Valero

August 28, 2023

Via Electronic Submission to: rulecomments.dep@maine.gov

Maine Department of Environmental Protection
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Re: Comment on Chapter 128: Advanced Clean Trucks Program

To Whom It May Concern:

Please find below the comments from Valero on the proposed adoption of California's Advanced Clean Trucks ("ACT") program in Maine. Valero appreciates the opportunity to provide feedback regarding Maine Department of Environmental Protection's ("DEP's") consideration of ACT.

Introduction

Valero Energy Corporation and its subsidiaries (collectively, "Valero") submit these comments as part of DEP's stakeholder engagement regarding Advanced Clean Trucks. In addition to being the nation's largest independent refiner of petroleum fuels, Valero is one of the top producers of domestic biofuels. Valero was the first traditional petroleum refiner to enter large-scale ethanol production and is now the second largest ethanol producer in the U.S. Through our Diamond Green Diesel joint venture with Darling Ingredients, following a recent expansion project to construct a new plant in Port Arthur, Texas, we are currently the leading renewable diesel producer in the world. Our Board recently approved a project to commission production of sustainable aviation fuel, and we are actively pursuing carbon sequestration opportunities in the United States that will substantially lower the carbon intensity of the ethanol we produce.

Comments

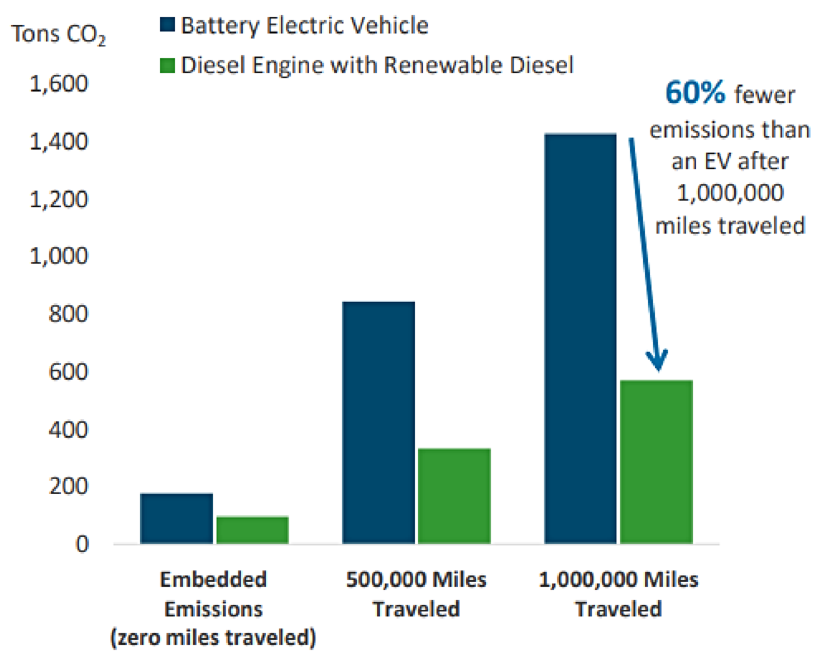
a. Transportation sector decarbonization should embrace all technologies fit for purpose.

Valero recognizes DEP's desire to expediently lower GHG emissions from the transportation sector. As a proud producer of the low-carbon liquid fuels that have been and will continue to be essential to the decarbonization of the transportation sector, Valero encourages DEP to not limit its transportation sector planning to zero-emission vehicle ("ZEV") technologies.

An exclusive reliance on ZEV technologies ignores both the full lifecycle GHG emissions of ZEVs and the benefits of low-carbon liquid fuels and other emerging technologies. DEP should evaluate the merits of all fuels and vehicle technologies on a full lifecycle basis. Despite being treated by regulators as zero-emission vehicles, electric vehicles are not emissions free – in fact, when it comes to medium- and heavy-duty vehicles ("MHDV"), they are not even the most effective technology available today to reduce GHG emissions.

A lifecycle analyses conducted by Southwest Research Institute finds that a heavy-duty internal combustion engine vehicle ("ICEV") that runs on renewable diesel with a carbon intensity of 25 g/MJ results in 60% fewer lifecycle GHG emissions when compared to a battery electric vehicle ("BEV") using U.S. average grid electricity, as illustrated in Figure 1.

Figure 1: U.S. Heavy-Duty Long-Haul Vehicle Lifecycle Emissions (Sept. 2022 Valero Investor Relations Presentation)



Regarding "fitness for purpose," while ZEVs may provide options to help reduce GHG emissions, neither BEV nor fuel cell electric vehicle ("FCEV") technology is compatible with the full range of use, duty and demand posed by the medium- and heavy-duty ("MHD") transportation sector, and therefore neither one is suitable to replace the ICEV and adequately serve the state's freight and transit needs.

