American Petroleum Institute
Northeast Region

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Via Electronic and U.S. Mail

Serena McIlwain, Secretary
Maryland Department of the Environment
1800 Washington Blvd.
Baltimore, Maryland 21230

IN RE: Comments Relative to Maryland's Climate Pathway Report

Secretary McIlwain:

The American Petroleum Institute (API)[1] appreciates this opportunity to provide comments to Maryland's Department of the Environment (MDE) on *Maryland's Climate Pathway* report (Pathway Report). The Pathway Report recommends policies and actions demonstrating how the state can meet the climate goals set forth in the Climate Solutions Now Act (CSNA). The Pathway Report "will inform the state's 2031 Greenhouse Gas Reduction Plan that the [MDE] will submit to Governor Moore and the General Assembly in late December." These comments will focus on the Pathway Report's recommendations concerning the electricity, buildings, and transportation sectors.

API's members are a significant contributor to Maryland's economy.[2] API believes that the best way to empower Marylanders is to implement energy policies that are measured and prioritize efficiency, reliability, and affordability. API and our member companies are committed to working with regulators and policymakers to deliver solutions that reduce carbon emissions while meeting society's growing energy demands. API believes that prudent energy and environmental policy recognizes that many different forms of energy will be needed for decades to come.[3] Efficient,[4] affordable and reliable energy is essential to sustaining the global economy and the wellbeing of all.

[1] API represents all segments of America's natural gas and oil industry, which supports more than eleven million U.S. jobs and is backed by a growing grassroots movement of millions of Americans. Our 600 members produce, process and distribute the majority of the nation's energy, and participate in "API Energy Excellence," which is accelerating environmental and safety progress by fostering new technologies and transparent reporting. API was formed in 1919 as a standards-setting organization and has developed more than 700 standards to enhance operational and environmental safety, efficiency, and sustainability.

[2] The natural gas and oil industry, including petrochemical and plastics, supported more than 106,600 jobs in Maryland in in 2021. The industry provided more than $8 billion in wages and contributed nearly $16 billion to the state economy. "Impacts of the Oil and Natural Gas Industry on the US Economy in 2021," Price-Waterhouse Cooper, prepared for the American Petroleum Institute, April 2023. Table B-23. The Economic Impact of the Oil and Natural Gas Industry in Maryland, 2021). *(See* https://www.api.org/-/media/files/policy/american-energy/pwc/2023/api-pwc-economic-impact-report-2023).

[3] *See* https://www.eia.gov/todayinenergy/detail.php?id=51558.

[4] The United States has reduced carbon dioxide emissions to generational lows since 2000, leading the world in emissions reductions, thanks in large part to greater use of natural gas in electricity generation and advancements in technology and innovation. Many of these emission reductions are a result of natural gas replacing coal-fired power plants.

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OVERVIEW

A Measured Approach

Consistent with the goal of empowering every Marylander, API believes that a measured approach is one in which all voices and perspectives are heard, resulting in policies that allow stakeholders to compete on a level playing field to meet the state's vast energy needs while achieving its ambitious environmental goals. As the state considers various energy and climate policies, it must do so with the goal of enriching Marylander's lives through policies which are both effective and not burdensome to the taxpayer and consumer.

API is concerned that the proposed policies to eliminate natural gas use in new building construction, incentivize thermal electrification, ban the sale of internal combustion engine vehicles, and rapidly change the state's electricity supply are economically inefficient, remove consumer choice, and may result in increased consumer costs and an overreliance on an aging electric grid. Additionally, these policies may fail to adequately reduce GHG emissions.

Natural Gas Has Provided Emission Reduction Benefits

Decarbonization efforts should be undertaken in a technology neutral manner that incentivizes emission reductions rather than favoring specific energy sources. Natural gas has a proven track record of facilitating carbon dioxide (CO_2) emissions reductions in all sectors of the economy. It is essential for home heating in Maryland, with approximately 43 percent of the state's households using natural gas.[5]

Over the last two decades, the steady decline in the carbon intensity of Maryland's energy supply has coincided with increasing use of natural gas across the residential, commercial, electricity, and industrial sectors. Between 2005 and 2018,[6] the state's carbon intensity fell by 40 percent[7] while natural gas consumption rose by almost the same amount.[8] In the residential and commercial sectors, carbon intensity fell more than 12 percent during that same period as Marylanders increasingly chose cleaner-burning natural gas for heating and cooking.[9]

API believes that consumers should retain the ability to choose how to fuel their homes and businesses, particularly considering the CO_2 emission reductions that have been facilitated by increased natural gas usage. Available and reliable energy sources such as natural gas can help curb CO_2 emissions while allowing for growth.

