



## Testimony in Support of Advanced Clean Trucks (Chapter 128)

To the Board of Environmental Protection  
by Jack Shapiro, Climate and Clean Energy Program Director  
August 28, 2023

### The Advanced Clean Trucks Standard is Essential to Meet Maine’s Climate Goals

Maine’s transportation sector accounts for nearly half of the state’s carbon emissions from fossil fuels, by far the top contributor to climate change of any sector.<sup>1</sup> Twenty-seven percent of those transportation sector emissions come from medium- and heavy-duty vehicles.<sup>2</sup> Maine’s 2020 bipartisan Climate Action Plan, *Maine Won’t Wait*, identifies reducing transportation emissions as “Strategy A,” highlighting the need to “pursue aggressive transition strategies and innovative solutions within this important sector” to hit our 2030 and 2050 emissions reduction goals.<sup>3</sup>

In 2019, bipartisan majorities of the Maine Legislature passed new climate laws to: reduce greenhouse gas (GHG) emissions by 45% in 2030, and 80% in 2050.<sup>4</sup> Since then, Maine has also established a net-zero emissions target by 2045.<sup>5</sup>

*Maine Won’t Wait* called for the development of a Clean Transportation Roadmap to guide the state toward the achievement of its mandatory emissions reduction goals. The Roadmap, published in 2021, identifies adopting the ACT program as a necessary policy to achieve these goals.<sup>6</sup> If implemented, the ACT and ACCII “programs will have profound impact on GHG emissions from the transportation sector” and will send “clear, long-term signal to automakers to increase deliveries of EVs”.<sup>7</sup>

A report from the North American Council on Freight Efficiency following their 2021 electric truck demonstration found that medium- and heavy-duty trucks are the fastest-growing contributor to emissions in the U.S. due largely to an increase in online shopping, and that if all North American trucks in the four represented market segments (Class 3, 4, 5 Vans & Step Vans,

<sup>1</sup> <https://www.maine.gov/dep/commissioners-office/kpi/details.html?id=606898>, 9<sup>th</sup> Biennial Report on Progress toward Greenhouse Gas Reduction Goals

<sup>2</sup> <https://www.maine.gov/future/sites/maine.gov.future/files/inline-files/Maine%20Clean%20Transportation%20Roadmap.pdf>

<sup>3</sup> <https://www.maine.gov/climateplan/>

<sup>4</sup> <http://www.mainelegislature.org/legis/statutes/38/title38sec576-A.html>

<sup>5</sup> <http://www.mainelegislature.org/legis/statutes/38/title38sec576-A.html>

<sup>6</sup> <https://www.maine.gov/future/initiatives/climate/cleantransportation>

<sup>7</sup> <https://www.maine.gov/future/sites/maine.gov.future/files/inline-files/Maine%20Clean%20Transportation%20Roadmap.pdf> Clean Transportation Roadmap, Page 2

Class 6 Box Trucks, Class 8 Terminal Tractors, and Class 8 Regional Haul Tractors) were electric, the industry would save over a million tons of carbon emissions each year.<sup>8</sup>

### **Climate Impacts**

Mainers are already feeling the impacts of climate change. This June was one of the wettest on record in Maine,<sup>12</sup> and July is the hottest month ever recorded in global history.<sup>13</sup> Inconsistent and extreme weather patterns have led to increased flooding, high heat days, and shorter winters. Average annual precipitation in Maine has increased by 15% (5.8 inches) since 1895, with most of the increase taking the form of rain rather than snow. Not only is it raining more, the intensity of rain events is also increasing. Maine now sees three times as many rain events with more than four inches of rain, and twice as many rain events with more than two inches of rain as last century.<sup>14</sup>

Average annual temperatures in Maine have increased by 3.2°F over the past 124 years, with the most notable increases occurring since 1960. The Northeast is warming more rapidly than the rest of the world and is expected to have reached 5.4°F (3°C) of warming when the average global warming reaches 3.6°F (2°C).<sup>15</sup> The Gulf of Maine is warming faster than 99% of ocean area worldwide,<sup>16</sup> and our winters have shortened by at least 2 weeks in the past century.<sup>17</sup> Maine now experiences 5 more days of thaw, 9 more days of bare ground, 10 more days of mud, and 4-12 more days of insect survival than it did 100 years ago.<sup>18</sup>

Last summer, sunsets were blood-red due to smoke from fires in the western United States. This summer, Maine's air quality reached dangerous levels due to unprecedented fires in Canada.<sup>19</sup> Maine people and communities are already experiencing the impacts of climate change. We are fortunate to have strong state policies put in place in the past two years, but we must take the necessary steps, like the adoption of the ACT program, to implement them with diligence.