- Current BEV technology is not suitable for long-haul trucks. Considering the present lithium-ion battery technology, to achieve a range of 600 miles, a battery pack on a long-haul truck would need to store 1,200 kilowatt-hours (kWh) of energy, weigh 6,300 kilograms (13,900 pounds), have a volume of 2,700 liters (95 cubic feet), and cost about $180,000.[1]

- Due to federal weight constraints for tractor trailers, a long-haul BEV truck would lose 20% of payload capacity compared with a diesel truck, reducing the available revenue per mile and increasing the number of trucks needed to avoid delay or interruption of Maine's statewide freight services.[2]

- At a range of 150 miles, a long-haul BEV truck would need to stop three times to recharge over a 600-mile day. Even if a network of 350-kilowatt (kW) fast-chargers was widely available, charging time would reduce a driver's effective work day by over 2 hours, further requiring an increase in the number of trucks to maintain the pace and demand of freight services.[3]

- ACT will not only require an increase in the number of trucks to accommodate MHD EV charging, but an increase in the number of truck drivers as well in order to comply with federal hours-of-service regulations. The United States Department of Transportation's Federal Motor Carrier Safety Administration ("FMCSA") regulates the number of hours commercial drivers may drive and work per day and week. According to the 11-hour driving limit, a property-carrying driver may drive a maximum of 11 hours after 10 consecutive hours off duty.[4] And per the 14-hour rule, a property-carrying driver may not drive beyond the 14th consecutive hour after coming on duty, following 10 consecutive hours off duty.[5] Given the time intensity of EV charging, additional workers will be needed to ensure MHD fleets charging needs are satisfied while complying with the applicable hours-of-service regulations.

- Current FCEV technology facilitates larger and heavier vehicles than BEVs due to its higher energy storage capacity, and it offers drivers a refueling experience much like conventional vehicles, with the fuel tank capable of being refilled in a matter of minutes. However, adoption of the technology and particularly commitment to developing fueling infrastructure has been limited within the U.S.—currently the U.S.

[1] Assumes a battery pack energy density of 170 Wh/kg. Burke, Andrew, *Assessment of Requirements, Costs, and Benefits of Providing Charging Facilities for Battery-Electric Heavy-Duty Trucks at Safety Roadside Rest Areas: A Research Report from the National Center for Sustainable Transportation*, at page I (Feb. 2022) https://ncst.ucdavis.edu/research-product/assessment-requirements-costs-and-benefits-providing-charging-facilities-battery.
[2] Based on a federal maximum loaded weight of 36,000 kg, on a tractor weighing 8,600 kg and compared to a tractor carrying 965 kilograms (300 gallons) of diesel fuel. *Id*. at 4 and 15.
[3] Based on the Volvo Class 8 Box truck, having a range of 150 miles and an energy capacity of 1.75 kWh/mi. *Id* at 3.
[4] *See* https://www.fmcsa.dot.gov/regulations/hours-service/summary-hours-service-regulations.
[5] *Id.*

has 58 active public and private FCEV hydrogen fueling stations, none of which are located in Maine.[6]

- Major hydrogen production and distribution infrastructure would need to be put in place before FCEV would even be serviceable. "[A]nalysis [also] suggests that the infrastructure for the hydrogen pathway is generally costlier than battery electric," with hydrogen transport facing "the largest cost-penalty in the near-term."[7] It is estimated that the capital cost for a single hydrogen filling station is $1.5 to $2.0 million.[8] Moreover, there are currently no hydrogen fuel cell tractor-trucks commercially available in North America or Europe to confirm their true cost or economic viability.[9]

The transition of a large and complex transportation system to a BEV or FCEV technology is a massive undertaking, requiring the establishment of new manufacturing, assembly and supply chains; build-out of new charging/fueling infrastructure; interface with public utilities; re-conception of fuel distribution logistics; and ultimate design of end-of-life resource recovery strategies. Renewable diesel, on the other hand, can utilize existing infrastructure (*i.e.*, pipelines, terminals, and retail distribution supply chains), requiring far less investment when compared against BEV charging and FCEV hydrogen fueling build-out. Renewable diesel can even be used as a petroleum diesel substitute to address a number of hard to decarbonize market segments where BEV and FCEV technologies are similarly challenged (*i.e.*, rail, marine, construction/mining equipment, etc).

DEP should remain open to emerging innovative approaches and new technologies for reducing GHG emissions from ICEV, such as on-board carbon dioxide capture and subsequent sequestration. Analysis from a Northwestern University research team has shown that cost-effective diesel tractors trucks combined with well-developed on-board carbon capture technologies offer a practical way to make large freight vehicles carbon neutral when running on fossil fuels and even carbon negative when running on biofuels.[10] Given existing liquid fuel

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[6] U.S. DOE Alternative Fuels Data Center, Hydrogen Fueling Station Locations, https://afdc.energy.gov/fuels/hydrogen_locations.html#/analyze?region=US-CA&fuel=HY&country=US, accessed August 7, 2023.

[7] Hall, Dale and Lutsey, Nic, ICCT White Paper, "Estimating the Infrastructure Needs and Costs for the Launch of Zero-Emission Trucks" at 18 (August 2019). https://theicct.org/sites/default/files/publications/ICCT_EV_HDVs_Infrastructure_20190809.pdf

[8] For stations built between 2015 and 2017 for 400-500 kg/day. California Hydrogen Business Council, "Hydrogen FAQs," https://californiahydrogen.org/resources/hydrogen-faq/#:~:text=Capital%20costs%20in%20California%2C%20where,early%20(2013)%20market%20fueling., accessed June 23, 2022.