The Perils of Bad Energy Policy

The experience of California provides insight as to how bad energy policy can negatively impact consumers in terms of reliability and cost. The state enacted an aggressive renewable portfolio standard that prioritized the development of

[5] U.S. Energy Information Administration (EIA). *See* https://www.eia.gov/state/print.php?sid=MD.
[6] The most recent year for which emissions data is available from the U.S. Energy Information Administration.
[7] EIA. *See* https://www.eia.gov/environment/emissions/state/, Energy-related CO_2 Emission Data Tables, Table 7: Carbon intensity of the energy supply by state (1990-2018).
[8] EIA. *See* https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_SMD_m.htm. Natural Gas Consumption by End Use.
[9] EIA and API analysis.

certain types of resources rather than the reduction of carbon emissions. Additionally, state regulators effectively halted the development of new gas-fired plants and directed utilities to close some coastal gas-fired power plants. These actions contributed to declining grid reliability as utilities were left with insufficient ramping capabilities needed to balance intermittent generation. This culminated in a load-shedding event in August 2020 that left hundreds of thousands of Californians without electricity in the middle of a heat wave.

Following the blackouts, California Governor Gavin Newsom issued an emergency proclamation directing state agencies to develop additional power capacity to avoid future disruptions that were driven by an overreliance on intermittent power and a lack of new baseload resources as well as an anticipated capacity shortfall over the next several years.[10] In response to reliability challenges, California's Department of Water Resources purchased four gas-fired generators at a cost of nearly $200 million. The type of generators purchased – aeroderivative gas turbines – tend to have higher carbon emission rates than the combined cycle gas-fired plants being developed elsewhere in the country.[11] In addition to reliability issues, these policies have also contributed to California's surging retail electricity prices,[12] which were the highest in the country in 2021.[13]

The continued reliability of the power grid in the Mid-Atlantic has also come into question. The PJM Interconnect (PJM), the grid operator that oversees the wholesale electricity market for 13 states – including Maryland and the District of Columbia – warned in a recent report that government policies are driving rapid generator retirements that threaten reliability.[14] These retirements are occurring just as demand for electricity is poised to grow due to policies intended to spur electrification of the heating and transportation sectors.[15]

The events and experiences in California underscore the importance of sound energy policy and highlight the benefits of a technology-neutral approach when addressing climate change.

MDE Must Consider Impact on Affordability

Many state-level clean energy policies seek to replace fossil fuel heating with electricity generated primarily through non-combustion, emissions free sources. But the practical reality of doing so is that residential and commercial consumers may be left to use only electric heat pumps for heating and service needs.

Recent Energy Information Administration (EIA) projections indicate – even with the integration of vast amounts of low-emission generation – natural gas will remain an important and necessary fuel for decades to come. Additionally, state and federal policies will likely put upward pressure on the demand for electricity, which can actually serve to increase the demand for natural gas generation. Natural gas will likely continue to be the marginal fuel for decades to come in PJM, even as large quantities of renewable resources are added to the grid. Accordingly, the electricity used to meet the region's needs will frequently come from natural gas-fired generators. EIA recently noted that "renewables will be the primary source for new electricity, but natural gas … [and] batteries will be used to help meet load and support grid

[10] *See* https://water.ca.gov/News/News-Releases/2021/Sept-21/Temporary-Power-Generators.
[11] *See* https://www.ge.com/gas-power/products/gas-turbines/lm6000. Based on an assumed natural gas carbon intensity of 117 lbs./million BTU.
[12] *See* https://www.utilitydive.com/news/californias-dilemma-how-to-control-skyrocketing-electric-rates-while-buil/597767/
[13] Energy Information Admin Average Retail Price of Electricity to Ultimate Customers, available at: https://www.eia.gov/electricity/data.php#sales.
[14] *See* "Energy Transition in PJM: Resource Retirements, Replacements and Risks." PJM. February 2023, available at: https://www.pjm.com/-/media/library/reports-notices/special-reports/2023/energy-transition-in-pjm-resource-retirements-replacements-and-risks.ashx.
[15] *Ibid*.

reliability."[16] Given these facts, it is unclear if any heating technology that utilizes electricity from the regional power grid would result in meaningful reductions in GHG emissions.

Development of effective and equitable public policy requires that all relevant information be part of the discussion. Widespread heating electrification has significant reliability and capacity need implications that are largely absent from the many deep decarbonization studies conducted to date.[17] Additionally, increased electricity loads resulting from electrification, without corresponding investments in the electric grid, could compromise the reliability of the system.

While incremental changes in specific buildings are unlikely to have impacts, an accretion of smaller changes in the same area could require distribution system upgrades and, in the long run, transmission system upgrades that can be controversial and challenging to site.[18]

Unfortunately, frequently minimized in policy discussions is the cost impact proposed legislation could have on the consumer. Cost is an important consideration as it directly and immediately impacts consumers, while potentially disproportionately affecting lower-income individuals and communities. Equipment installation costs also vary by building sector and geographic region. Carbon reduction strategies must evaluate these impacts and offer solutions that minimize economic disruption while maximizing the benefits. Given the significant role that natural gas plays in heating as well as commercial and industrial processes, electrification policies could have a significant impact on residents and businesses in the state.