### **Maine has a History of Adopting Strong Emissions Standards**

The Federal Clean Air Act (CAA) establishes the framework for controlling mobile source emissions in the United States. While the law generally preempts states from adopting their own emissions standards, the CAA grants California a special exemption to do so as long as the state standards are at least as protective as the federal standards.<sup>9</sup> Section 177 of the CAA authorizes other states to adopt the California standards if they are identical to California's standards, and so long as states provide vehicle manufacturers at least two model years' lead time before enforcement.<sup>10</sup>

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<sup>8</sup> <https://runonless.com/wp-content/uploads/RoL-E-Infographic-HZ.pdf>

<sup>9</sup> 42 U.S.C. § 7543.

<sup>10</sup> Id. § 7507.

Thirty years ago, Maine’s Legislature specifically authorized the Department to adopt California’s vehicle emissions standards consistent with the CAA.<sup>11</sup> This authority is bolstered by even longer-standing general grants of jurisdiction over emission standards and air quality. The Department has exercised these authorities on numerous occasions. Maine first adopted California’s vehicle emission standards in 1993, impacting model years beginning in 2001, including emissions standards for medium and heavy duty trucks.<sup>12</sup>

Since then, the Department has periodically amended its rules to remain consistent with California’s emission standards in compliance with the CAA. In 2012, for instance, the Department amended Chapter 127, New Motor Vehicle Emission Standards, to adopt motor vehicle emission standards for criteria pollutants for model years 2015-2025 and greenhouse gases for model years 2017-2025.<sup>13</sup> The 2012 amendment also revised the state’s Zero Emission Vehicle requirements, improved vehicle labeling requirements, and amended greenhouse gas standards for passenger vehicles.

Most recently, in 2021 the Department proposed that the Board of Environmental Protection adopt a new chapter incorporating California’s Advanced Clean Trucks regulation encouraging the sale of electric medium- and heavy-duty vehicles.<sup>14</sup> The Board conducted a hearing and accepted public comment on the proposed rule and held a deliberative session. Ultimately, the Board allowed the rulemaking to expire under the Administrative Procedure Act to await the outcome of a stakeholder engagement process.

### **Maine MHD Stakeholder Group**

Following the initial ACT rulemaking in 2021, the Governor's Office of Policy Innovation and the Future (GOPIF) assembled a Medium- and Heavy-Duty Stakeholder Group to exchange ideas between industry stakeholders about zero emissions medium- and heavy-duty vehicles, with a focus on electric vehicle charging and the proposed ACT rule. The group met throughout the course of 2022, connecting industry leaders with electrification experts to review the progress toward zero emission medium- and heavy-duty vehicles and discuss implementation strategies.

The Maine Motor Transport Association reported that through these stakeholder meetings, they believe leaders in Maine have “heard and understand our concerns and we have no indication this has changed.”<sup>15</sup> Maine is ready for this program, and we are confident that Maine’s leadership will continue to work with the business community to ensure that the transition to zero emission vehicles is smooth and economically beneficial.

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<sup>11</sup> An Act Regarding Automobile Air Emission Standards, P.L. 1993, ch. 358, § 1 (codified as amended at 38 M.R.S. § 585-D).

<sup>12</sup> 06-096 C.M.R. ch. 127 (Feb. 17, 1993) (amended 1994).

<sup>13</sup> 06-096 C.M.R. ch. 127 (Dec. 12, 2012) (amended 2013).

<sup>14</sup> Me. Dep’t of Env’t Prot., Rulemaking Fact Sheet 06-096 Chapter 128, Advanced Clean Trucks Program (2021).