[9] Sharpe, Ben & Basama, Hussein, ICCT Working Paper 2022-09, "A meta-study of purchase costs for zero-emission trucks" at 12 (February 2022), https://theicct.org/wp-content/uploads/2022/02/purchase-cost-ze-trucks-feb22-1.pdf.

[10] Schmauss, Travis A. & Barnett, Scott A, "Viability of Vehicles Utilizing On-Board CO_2 Capture," ACS Energy Letters 2021, 6, 8, 3180-3184 (August 18, 2021) https://doi.org/10.1021/acsenergylett.1c01426.

infrastructure, "rapid adoption of such vehicles should be possible and CO_2 emissions can be continuously decreased."[11]

There are other complexities associated with a singular transition to MHD ZEVs that DEP should also consider, including:

- Significant environmental impacts arise from other aspects of the ZEV lifecycle, including raw material acquisition and processing, and battery production, transport, disposal, and recycling.[12]

- MHD ZEVs are more expensive than their ICEV counterparts. The International Council on Clean Transportation's ("ICCT's") literature survey of purchase costs for zero-emission trucks found the cost to purchase new battery-electric tractor trucks ranged from $200,000 to $800,000, and similarly, the cost of new hydrogen fuel cell trucks ranged from $200,000 to $600,000.[13,14] Even considering tax credits established under the Inflation Reduction Act for new commercial vehicles (26 U.S.C. 45W), there is a significant cost difference between ICEV and their ZEV counterparts.

    - In addition, vehicle costs are often too high for the MHD payback period (the length of time required for an investment to recover its upfront costs).[15] Battery packs for MHDVs must be specifically suited for high lifetime mileage, deeper discharges per cycle, overall ruggedness, resistance to temperature extremes, and for production at low sales volumes. These characteristics push costs for MHDV

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[11] *Id.*

[12] *See* UC Davis, *Achieving Zero Emissions with More Mobility and Less Mining*, at 10 (January 2023) https://www.climateandcommunity.org/_files/ugd/d6378b_3b79520a747948618034a2b19b9481a0.pdf ("Under prevailing technologies, lithium is an essential ingredient in the batteries that power EVs, as well as other consumer electronics and forms of electric mobility such as e-buses, e-trucks, and e-bikes. Lithium mining—currently concentrated in Australia, Chile, China, and Argentina—is, like all mining, environmentally and socially harmful"). *See also* Perry Gottesfeld, *Electric cars have a dirty little recycling problem–batteries*, CANADA'S NATIONAL OBSERVER, Jan. 22, 2021, https://www.nationalobserver.com/2021/01/21/opinion/electric-cars-have-dirty-little-recycling-problem-their-batteries.

[13] ICCT Working Paper 2022-09, *A Meta-Study of Purchase Costs for Zero-Emission Trucks*, at 4 (February 2022) https://theicct.org/publication/purchase-cost-ze-trucks-feb22/.

[14] Per CARB's own estimate, final capital costs for a hydrogen fuel cell Class 8, day cab tractor used in regional operation were $629,189 in 2018 compared with $134,000 for an analogous diesel vehicle. In 2024, CARB estimates that a hydrogen fuel cell tractor truck will cost $431,480 compared to $144,101 for a new diesel tractor. CARB, Appendix H: Draft Advanced Clean Trucks Total Cost of Ownership Discussion Document at 1 (October 22, 2019) https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2019/act2019/apph.pdf. Consistent with CARB's estimates, the ICCT recently forecast that composition costs for a hydrogen fuel cell tractor-truck in 2025 will exceed $400,000. CARB has also recognized that operating costs for a regional-hydrogen tractor in 2024 will exceed those for tractor trucks powered by diesel or battery electric. Sharpe, Ben & Basama, Hussein, ICCT Working Paper 2022-09, "*A meta-study of purchase costs for zero-emission trucks*" at 12 (February 2022), https://theicct.org/wp-content/uploads/2022/02/purchase-cost-ze-trucks-feb22-1.pdf.

[15] U.S. DOE, *Medium- and Heavy-Duty Vehicle Electrification: An Assessment of Technology and Knowledge Gaps*, at 35 (December 2019), https://www.osti.gov/biblio/1615213.

battery packs toward the uppermost end of cost-range. The relatively high daily range needed by commercial vehicles results in battery costs that drive vehicle incremental costs as high as 50%–100% of the price of a conventional truck.[16]

- Along with their higher upfront capital expenditure, electric MHDVs also must contend with electricity price projections, where utility demand charges are difficult to determine and electricity costs carry uncertainties such as whether there will be additional costs for trained personnel to operate a high-powered fast charging system. According to an Atlas Public Policy report, "[r]elying on public charging networks to charge MHD EVs was not a viable option due to the high cost of charging."[17] The substantial electricity demand requirements of MHDVs coupled with limited downtime to charge larger class vehicles greatly reduces any financial savings associated with electricity, if they exist at all, over diesel based on current rates.

b. DEP must consider the availability of charging infrastructure and grid reliability impacts.