BUILDING SECTOR CONSIDERATIONS

As described in detail below, the extensive data sets in Massachusetts and New York suggest that the installation of air-source heat pump systems at the residential level is too costly for most low- and middle-income homeowners in the northeast.

Costs to Consumers

The MDE should understand the added cost associated with heat pumps in both new and existing construction. According to research conducted for the National Association of Home Builders, all-electric homes can cost more

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[16] See October 6, 2021, U.S. EIA website: https://www.eia.gov/todayinenergy/detail.php?id=49856. Renewable capacity in generator interconnection queues has grown year over year. As of 2021, the queues included over 755 gigawatts (GW) of generation capacity. Solar and wind comprised the vast majority at 680 GW; furthermore, an estimated 200 GW of electric storage capacity was in queues, a common complement to renewable projects. The amount already in queues may represent 70 percent of the projected capacity to meet the Biden administration's clean energy target of 80 percent emissions-free power generation by 2030. However, the completion rate for projects languishing in interconnection queues has been abysmal. Even for those projects that ultimately achieve commercial operation, average wait times while in the queues has nearly doubled over the past decade. Renewables-associated transmission proposals fared worse than conventional projects, with a 19 percent completion rate for wind and 16 percent for solar, respectively, compared to 24 percent overall. See "2030: The Report," Goldman School of Public Policy at the University of California Berkeley. April 2021. Available at: https://gspp.berkeley.edu/faculty-and-impact/centers/cepp/projects/2030-report-powering-americas-clean-economy and "Queued Up: Characteristics of Power Plants Seeking Transmission Interconnection," Lawrence Berkeley National Laboratory. May 2021. Available at: https://eta-publications.lbl.gov/sites/default/files/queued_up_may_2021.pdf.

[17] Jenkins, J.D., Luke, M., and Thernstrom, S. (2018). "Getting to zero carbon emissions in the electric power sector" 2498–2510.

[18] *See* Hopkins AS, Horowitz A, Knight P, Takahashi K, Comings T, Kreycik P, et al. *"*Northeastern Regional Assessment of Strategic Electrification: Northeast Energy Efficiency Partnerships," June 29, 2017.

upfront in comparison to gas homes.[19] Specifically, the overall range of estimated electrification costs for an electric reference house compared to a baseline gas reference house in cold-weather climates was between $11,000 and $15,000.[20] The higher costs in colder, heating-dominated climates are due to the need for more expensive heat pumps rated to operate in colder temperatures. The more expensive electric equipment can also result in higher energy costs by $84 to $404 annually compared to a baseline gas house, and by $238 to $650 annually compared to a gas house with high efficiency equipment. Consumers in colder climates will therefore likely be faced with higher upfront construction costs and higher operating costs throughout the life of the equipment.[21] With respect to appliances, electric stoves are estimated to cost anywhere from ten to thirty percent more than those powered by gas.[22]

With a climate similar to Maryland's, electrification costs in Massachusetts are likely comparable. *Diversified Energy Specialists,* a renewable energy consulting and environmental markets trading company based has completed case studies on residential air-source heat pump rebate programs in the state. *Diversified Energy Specialists* concluded that electrification costs in Massachusetts would likely be comparable to those included in the National Association of Home-Builders analysis. [23]

The Massachusetts Clean Energy Center (CEC) launched a "Whole-Home Air-Source Heat Pump Pilot Program"(CEC Pilot Program) in May 2019.[24] For the 24 *new construction projects* the average conditioned square footage of home was 1,694 sq. ft., and the average heat pump project cost was $14,349.[25] Replacing and upgrading a natural gas, propane, or heating oil system at the end-of-life in the Northeast typically costs a homeowner $7,000 - $10,000.[26] According to National Association of Home Builders' 2021 Priced-Out Estimates, every $1,000 increase in the median new home price would disqualify 153,967 American households from obtaining a new home mortgage.[27]

Furthermore, electrification is presently most viable in new construction located in milder climates, where a single electric heat pump can be used instead of separate heating and cooling units, and especially where local gas infrastructure installation costs can be avoided.[28] But requiring existing buildings to retrofit is entirely another matter. The costs are often exceptionally high, potentially in the tens of thousands of dollars per unit.[29] Beyond more obvious