<sup>15</sup> <https://www.mmta.com/petition-filed-to-have-maine-adopt-ca-advanced-clean-trucks-rule/>

## **Multi-State Medium- and Heavy-Duty Zero Emission Vehicle Memorandum of Understanding**

In 2020, Maine joined 16 other states and the District of Columbia in signing a Multi-State Medium- and Heavy-Duty Zero Emission Vehicle Memorandum of Understanding<sup>16</sup> committing signatory states to “agree to work together to foster a self-sustaining market for zero emission medium- and heavy-duty vehicles.” The memorandum explicitly recommends adoption of the Advanced Clean Trucks Standard for all Section 177 states, and sets a stand-alone goal of 30% new medium- and heavy-duty vehicle sales being zero emission vehicles by 2030.

The Multi-State Medium- and Heavy-Duty Zero Emission Vehicle Memorandum of Understanding, in conjunction with Maine’s Medium- and Heavy-Duty Stakeholder Group and the recommendations outlined in Maine’s Clean Transportation Roadmap, have positioned Maine to adopt the ACT standard. Maine leadership has made commitments to transition our medium- and heavy-duty vehicles to zero emission, and our state has undergone the research and public engagement processes to ensure that this standard will be feasible and beneficial for Maine people and businesses.

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## **ACT will Increase Vehicle Choice and Availability for Maine Towns, Schools, and Businesses**

The ACT standard will ensure that manufacturers provide medium- and heavy-duty zero emission vehicles (MHDZEVs) at an accessible price point for Maine individuals, businesses, municipalities, and schools in order to meet annual sales requirements. The program will require 55% of Class 2b – 3 truck sales, 75% of Class 4 – 8 straight truck sales, and 40% of truck tractor sales to be zero emission vehicles by 2035.<sup>17</sup> As such, the standard will increase availability for Maine buyers without requiring any individual, business, or other entity to purchase a zero-emission truck if it does not suit their particular uses.

A number of incentives currently available are compatible with the MHDZEV ramp called for by the ACT standard. The Inflation Reduction Act passed in 2022 allocated over \$1 billion to replace dirty heavy-duty vehicles with clean, zero-emission vehicles, support zero-emission vehicle infrastructure, and to train and develop workers.<sup>18</sup> This funding is being distributed in a number of ways, including through rebates, grants, tax credits, and support for technical training and zero-emission infrastructure. As of January 2023, commercial buyers are now eligible for a \$40,000 tax credit for the purchase of clean trucks greater than 14,000 pounds.<sup>19</sup> Here in Maine, additional state rebates are available for businesses seeking to purchase electric trucks at

<sup>16</sup> <https://www.nescaum.org/documents/mhdv-zev-mou-20220329.pdf>

<sup>17</sup> <https://ww2.arb.ca.gov/resources/fact-sheets/advanced-clean-trucks-fact-sheet>

<sup>18</sup> <https://www.epa.gov/inflation-reduction-act/clean-heavy-duty-vehicle-program>

<sup>19</sup> <https://afdc.energy.gov/laws/13039>

participating dealerships. Businesses can receive up to \$5,000 off for an all electric van (chassis cab or cutaway) and \$8,000 off an all-electric cargo van.<sup>20</sup>

An independent study of the impact of engine regulations on heavy-duty vehicle sales found that previous truck pollution standards did not significantly impact vehicle sales, production, or employment in the industry.<sup>21</sup> Truck pollution standards provide several years of lead time for the market to adapt, and it has always responded accordingly in the past.

Maine has already seen success in increasing deployment in one segment of the trucks and buses through the EPA's new Clean School Bus program. Funded by the Bipartisan Infrastructure Law, Maine was granted 34 buses in the first round of the program, more than any other New England state and the 4<sup>th</sup> most of any state in the nation.<sup>22</sup> The Maine Clean School Bus program has been created to assist school districts in participating in the next round of funding, which is now open.<sup>23</sup> Mount Desert Island School District was the first school district in Maine to operate an electric school bus, and the Maine Department of Education tracked the vehicle's performance over the first year of deployment. The study they released found that the bus was effectively able to complete both of its routes throughout the school year, and ultimately saved the school district over 50% on cost relative to an equivalent gas-powered bus.<sup>24</sup> This equates to approximately 30,000 pounds of greenhouse gas emissions avoided and over 2,400 gallons of diesel fuel saved.<sup>25</sup> The success of the clean school bus program evidences the efficacy of MHDEV deployment in Maine and can be used as a helpful model by which to inform the MHDEV transition.