As part of its evaluation of potential economic impacts to the welfare of Maine residents and in-state businesses, DEP must assess grid reliability impacts stemming from ACT's forced electrification of its MHD transportation sector. Reliance on BEVs for freight transport may have unintended, negative consequences, especially in relation to the electricity generating sector. In addition, DEP needs to accurately predict the number of additional chargers that will be needed to support Maine's anticipated MHD BEV population, which will require DC fast chargers ("DCFC"). Maine currently has approximately 219 operational public and private DCFCs,[18] of which roughly 66% are exclusive to Tesla vehicles.[19] Additionally, of Maine's 75 non-Tesla DCFCs, approximately 50% are not realistically available for servicing commercial MHDVs, being located at car dealerships, restaurants, shopping centers, and/or garages.[20] This leaves approximately 17% of Maine's statewide DCFCs (approximately 37 chargers total) potentially available for use by MHDVs.[21] Moreover, most of Maine's existing DCFC and prospective installations, such as under MaineDOT's NEVI Deployment Plan, are first and foremost intended to service light-duty passenger vehicles and do not prioritize the necessary commercial depot charging systems necessary to support electric MHDV fleets.[22]

ZEV mandates like ACT also present significant risks to grid reliability and the stability of the transportation sector. Transitioning truck stops into BEV charging hubs will require massive

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[16] *Id.* at 24.
[17] Satterfield, Charles and Nigro, Nick, *Assessing Financial Barriers to Adoption of Electric Trucks*, at ES-6 (Feb. 2020), https://atlaspolicy.com/wp-content/uploads/2020/02/Assessing-Financial-Barriers-to-Adoption-of-Electric-Trucks.pdf.
[18] *See* https://afdc.energy.gov/stations/#/analyze (accessed on August 22, 2023).
[19] *See* https://afdc.energy.gov/stations/#/analyze (accessed on August 22, 2023).
[20] *See* https://afdc.energy.gov/stations/#/analyze (accessed on August 22, 2023).
[21] *See* https://afdc.energy.gov/stations/#/analyze (accessed on August 22, 2023).
[22] *See, i.e.,* https://www.nature.com/articles/s41560-021-00855-0.

power, on a scale that has been likened to the power required by a small town[23, 24] or sports arena.[25] Moreover, Maine already has weather-related grid reliability challenges. The U.S. Energy Information Administration ("EIA") tracks a set of three reliability metrics for the U.S. electric grid, as shown in Table 1.[26]

Table 1: Maine Electrical Power Reliability Metrics

Metric	Description	3-year Average (2019-2021)
System Average Interruption Duration Index (SAIDI)	Describes the duration of the average customer interruption	986 minutes
System Average Interruption Frequency Index (SAIFI)	Describes how often the average customer experiences an interruption	3.0 interruptions per year
Customer Average Interruption Duration Index (CAIDI)	Describes the average time required to restore service	312 minutes

Averaged over 2019-2021, Maine was one of five U.S. states that was in the fourth quartile for all three-reliability metrics (the others being Alabama, Louisiana, Mississippi and North Carolina),[27] with the leading cause of electric outages attributed to "Weather or Falling Trees."[28] According to the EIA, "Maine, historically a state with long electricity interruptions during the winter, is a heavily forested state where power interruptions resulting from falling tree branches are common. In 2020, Maine saw the highest average number of power interruptions" amongst the fifty states.[29]

A reliance on BEVs for the replacement of damaged electrical poles, emergency assistance, storm recovery and personal mobility for necessities like food and medicine would have exponentially increased the magnitude of the disaster and the hardship to the local community.

c. A rapid transition to BEVs and FCEV risks raw material shortages and supply chain vulnerabilities from geopolitical rivals.

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[23] *See* https://www.autoblog.com/2022/11/26/electric-vehicle-charging-stations-could-use-as-much-power-as-a-small-town-by-2035-and-the-grid-isn-t-ready/.
[24] *See* https://www.caranddriver.com/news/a41970523/truck-stops-energy-cost-electric-vehicles/.
[25] *See* https://www.bloomberg.com/news/articles/2022-11-14/tesla-s-electric-semis-are-coming-and-trucks-stops-aren-t-ready.
[26] *See* https://www.eia.gov/electricity/state/maine/state_tables.php.
[27] EIA State Electricity Profiles for 2021, *see https://www.eia.gov/electricity/state/*. *See also* https://www.eia.gov/todayinenergy/detail.php?id=50316.
[28] U.S. Department of Energy "State of Maine Energy Sector Risk Profile," March 2021, *see* https://www.energy.gov/sites/default/files/2021-09/Maine%20Energy%20Sector%20Risk%20Profile.pdf.
[29] *See* https://www.eia.gov/todayinenergy/detail.php?id=50316.