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[19] *See* https://www.nahb.org/-/media/NAHB/nahb-community/docs/committees/construction-codes-and-standards-committee/home-innovation-electrification-report-2021.pdf.
[20] The study included the cold weather climates of Denver and Minneapolis.
[21] *Ibid*. Climate zone had a strong influence on both construction costs and energy use costs. In colder climates, heat pumps with variable refrigerant flow rated for operation during low outdoor temperatures are needed. Often referred to as cold climate heat pumps, these systems are *typically* more expensive: $8,000-$9,000 more compared to a gas furnace. (*Emphasis added*).
[22] *See* https://www.blvdhome.com/blog/electric-vs-gas-stoves.
[23] *See* https://www.smartheatnj.com/wp-content/uploads/2021/09/Cost-of-Residendial-Air-Source-Heat-Pumps-Uglietto.pdf.
[24] *See* https://files-cdn.masscec.com/Program%20Summary%20%E2%80%93%20Whole-Home%20ASHP%20Pilot%20%2002172021.pdf.
[25] *See* https://www.masscec.com/blog/2020/09/29/september-whole-home-heat-pump-pilot-update-still-time-apply.
[26] *See* https://www.smartheatnj.com/wp-content/uploads/2021/09/Cost-of-Residendial-Air-Source-Heat-Pumps-Uglietto.pdf.
[27] *See* https://www.nahb.org/-/media/NAHB/news-and-economics/docs/housing-economics-plus/special-studies/2021/special-study-nahb-priced-out-estimates-for-2021-february-2021.pdf
[28] Deason, J., Borgeson, "M. Electrification of Buildings: Potential, Challenges, and Outlook", Current Sustainable Renewable Energy Rep 6, 131–139 (2019). *See* https://doi.org/10.1007/s40518-019-00143-2.
[29] *See* 20 No. 3 New York Zoning Law and Practice Report NL 1. Also, Representative Alexandria Ocasio-Cortez filed legislation to appropriate $172 billion over 10 years for energy efficiency upgrades and building electrification retrofits to 950,000 public housing units*.* See Senator Sanders and Representative Ocasio-Cortez bill which would fund public housing efficiency retrofits, 2021 WL 1523875.

capital and operating cost considerations, converting existing direct fuel equipment to electric may also require an expensive upgrade to a building's electricity service feed to power the new equipment.[30]

In addition to new construction, the CEC Pilot Program involved 53 *existing building projects* for homes displacing natural gas. The average conditioned square footage was 1,590 sq. ft., and the average project cost was $21,479. Again, replacing and upgrading a natural gas, propane, or heating oil system at the end-of-life in the Northeast typically costs a homeowner $7,000 - $10,000.[31] Similarly, the research conducted for the National Association of Home Builders concluded that the retrofit cost of electrification for an existing baseline gas house ranges between $24,282 and $28,491, while the retrofit cost of gas equipment and appliances for an existing baseline gas house ranges between $9,767 and $10,359 using standard efficiency equipment, and between $12,658 and $13,425 using high efficiency gas equipment.[32]

Similarly, in April 2021, San Francisco's Board of Supervisors determined that requiring electrical retrofits of city residences (furnaces, water heaters, ovens and cooktops, and laundry appliances) would likely result in substantial costs to the homeowners from disposal of old appliances, purchase of new appliances, labor, and electrical panel upgrades.[33] Estimated costs of retrofitting ranged from $14,363 per housing unit up to $19,574 for multi-family units and $34,790 for single family homes. Applying these cost estimates to an estimated 240,231 housing units (76,470 single-family homes and 163,761 multi-family homes), the citywide cost to retrofit all residential units currently using natural gas-fueled appliances with those fueled by electricity ranges from $3.5 to $5.9 billion. Accordingly, less-costly measures for reducing emissions were recommended that included mandatory electrification for all newly constructed residences, mandatory electrical retrofits of gas-fueled appliances for all residences at the time of sale, and/or mandatory electrical retrofits of gas-fueled appliances for all residences when they need to be replaced.[34]

And consider that in April 2019 the New York City Council adopted Local Law 97, that requires existing buildings over 25,000 square feet to reduce their GHG emissions by 40 percent by 2030 and 80 percent by 2050. Many of these buildings use natural gas-fired boilers to provide heat and hot water. Approximately 75 percent of covered buildings do not comply with the 2030 emissions limits, resulting in close to 37,500 buildings required to undertake some level of retrofit before then, including replacing any natural gas fired boilers with electric boilers. These costs alone are estimated to reach $21 to $24 billion.[35]

Lastly, research conducted for the Massachusetts Home Builders[36] indicates that the specialized stretch energy code allowing zero-emissions construction is likely to increase the cost of building single-family homes and townhouses by roughly 1.8 to 3.8 percent (approximately $10,000 to $23,000 for the median single-family home), depending on the

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[30] For example, one study notes that to accommodate electric space heating in California, there is an estimated cost of $4,700 to upgrade the electricity service for an existing single-family building and $35,000 for a low-rise multifamily building. See "Palo Alto Electrification Study, TRC Energy Services," November 16, 2016. *See* https://www.cityofpaloalto.org/files/assets/public/development-services/advisory-groups/electrification-task-force/palo-alto-electrification-study-11162016.pdf.

