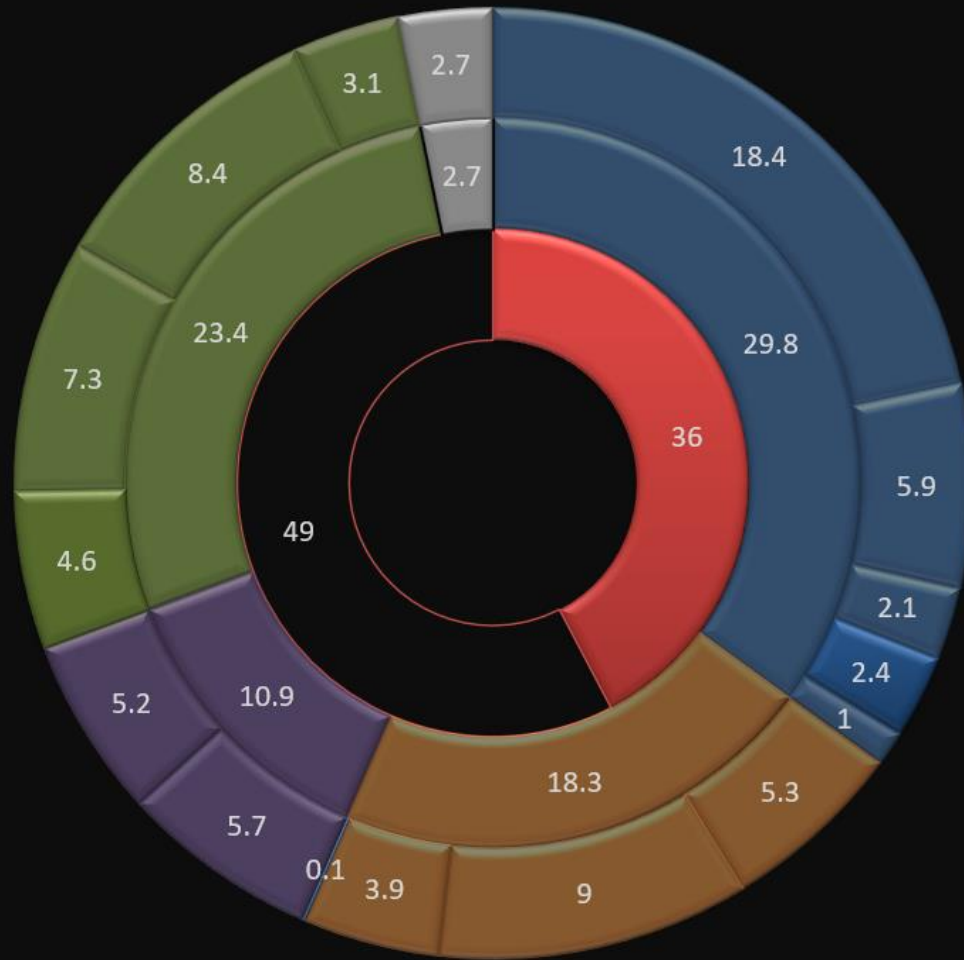
PSC PLANNING STUDY



- Maryland has always been a “summer peak” state for electricity consumption - greatest electricity demand was from air conditioning during summer months. Moving from heating oil, natural gas and propane to electric will make Maryland a “winter peak” state.
- Eliminating fossil fuels will increase the transmission load as energy is transferred by electric lines instead of pipelines and propane/heating oil trucks.
- Electric Vehicles also increase the demand on the system.
- Highest demand for winter peaks is during cold winter nights when solar production is low.
- Results of the study are due back to the General Assembly by September 30, 2023.



WAIT! THERE IS MORE! STILL SHORT FOR 2031 AND NEED NET ZERO BY 2045!



■ **REDUCTION NEEDED: NET 85 OUT OF 85!**

□ 2045 Allowance ZERO

■ **TRANSPORTATION 29.8**

■ Onroad Gasoline 18.4

■ Onroad Diesel 5.9

■ Nonroad 2.1

■ Aviation 2.4

■ Other 1

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■ Industrial Processes and Product Use 7.3

■ Waste Management 8.4

■ Agriculture 3.1

■ **INDUSTRY 2.7**

GORDON • FEINBLATT_{LLC}
ATTORNEYS AT LAW

THANK YOU!

MICHAEL POWELL

mpowell@gfrlaw.com (410) 576-4175
www.michaelcpowell.com

MAX COOKE

mcooke@gfrlaw.com (410) 576-4141

1001 Fleet Street, Suite 700 | Baltimore, MD 21202 | 410-576-4000 | gfrlaw.com | [@GordonFeinblatt](https://www.instagram.com/GordonFeinblatt)