A transition to ZEVs would expose Maine to supply chain vulnerabilities largely beyond the control of regulators. For instance, by 2030, Wells Fargo projects a risk of shortages across all of the key components of EV batteries, except manganese,[30] which is underscored by long lead times for the EV battery supply chains,[31] and a reliance on geopolitical rivals who control those supply chains.[32] As such, there is a mismatch between ACT and the availability of critical minerals essential to realizing its target.[33] Results have shown that "mass electrification of the heavy-duty segment on top of the light-duty segment would substantially increase the lithium demand and impose further strain on the global lithium supply."[34] The significant impact is attributed to the large single-vehicle battery capacity required by HDV and the expected battery replacement needed within the lifetime of HDV.[35] Specifically, "[t]he results suggest that global lithium resources will not be able to sustain simultaneous mass electrification of both the LDV and HDV segments."[36] Because the electrification in the LDV segment has already imposed significant strains on the global lithium supply, further mass electrification in the HDV segment, which is expected to increase the accumulated net demand by 29% to 53%, would come with risks.[37] Even if electric HDVs gain a technoeconomic advantage over other powertrain technologies and achieve market success in the short term, their long-term development is likely to face resource constraints with a reflected surge in lithium prices.[38] It is therefore "recommended that both the government and vehicle manufacturers should carefully consider the ambitious promotion of vehicle electrification in the heavy-duty segment."[39]

d. DEP's proposal will impact both intrastate and interstate transport.

By imposing restriction on freight vehicles travelling both within and across state lines, ACT would restrict the movement of goods in Maine and in the United States. One in sixteen jobs in the state of Maine are trucking industry jobs,[40] and trucking companies located in Maine are also "[p]rimarily small, locally owned businesses" that will be burdened with increased costs and acutely impacted by ACT.[41] DEP should quantify the economic impact of supply-chain disruptions and bottlenecks likely to occur if fleet owners are forced to acquire ZEVs that are not supported by adequate infrastructure.

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[30] Colin M. Langan, et al., *BEV Teardown Series: The Untold Electric Vehicle Crisis, Part 1: Tesla Model Y–The Pace Car*, WELLS FARGO (May 11, 2022).
[31] IEA 2022 Global EV Outlook, at 179, https://www.iea.org/reports/global-ev-outlook-2022.
[32] *Id.* at 154-58.
[33] IEA, *World Energy Outlook Special Report – The Role of Critical Minerals in Clean Energy Transitions* (Revised March 2022), https://iea.blob.core.windows.net/assets/ffd2a83b-8c30-4e9d-980a-52b6d9a86fdc/TheRoleofCriticalMineralsinCleanEnergyTransitions.pdf.
[34] Hao, H., Geng, Y., Tate, J.E. et al., *Impact of transport electrification on critical metal sustainability with a focus on the heavy-duty segment*, NAT COMMUN 10, 5398 (2019) https://www.nature.com/articles/s41467-019-13400-1
[35] *Id.*
[36] *Id.*
[37] *Id.*
[38] *Id.*
[39] *Id.*
[40] *See* https://legislature.maine.gov/doc/3432.
[41] *See* https://legislature.maine.gov/doc/3432.

In addition to the Maine trucking industry, "84.4% of Maine communities depend exclusively on trucks to move their goods."[42] DEP should address how consumers will be impacted by higher costs of food and goods as the costs of replacing existing vehicles with ZEVs are passed through to customers.

Road freight also plays a vital role in the economic growth of our country and is an important and ongoing component of the transportation planning processes in the United States as the interstate transport of goods impacts the national economy and quality-of-life standards. For example, the availability of out-of-state charging infrastructure and support for electric and fuel cell MHDVs outside of Maine is beyond DEP's control or influence. DEP should assess impacts to its own economy, as well as the national economy, as a result of one state potentially accelerating ZEV freight transport that would cease to be reliable or functional outside its geographically confined network of charging/fueling infrastructure and support systems.

e. Maine lacks the legal and legislative authority to adopt a transportation electrification mandate like California's ACT standard.

The measures contemplated by California's ACT program are extraordinary. In considering their adoption in Maine, there is little to no legal analysis to confirm that the novel approaches and requirements mandated under the regulations are within the authority of DEP and do not offend principles of state or federal law. DEP should consider whether the measures called for in the California ACT rule conflict with or are otherwise preempted by the statutory mandates of federal legislation such as the Energy Policy and Conservation Act ("EPCA"); the federal CAA; the Energy Independence and Security Act ("EISA"), including the Renewable Fuel Standard ("RFS").

ACT will have vast nationwide political and economic significance. Requirements that mandate a shift from ICEV to ZEV sales will significantly impact supply chains, consumer costs, electric power infrastructure, domestic energy security, and interstate commerce.

Additionally, ACT includes measures that may violate other constitutional provisions and principles. These include, but likely are not limited to, the Dormant Commerce Clause, which prohibits state regulations that improperly discriminate against out-of-state commercial interests or that unduly burden interstate commerce; the dormant foreign affairs preemption doctrine under the Supremacy Clause, which preempts state laws that intrude on the exclusive federal power to conduct foreign affairs; the Takings Clause of the Fifth Amendment, which precludes the taking of private property (or the elimination of entire industries) for public use without just compensation; and the equal sovereignty doctrine, which constrains the federal government from treating states disparately.