[31] *See* https://www.smartheatnj.com/wp-content/uploads/2021/09/Cost-of-Residendial-Air-Source-Heat-Pumps-Uglietto.pdf.

[32] *See* https://www.nahb.org/-/media/NAHB/nahb-community/docs/committees/construction-codes-and-standards-committee/home-innovation-electrification-report-2021.pdf, at note 8.

[33] Many factors impact potential construction costs. For instance, some buildings would require sidewalk transformers to be installed to handle the increased electrification demanded. And most homes in San Francisco would require electric panel conversions to support electric appliances.

[34] *See*: https://sfbos.org/sites/default/files/BLA.ResidentialDecarbonization.042221.pdf.

[35] *See* "Big Questions (and Some Answers) About the Climate Mobilization Act" (PowerPoint), April 23, 2020, NYCBAR 44, and "Retrofit Now! Reducing Carbon and Complying with LL97," CUNY Building Performance Lab.

[36] "Public Policy for Net Zero Homes and Affordability", Wentworth Institute of Technology, Massachusetts Institute of Technology , and Home Builders & Remodelers Association of Massachusetts (2023). *See* https://hbrama.com/wp-content/uploads/2023/05/Public-Policy-for-Net-Zero-Homes-and-Affordability-Final-6-14-23.pdf.

pathway to compliance selected, and increase the cost of construction of large multi-family buildings by roughly 2.4 percent, at least initially. The economic modeling demonstrates that these increases in construction costs could push the median single-family home in Massachusetts out of reach for between 15,000 and 33,000 households, before accounting for any public financial incentives for green buildings. The increased energy efficiency of homes will potentially offset some of the increase in construction costs, but not all.

Some of the increased construction costs could impact homebuyers and renters, while some costs could be absorbed by builders in the form of reduced profit margins. Increases in construction costs, however, are likely to reduce construction starts overall, as fewer projects make economic sense and fewer households can afford new homes, putting further pressure on housing supply and affordability. The authors determined that the increased costs will likely be felt most by households with low and moderate incomes.[37]

Generation Fleet Impacts

With respect to electric generation, a rapid shift away from dispatchable generating resources that have firm fuel can result in higher electricity costs for customers.[38] Several of the considerations for policy implementation for the electricity sector in the report include a strengthened Regional Greenhouse Gas Initiative target of zero GHG emissions by 2040 and a clean electricity standard (CES) requiring 100 percent of in-state electricity to be produced from clean sources by 2035. These considerations ignore the benefits of maintaining flexible gas-fired power plants to help balance intermittent renewables and avoid shortages that could put upward pressure on electricity costs. Many utilities with aggressive decarbonization targets across the country have found that retaining natural gas on their system can help manage the costs of transitioning to zero-carbon generation.

Southern California Edison, the second largest utility in the country, wrote in its decarbonization roadmap that "some natural gas continues to be deployed because removing it completely from the 2045 electricity landscape would significantly increase resource costs." The roadmap, which is called "Pathway 2045," describes how the utility will achieve carbon neutrality by 2045 as required under state law. It also notes that it plans to keep 10,000 MW of gas-fired capacity available, because without it "average annual resource costs would rise nearly 40% post-2030."[39]

The retirement of all fossil fuel fired generators also ignores the fact that many – especially those fueled by natural gas – can be transitioned to lower-emitting fuels like low-carbon hydrogen or renewable natural gas. These plants can also be retrofitted with carbon capture and sequestration technology as they become commercially available. These alternatives will help provide PJM a more complete portfolio of flexible resources which will provide greater reliability while managing the costs of decarbonization.

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[37] *Ibid*.

[38] As EIA notes "electricity prices vary by locality based on the availability of power plants and fuels, local fuel costs, and pricing regulations." Shifting away from dispatchable power plants can require the use and importation of higher priced electricity. *See* https://www.eia.gov/energyexplained/electricity/prices-and-factors-affecting-prices.php#:~:text=Prices%20are%20usually%20highest%20in%20the%20summer%20when%20total%20demand,to%20meet%20the%20increased%20demand.&text=The%20cost%20to%20supply%20electricity%20varies%20minute%20by%20minute.

[39] Southern California Edison, Pathway 2045, at p. 8, November 2019, *see* www.edison.com/home/our-perspective/pathway-2045.html.

Policies Will Have a Significant Impact on Reliability

Marylanders need affordable and reliable energy. On cold nights, it is essential that everyone has access to affordable and reliable home heating. As discussed, a key policy for consideration in *Maryland's Climate Pathway* report is reducing emissions from the state's buildings sector through the adoption of zero emission building codes and standards. Given that most building emissions are related to space heating, this would likely require a significant increase in the use of heat pumps in the residential and commercial sectors.