## Health Benefits

Medium- and heavy-duty trucks are some of the dirtiest vehicles on the road. They were only 6% of the vehicles on the road in 2020 but generated 59% of ozone- and particle-forming NOx emissions and 55% of particulate pollution.<sup>26</sup>

An analysis by the International Council on Clean Transportation found that by adopting the ACT and Heavy-Duty Omnibus rules, Maine could reduce medium- and heavy-duty vehicle NOx emissions by 28,730 tons, PM emissions by 182 tons, and well-to-wheel CO2 emissions by 22.13 million metric tons by 2050. Maine can also expect these MHDV emission reductions to result in avoided deaths, as well as costly hospital visits and sick days.<sup>27</sup> According to a Clean Air Task Force analysis, diesel pollution from heavy-duty vehicles costs Mainers \$290,634,197

<sup>20</sup> <https://afdc.energy.gov/laws/all?state=ME>

<sup>21</sup> <https://www.erm.com/hdv-prebuy-report-oct2022/>

<sup>22</sup> <https://www.epa.gov/cleanschoolbus/awarded-clean-school-bus-program-rebates>

<sup>23</sup> <https://www.maine.gov/doe/transportation/cleanbus>

<sup>24</sup> [https://www.maine.gov/doe/sites/maine.gov/doe/files/2022-11/MDI%20High%20School\\_Rural%20Bus%20Electrification\\_Case%20Study%202022.pdf](https://www.maine.gov/doe/sites/maine.gov/doe/files/2022-11/MDI%20High%20School_Rural%20Bus%20Electrification_Case%20Study%202022.pdf)

<sup>25</sup> <https://www.newscentermaine.com/article/news/education/electric-school-bus-mount-desert-island/97-ee50e54b-4995-4b41-af2d-d956f7a279bd>

<sup>26</sup> <https://www.lung.org/getmedia/e1ff935b-a935-4f49-91e5-151f1e643124/zero-emission-truck-report>

<sup>27</sup> <https://theicct.org/wp-content/uploads/2022/09/HDV-fact-sheet-ME-092122.pdf>

in health care costs, 1,032 lost work days, and 6,194 days where poor air quality restricts activity each year.<sup>28</sup>

Communities of color and low-income communities often bear the brunt of the health impact from vehicular pollution. According to the American Lung Association, “approximately 45% of residents living in counties with major truck traffic are people of color.”<sup>29</sup> The same report found that living within just one-third of a mile of a highway or close to ports, warehouse distribution centers, or other freight corridors is devastating for lung health and can lead to early death. Transitioning to clean trucks through the ACT standard will help to reduce these health disparities.

The American Lung Association’s (ALA) “State of the Air” 2023 report found that over 35 percent of all Americans, approximately 120 million people, live in areas impacted by unhealthy levels of ozone and/or particle pollution. People of color make up the majority of those living in communities with unhealthy air. The report also notes that a person of color is 64 percent more likely than a white person to live in a community impacted by unhealthy air and 3.7 times more likely to live with the most polluted air in the United States.<sup>30</sup> The report directly recommends the adoption of ACT as a top solution to address these concerns.

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### **Manufacturer and Vehicle Market Trends Align with ACT Adoption**

Global model availability for MHDZEVs rose from 609 models to 808 models available for purchase between 2021 until the end of 2022. Additionally, CALSTART estimates that the United States and Canada will experience steady growth from 166 models to 213 models available for purchase by the end of 2023.<sup>31</sup> These include trucks of all classes and uses, for example Burlington, VT operates an all-electric fire truck<sup>32</sup> and bucket truck<sup>33</sup>, and Portland, Maine is expecting delivery of their first all-electric refuse truck in the fall of 2023.<sup>34</sup>

A 2022 study conducted by Roush Industries evaluated the cost of electrifying vehicles in several medium- and heavy-duty market segments such as class 8 transit and class 7 school buses, class 3-7 shuttles & delivery vehicles, and class 8 refuse haulers. The study found that by 2027, when considering vehicle purchase price alone, EV’s are favored in all categories except shuttle buses, and favored in all categories in total cost of ownership when purchased in 2027, when the proposed adoption of the ACT sales standards would take effect in Maine.<sup>35</sup>