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[42] *See* https://legislature.maine.gov/doc/3432.

f. Limitations of CAA § 177.

The early stages of California's ZEV program were mired by low consumer acceptance, slow technological advancement, missed goals, and backtracking. While California's goals remained aspirational, it always maintained (and several times applied) the ability to re-write the rules when the program proved infeasible for automakers.[43, 44, 45] The limitations in § 177 of the Clean Air Act ("CAA") do not provide states (other than California) with the flexibilities to adjust ambitious targets to accommodate the realities of record inflation, extraordinary supply chain disruptions, global uncertainty due to the war in Ukraine, and critical concerns about the availability, cost and foreign dependence of minerals needed for ZEV batteries. Rather, states may adopt and enforce standards to control emissions from new motor vehicles only if "such standards are identical to the California standards".[46]

Maine must carefully consider what the implications will be if reality cannot keep pace with its ambitions – e.g., if automakers cannot supply ZEVs in the numbers needed to meet DEP's proposed MHD sales mandates, if trucking companies choose not to or cannot afford to purchase the ZEVs, and if the electrical grid and ZEV charging infrastructure cannot keep pace with the growth in MHD ZEV fleet. Without the option of modifying the rules to accommodate ZEV realities, states adopting California's standards via § 177 risk creating for themselves a quagmire in which manufacturers are unable to sell and consumers unable to purchase the new trucks.

g. California's struggles present a cautionary tale for Maine.

DEP should consider the implications that a strategy focused on a singular technology may have on community decision-making, consumer choice, and the unintended consequences that reliance on electrification may present, including foreign supply chain disruptions and forced labor in the production of the raw materials needed to manufacture batteries.[47]

As California has faced rolling blackouts and historic energy prices, Governor Newsom in his May 2022 state budget proposal, has pivoted to the use of traditional fuel infrastructure to

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[43] California Air Resources Board ("CARB" or "ARB"), *ARB Modified Zero-Emission Vehicle (ZEV) Regulation* (April 24, 2003) https://ww2.arb.ca.gov/news/arb-modifies-zero-emission-vehicle-zev-regulation (providing that ARB voted to modify California's ZEV rule in order to allow automakers to meet part of their ZEV requirement).
[44] CARB, *Notice of Public Hearing to Consider Proposed Amendments to the California Zero-Emission Vehicle Regulations Regarding Treatment of Majority Owned Small or Intermediate Volume Manufacturers and Infrastructure Standardization* (May 1, 2001) https://ww3.arb.ca.gov/regact/charger/notice.htm (stating that "[a]t a January 25, 2001, hearing, the Board approved major changes to the ZEV regulations that will significantly reduce the number of ZEVs required during the near term").
[45] CARB, *Proposed 2014 Amendments to the Zero Emission Vehicle Regulation* (September 2, 2014) https://ww2.arb.ca.gov/sites/default/files/barcu/regact/2014/zev2014/zev14isor.pdf?viewType=Print&viewClass=Print (stating that "California could see about 26,000 fewer ZEVs and TZEVs delivered in the 2018 through 2025 model years than would be delivered under the existing regulation").
[46] *See* 42 U.S.C § 7507.
[47] *See* U.S. Department of Energy, *2022 List of Goods Produced By Child Labor or Forced Labor*, at 50-51, https://www.dol.gov/sites/dolgov/files/ILAB/child_labor_reports/tda2021/2022-TVPRA-List-of-Goods-v3.pdf.

ensure system reliability to protect against outages.[48] Significant investments in charging/fueling infrastructure will also be needed. The CEC has projected that an additional 157,000 chargers will be needed to support California's anticipated electric MHD population in 2030—all of these will be DCFC, representing 9,100 additional job-years of dedicated workforce requirements,[49,50] compounding timeline feasibility challenges. CEC further projects that the MHDV charging network will see loads "in excess of 2,000 MW around 5 p.m. on a typical workday," further exacerbating the existing gap between net peak energy demand and existing generation.[51]

Moreover, unworkable ZEV sales mandates put Maine at risk of missing out on real carbon reductions available through incentivizing low-carbon liquid fuels and by encouraging the development of emerging carbon removal technologies. If buyers of MHDV are unwilling or unable to buy these significantly more expensive vehicles, they are likely to either go outside the state to purchase vehicles—in which case the only impact of the rule will be to drive business out of the state—or to postpone replacement of their fleets, which in turn will keep higher-emitting and inefficient vehicles on the road beyond their normal useful life. Therefore, the rule is likely to forego opportunities for earlier emissions reductions and to incentivize delay of investment.

h. DEP should prepare a transparent and reasoned economic analysis.

DEP should prepare a comprehensive costs model with respect to its proposed adoption of ACT before advancing a proposal. Without doing so, DEP cannot adequately consider alternatives that emphasize affordability alongside emissions reductions. DEP's analysis should transparently convey the consequences and difficulties associated with the major technology transformation required under ACT. For example, DEP should quantify less defined risks and potential impacts to Maine stakeholders. This includes discosing the total costs of compliance under ACT and quantifying impacts to Maine's job market. Without doing so, Maine's analysis of ACT is likely to be inconsistent and incomplete.