Broad adoption of heat pumps in Maryland could add significant electricity demand to the grid just as the power supply is being transitioned from firm, dispatchable resources to those that are intermittent and non-dispatchable. It also has the potential to change electricity consumption patterns and can put upward pressure on the wholesale clearing price of electricity which in turn can increase retail electricity prices paid by consumers.[40]

Solar resources have made up a considerable amount of new capacity added in the state. This change means that solar generation, which is greatest during the day and non-existent at night, may be unavailable to meet load as the system peaks. While battery storage remains a promising potential solution to the challenge of integrating intermittent resources, it is currently unavailable in the quantities and durations required to maintain reliability on a system that is almost completely reliant on intermittent renewables. Without solar generation to meet demand during these periods, PJM will need to ensure that it has not only enough other generation available, but that the available generation can ramp up quickly to meet heating load that increases sharply as temperatures fall in the evening.

Currently, natural gas generation is uniquely capable of providing that service, though it could eventually be complemented and replaced by emerging technologies including hydrogen and renewable natural gas that are consistent with the CSNA's goals. Requiring what are essentially all-electric buildings raises several practical questions that remain unanswered, namely: what resources are needed to reliably meet the current and future heating and other service needs of residential and commercial consumers in Maryland; and how should the state proceed to meet that need while also reducing GHG emissions at the lowest possible cost to those consumers.

Energy-efficient, low-carbon buildings could be powered by an innovative combination of natural gas and renewable energy (such as hydrogen) to both lower emissions and utility bills. This is the type of all-of-the-above energy strategy that Maryland should embrace to help address affordability for consumers while keeping the state on track to meet its emissions reduction goals. API believes that natural gas, in combination with hydrogen or other renewables including renewable natural gas, provides the state with an economical and practical tool for doing so.

TRANSPORTATION SECTOR CONSIDERATIONS

Deferring Policy Decisions to California May Not Be Right Fit for Maryland

Maryland has adopted California's Advanced Clean Cars II (ACC II) regulations banning the sale of new vehicles with internal combustion engines (ICE) for 2035 and all subsequent model years. Maryland has also adopted California's

[40] *See* https://www.eia.gov/energyexplained/electricity/prices-and-factors-affecting-prices.php#:~:text=Prices%20are%20usually%20highest%20in%20the%20summer%20when%20total%20demand,to%20meet%20the%20increased%20demand.&text=The%20cost%20to%20supply%20electricity%20varies%20minute%20by%20minute.

Advanced Clean Truck rule that simultaneously requires manufacturers to build zero-emission trucks at increasing percentages of their offerings by the year 2035. API has encouraged the MDE and state policymakers to review the differences between California's population density, geography, and weather patterns before choosing to follow California in their adoption of the ACC II rules. [41]

Additionally, Maryland models the Advanced Clean Fleet (ACF) rule indicating that it "is *assumed to help facilitate* achievement of the ACT targets in the near term … and operate[s] by driving sales of freight trucks after 2035, reaching 100% electric truck sales by 2040."[42] This statement fails to identify that when combined with the ACT, the ACF requires the purchase of medium- and heavy-duty trucks. As indicated in API comments on the ACF to California, "medium-, and heavy-duty vehicles (MHDV) are used in a wide variety of applications with a diverse set of equipment specifications and performance requirements which range from light to extremely demanding." For this reason, using the ACF to require certain Maryland businesses to adopt EVs may have significant negative impacts to those businesses if the vehicles do not meet their needs.

A policy centered on electric vehicles and a "one-technology-fits-all applications" approach, could result in stranded investments and lost opportunities to achieve significant emissions reductions from in-use vehicles over the very ambitious 2024-2040 timeline that CARB requires for the fleet uptake of new zero emission MHDV.

Furthermore, the California South Coast Air Quality Management District commented in April 2021 that the proposed rule did not meet the state's more immediate public health and welfare goals associated with the reduction of NOx and diesel particulate matter emissions and was more costly than a regulatory policy focused on the use of currently available technology.[43]

Prudent Public Policy Provides Customer Choice and Avoids Mandates

Maryland's economy depends on a reliable and affordable transportation fleet powered by energy sources that provide the consumer with a vehicle that they can afford and that does not unnecessarily limit consumer choices.[44] Regulations that establish annual quotas for the production of zero emission light-, medium-and heavy-duty vehicles and policies that ban the sale of new vehicles equipped with internal combustion engines precludes opportunities to develop other technologies that can compete to reduce carbon emissions in transportation from both new and the existing vehicle fleet. Competition teamed with consumer preference provides the best approach to accomplishing the state's goals at the least cost and on the fastest timeline.

API also respectfully suggests that as Maryland considers electrification of the transportation sector that it continues to analyze the impact on tax revenue generated from changes to gasoline and diesel fuel consumption and switching to increased consumption of electricity. Liquid transportation fuels are taxed at both the federal and state level to fund the

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[41] API Comments to Notice of Proposed Action [23-049-P-I] – COMAR 26.11.34 Low Emissions Vehicle Program, June 26, 2023.