Moreover, DEP should not merely rely on and extrapolate from CARB's data and analysis without adequately considering differences in scale, climate, population density, and state economies that will have profound impacts on Maine's experience implementing ACT. State specific and regional factors are material and must be considered to ensure that ACT is properly and thoroughly vetted for application in Maine.

As discussed above, as California has felt the real-world implications of its climate policy with rolling blackouts and sky-high energy prices, it is now implementing a broader approach to

48 *See* https://www.ebudget.ca.gov/2022-23/pdf/Revised/BudgetSummary/ClimateChange.pdf.

49 CEC, Assembly Bill 2127 Electric Vehicle Charging Infrastructure Assessment Analyzing Charging Needs to Support ZEVs in 2030, 19-AB-2127 at 1 and 6 (July 14, 2021), https://www.energy.ca.gov/programs-and-topics/programs/electric-vehicle-charging-infrastructure-assessment-ab-2127.

50 Carr, Edward; Winebrake, James; Winebrake, Samuel, *Workforce Projections to Support Battery Electric Vehicle Charging Infrastructure Installation* (June 8, 2021) https://etcommunity.org/assets/files/Workforce-ProjectionstoSupportBatteryElectricVehicleChargingInfrastructureInstallation-Final202106082.pdf.

51 *Id.*

GHG reductions that includes investment in carbon capture and fossil fuel infrastructure to ensure future system reliability. DEP's recommendation need not focus on an inexplicable fear of prolonged reliance on liquid fuels infrastructure; rather, it can and should present a transparent, technology-neutral approach that allows for innovation that would better serve Maine's most vulnerable communities. For example, MaineDOT highlighted known risks and challenges inherent to MHD EV adoption in its "Maine Plan for Electric Vehicle Infrastructure Deployment (Maine PEVID)" dated July 2022:[52]

- "Maine also faces significant challenges with its large area, small population, and below-national-average per capita income. While Maine's climate is warming, its extreme low temperatures present additional challenges for EVs, in terms of both shortened range and longer charging times."[53]

- "For the five-year period of NEVI Formula funding, and the coming few decades, however, cold temperatures will remain a top challenge in relation to EV adoption and successful operation of EVSE."[54]

- "Maine is still evaluating electrification for medium- and heavy-duty vehicles. . . .[The] Maine PEVID includes a plan to reassess the state of MHDEV technology in a few years."[55]

- "[F]urther research and evolution of MHDEV technology is needed before making specific plans for the freight sector."[56]

- "In the near term, there is a significant risk that DC fast charging will not be economically viable, particularly in rural areas that currently represent the largest gaps in Maine's EV charging network. Initial analysis suggests that some rural stations may not be profitable within ten years, due to a lack of EV usage at these rural sites."[57]
- "Longer-term, if EV adoption rates take off as projected, there will be a need for new grid capacity. This need will hit at different times in different locations because each part of the electrical grid has unique capacity constraints."[58]

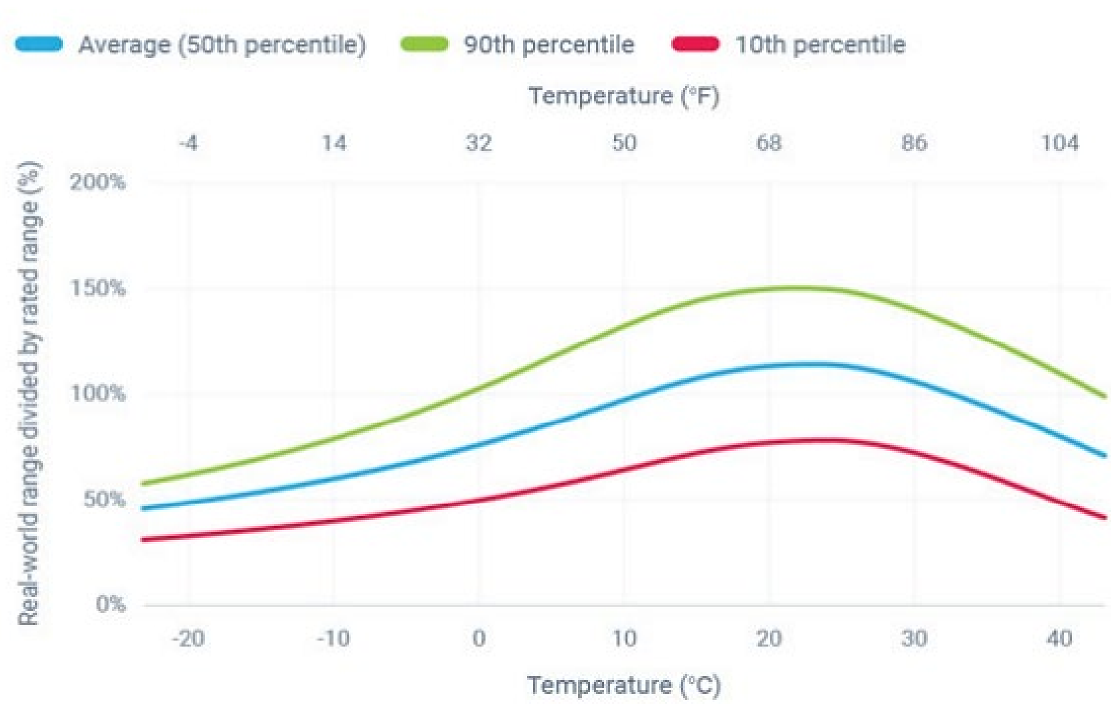
- "Cold weather reduces EV range and increases charging times (for both DCFC and L2). Maine's cold climate and low, widely dispersed population present significant challenges to EV adoption and to the sustainable operation of EV charging equipment.

[52] Maine Department of Transportation (MaineDOT), *Maine Plan for Electric Vehicle Infrastructure Deployment (Maine PEVID)* (July 2022) https://www.fhwa.dot.gov/environment/nevi/ev_deployment_plans/me_nevi_plan.pdf.
[53] *Maine PEVID* at 11.
[54] *Maine PEVID* at 13.
[55] *Maine PEVID* at 15.
[56] *Maine PEVID* at 32.
[57] *Maine PEVID* at 21.
[58] *Maine PEVID* at 21.

These challenges will be acute in northern and far-inland (esp. mountainous) parts of the state; these areas tend to be rural, with lower-than-average income, as well as low [Annual Average Daily Traffic] AADT."[59]

- "The following figure shows the impacts of temperature on EV range for 4,200 real-world EVs measured by GEOTAB":[60]

Graphic 13: *Impacts of Temperature on EV range for 4,200 real-world Evs Merasured by GEOTAB*



- "Medium- and heavy-duty vehicles in Maine present particular challenges. Compared to the average of 12,000 miles per year for light-duty vehicles, busses and combination trucks average 24,500 miles per year and 78,000 miles per year respectively. This leaves less downtime available for charging. In addition, trucks carry significantly higher payloads than light-duty vehicles, thus requiring even larger batteries (which take longer to charge). The [Transportation Working Group] TWG recognized that it didn't yet have the framework needed to explore the electrification of medium-heavy duty truck fleets."[61]

[59] *Maine PEVID* at 21.
[60] *Maine PEVID* at 21.
[61] *Maine PEVID* at 22.

- "While cold weather presents significant challenges, financial viability (in rural parts of the state) remains the biggest risk. In remote locations, there is the risk that if DCFC facilities are oversized for the market demand, then operating revenue will not be able to cover costs. This could result in private vendors and/or property owners becoming disillusioned with the economic burden of owning/hosting this critical infrastructure. Facilities may fall into disrepair or be removed entirely, creating a negative case study on the transition to EVs."[62]

- "Maine faces significant challenges; these include low population density, remote stretches of important roads where limited or no electric service currently is available, a high percentage of state road mileage, and below-national-average per capita income."[63]

- "Analysis shows that expected NEVI formula funding simply is not enough to fully build out Maine's current and nominated AFCs within the NEVI funding period."[64]

- "Most of the existing DCFC stations on AFCs do not meet the NEVI requirements for being fully built out. Based on studying the costs that would be incurred to bring the existing DCFC stations on current AFCs up to the NEVI standard, Maine has concluded that doing so would spend virtually all the charging infrastructure funding that can reliably be expected and would not lead to acceptable results. It would mean not completing the northern interstate (with its connection to New Brunswick, Canada) and not completing two remote AFC corridors that connect with the province of Québec and are important for wood products and tourism."[65]

- "Through [its] equity discussions Maine has identified both concerns and opportunities related to electrification:
    - The initial cost of electric vehicles is high.
    - Other factors that facilitate buying an EV, such as ability to charge at home (an estimated 80% of charging occurs at home) and owning two or more vehicles, also are strongly associated with higher income families."[66]

Maine stakeholders should have an opportunity to evaluate the data, costs, and assumptions underlying ACT before DEP proceeds. It is critical from the outset to design Maine's MHDV transportation program to minimize the potential for unfair subsidies, price shocks, and supply disruptions. In our view, considering the very real limitations and economic impacts that will stem

[62] *Maine PEVID* at 22.
[63] *Maine PEVID* at 24.
[64] *Maine PEVID* at 24.
[65] *Maine PEVID* at 24.
[66] *Maine PEVID* at 36.

from ACT, Maine will be unable to meet its climate goals in a feasible or cost-effective manner without a diverse set of technologies at its disposal.

Conclusion

Maine should support and foster technological innovations in the transportation sector by embracing technology-neutral approaches to decarbonization. Decarbonizing the transportation sector will require multiple technologies competing in an open market that rewards technologies based on emissions reductions and costs. Valero is prepared to work with DEP to help ensure its GHG reduction goals are achieved.

* * *

Valero appreciates the opportunity to comment and would welcome the opportunity to have additional discussions on these issues. Please do not hesitate to contact me with any questions or if Valero or I can otherwise be of assistance.

Sincerely,

Mandy Garrahan
Executive Director Strategic Planning & Public Policy