[42] *Emphasis added*.

[43] SCAQMD, "Staff Comments on Proposed Advanced Clean Fleets Regulatory Concepts," April 2, 2021, https://www.arb.ca.gov/lists/com-attach/25-acf-comments-ws-WiIRNAFhU3FWPQFl.pdf.

[44] Nearly all products that consumers use in the United States are currently transported by truck. See "Trucking in America: Everything you bought in 2021 moved on a truck, CNET (December 30, 2021). *See* https://www.cnet.com/tech/tech-industry/features/trucking-in-america-hidden-truths-about-the-industry-transporting-our-stuff/. *See* also Center for Intermodal Freight Transportation Studies, University of Memphis, *"*Overview of the U.S. Freight Transportation System" (August 2007).

construction and maintenance of bridges, roads, highways, and other transportation initiatives. State motor fuels tax revenue collections in Maryland are significant and the state should recognize that typically 95 percent of the federal tax revenue collected in a state is returned to that state from the federal government.

Efficiencies Have Occurred and Continual Improvements Being Made

Recent forecasts of long-term energy trends such as those prepared by the U.S. Energy Information Administration[45] indicate that despite projections of growth in the electric vehicle fleet, liquid fuels consumption will continue to be the primary transportation energy source through the next two decades. The automobile industry has made tremendous progress making the internal combustion engine much more efficient across all vehicle segments. Consumers in the market for a new vehicle will find conventional vehicles 30 percent more efficient than 12 years ago.

The natural gas and oil industry is advancing cleaner fuels to provide consumers with lower-carbon options. Real-world CO_2 emissions per mile traveled for new light-duty vehicles have declined 49 percent since 1975.[46] Model year 2020 new vehicle estimated real world CO_2 emissions are at a record low, and fuel economy is at a record high.[47] API's member companies have made and continue to make significant investments in new technologies that reduce carbon emissions in transportation, including: stand-alone production and coprocessing of bio-feedstocks to make renewable fuels; manufacturing of low-carbon ethanol; manufacturing of renewable natural gas from wastewater, landfill gas, and biodigesters at farms as fuel for compressed natural gas vehicles; production of blue and green hydrogen for transportation and stationary applications including building infrastructure; direct air carbon capture; carbon capture and sequestration of CO_2; development of advanced plastics to meet auto industry standards and consumer expectations while mitigating environmental impact through emissions reduction and improved vehicle efficiency by light-weighting; and installation of electric vehicle charging stations.

The ultimate trajectory and level of market penetration achieved by electric vehicles will depend on: (a) continued reductions in battery costs (that depend on availability of raw materials and that may require technology breakthroughs); (b) improvements in electric vehicle driving range; (c) expansion of the electric vehicle charging infrastructure; and, (d) ultimately consumer acceptance. Put differently, choices are constrained by what is available, what is affordable, and what is preferred. For most consumers purchasing a new vehicle, sticker price, fuel cost, and refueling convenience are of primary importance. And the trajectory of EV adoption also depends, heavily, on the assumption that future improvements in EV technology will not be overtaken by unforeseen breakthroughs that may impact the relative energy and environmental performance of other technologies.

A blog by the *Martec Group* indicates that EV investments and commitments are "at all-time highs. In March 2022, EV sales reported a 60% increase from 2021," and President Biden has established a goal for 50 percent of all new vehicles sold in 2030 to be zero emissions vehicles (ZEVs) while there is a global market "looking to increase that number to 75% by 2040." [48] The blog is based on a study that evaluates the chain for ZEVs to achieve these stated goals. The findings

[45] EIA "Annual Energy Outlook 2022." *See* https://www.eia.gov/outlooks/aeo/IIF_carbonfee/pdf/carbon_fee_analysis.pdf.
[46] U.S. Department of Energy, "Fact of the Week, January 31, 2022: Average Carbon Dioxide Emissions for 2021 Model Year Light-Duty Vehicles at an All-Time Low," https://www.energy.gov/eere/vehicles/articles/fotw-1223-january-31-2022-average-carbon-dioxide-emissions-2021-model-year#:~:text=The%20average%20production%2Dweighted%20carbon,%E2%80%92%20a%20decrease%20of%2049%25.
[47] *See* 2021 EPA Automotive Trends Report, at https://www.epa.gov/automotive-trends.
[48] *Martec Group*, "Electric Vehicle Growth in the U.S.: A look into the EV Battery Supply Chain," March 2022, available at https://martecgroup.com/electric-vehicle-battery-supply-chain/.

show that based on baseline United States Geological Survey 2020 production data and *Martec Group* analysis, for the U.S. to produce enough minerals domestically to reach the Biden administration's 50 percent by 2030 target, domestic production will require:

- 48x more lithium (The U.S. has one active mine today).
- 16x more nickel (The U.S. has one active mine today).
- 29x more cobalt (The U.S. has two active mines today, as a secondary material).
- Graphite that is not produced at scale in the U.S. (The U.S. has zero active mines today).

Additionally, the *Martec Group* study indicates that the increase in demand for the critical materials (lithium, nickel, cobalt, copper, neodymium, and aluminum) necessary for battery and electric motor production could put upward pressure on the price of EVs. In recent years, the price of each key mineral has experienced significant increases with lithium carbonate leading the way. Price increases from November 2020 to March 2022 include:

- Lithium Carbonate 1,184 percent,
- Nickel 136 percent,
- Cobalt 127 percent,
- Copper 43 percent,
- Neodymium 177 percent, and
- Aluminum 85 percent.

A lack of competition among raw materials gives suppliers more pricing power for their goods, and upward pressure on the price of materials for EVs could ultimately impact consumer costs.[49]

The MDE should consider the possible trajectory of the cost to supply batteries that will be used in EVs and should also consider the implications to U.S. energy and transportation security that could result from relying on non-domestic producers of raw materials and batteries.

Since EV charging infrastructure is currently only used by a small fraction of drivers, allowing utilities to invest in EV charging infrastructure and recover the costs of those investments through regulated cost recovery (*i.e.,* through charges to all their ratepayers) will likely result in an unfair shifting of costs. API believes that investments in charging infrastructure should be left to the private sector, which must raise its own capital and unlike utilities are not backstopped by utility ratepayers.

<u>Need for Economy-Wide Carbon Policy</u>

The report identified a program that caps emissions across the economy, or within particular sectors, and allocates emissions primarily through an auction mechanism that provide revenues for state investment, known as *cap-and-trade* as a policy consideration to be reviewed by the MDE.

API shares the goal of reduced emissions across the broader economy and, specifically, those from energy production, transportation and use by society. API believes that to achieve meaningful and permanent emissions reductions that meet the climate challenge, it will take a combination of policies, innovation, industry initiatives and a partnership

[49] *Ibid*.

between government and the various economic sectors. Accordingly, API has developed the "*Climate Action Framework*," which among other things endorses a carbon price policy.[50]

API believes that instead of a patchwork of federal and state regulations and mandates that could ineffectively or inefficiently address the climate challenge, an economy-wide government carbon price policy is the most impactful and transparent way to achieve meaningful progress. We recognize there are different ways for policymakers to consider carbon pricing – from a cap-and-trade system to a carbon tax – but there are some general parameters to begin the discussion.

Policy should be:

- *Economy-wide:* A carbon pricing system should be designed to price carbon at the outset for all relevant GHG emissions across the economy, from all relevant sectors and all emitters, accounting accurately for the benefits, costs and amounts of GHG emissions. Policies should support significant investments in innovation to develop technologies that lower the cost of GHG emissions abatement across the economy. Policy should be based on carbon-equivalent emissions on a common unit and period of measurement (*e.g.*, GWP100) basis across the U.S. economy, as practically and economically achievable as possible.
- *Transparent*: The carbon pricing system should be designed so that consumers have transparent incentives, based on actual GHG emissions, if possible, to reduce GHG emissions efficiently. With respect to transportation fuels, a government policy-imposed carbon price should be disclosed at the point of retail sale. To provide certainty for the economy and maintain the integrity of the policy, the price on carbon or emissions cap should be adjusted periodically through a defined, rational, and transparent process to meet GHG emissions targets. As applicable, the year 2005 should be the baseline against which future targets for reducing GHG emissions are determined. This already is the baseline for which U.S. economywide policy action has been determined in global climate negotiations.
- *Nonduplicative*: Policies should minimize the burden of duplicative regulations and be designed for a uniform cost of GHG emissions on a CO_2-equivalent basis throughout the economy that does not exceed the marginal cost of carbon emissions abatement, or the cost associated by an additional ton of carbon emitted into the atmosphere.
- *Maintain U.S. Competitiveness*: The goal of a carbon price policy should be to achieve GHG emissions reductions at the least cost to society, to meet the dual challenge of continued U.S. economic growth and global competitiveness while addressing the risks of climate change.
- *Avoid Carbon Leakage, Integrate with Global Carbon Markets*: Policy should be globally integrated, including through trade mechanisms, so that U.S. entities have the incentive to reduce their carbon footprint on a worldwide basis without being competitively disadvantaged and to avoid carbon leakage.
- *Focus on Net Emissions*: Attention should be given to net emissions such that ongoing voluntary actions are recognized, and the trading and use of applicable credits and offsets are allowed.

[50] *See* https://www.api.org/climate#carbon-price.

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CONCLUSION

API hopes that these comments provide constructive feedback, and we look forward to providing additional comments as appropriate.

Respectfully submitted,

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