<sup>28</sup> <https://www.catf.us/deathsbydiesel/>

<sup>29</sup> <https://www.lung.org/getmedia/e1ff935b-a935-4f49-91e5-151f1e643124/zero-emission-truck-report>

<sup>30</sup> <https://www.lung.org/getmedia/9e9947ea-d4a6-476c-9c78-ccc7d49ffe2/ala-driving-to-clean-air-report.pdf>

<sup>31</sup> [https://www.edf.org/sites/default/files/2023-](https://www.edf.org/sites/default/files/2023-05/Electric%20Vehicle%20Market%20Update%20April%202023.pdf)

[05/Electric%20Vehicle%20Market%20Update%20April%202023.pdf](https://www.edf.org/sites/default/files/2023-05/Electric%20Vehicle%20Market%20Update%20April%202023.pdf)

<sup>32</sup> <https://www.wcax.com/2020/09/23/burlington-fire-department-adds-electric-vehicle-to-their-fleet/>

<sup>33</sup> <https://www.burlingtonvt.gov/Press/burlington-unveils-vermont%E2%80%99s-first-all-electric-bucket-truck>

<sup>34</sup> <https://wgme.com/news/local/portland-ditches-diesel-buys-electric-garbage-trucks>

<sup>35</sup> [https://blogs.edf.org/climate411/wp-content/blogs.dir/7/files/2022/02/EDF-MDHD-Electrification-v1.6\\_20220209.pdf](https://blogs.edf.org/climate411/wp-content/blogs.dir/7/files/2022/02/EDF-MDHD-Electrification-v1.6_20220209.pdf)

Businesses, fleet owners, and industry service providers are investing in the zero-emission truck space. USPS announced recently that it will purchase an additional 9,250 Ford E-Transit electric delivery vans. Pride Group, the second largest refuse fleet in the U.S., ordered 200 Freightliner eCascadia Class 8 electric trucks and 50 Freightliner eM2 Class 6-7 electric trucks starting in mid-2023, with the intention of switching its local delivery fleet to 100 percent EVs within the next one to two years.<sup>36</sup> Amazon.com has 5,000 electric delivery vans in service, out of a commitment to deploy 100,000 by 2030, and is piloting class 8 electric trucks as well.<sup>37</sup> Here in Maine, the Portland-based company WEX announced a \$100 million investment in EV adoption and infrastructure development by 2025.<sup>38</sup> Businesses such as these are rational actors behaving in the best interest of their bottom lines, and they are already seeing the value of electrification for their transportation needs.

Globally, \$860 billion has been invested in EV manufacturing and infrastructure, with the United States representing nearly a quarter (\$210 billion) of that total.<sup>33</sup> Unprecedented investments in transportation electrification through the Infrastructure Investment and Jobs Act<sup>34</sup> and Inflation Reduction Act<sup>35</sup> have spurred significant investments over the past two years. Since the signing of the Inflation Reduction Act a year ago this month, 62 new EV supply chain projects specifically have been announced in the United States alone, including assembly facilities, battery factories, and battery cell production, totaling \$52.7 billion in new investments.<sup>36</sup> While many of these investments are targeted at the more mature light-duty market, they are part of the rapidly growing electric vehicle supply chain that will support the electrification of heavier duty vehicles as well. Adopting the ACT program will allow Maine to participate in this global transition, and failing to pass this standard would put Maine well behind the curve.

The largest trucks, such as class 8 long-haul tractor trailers, are the most challenging to electrify, and thus have the slowest sales ramp for any class under the ACT standard. However, even this market segment is rapidly electrifying, and a recent report by the International Council on Clean Transportation found that by 2030, the total cost of ownership of battery electric long-haul trucks will likely be lower than that of their diesel counterparts.<sup>39</sup> Despite their higher upfront price today, battery electric trucks have substantially lower operational expenses than the other trucks studied due to their higher energy efficiency and lower maintenance costs. For smaller vehicles, cost parity will be achieved even more rapidly.

As can be seen in a study conducted by the International Council on Clean Transportation, the ACT regulation would lead to a projected 21,426 MHDEVs on the road by 2035 relative to a projected 97,594 MHD ICE vehicles on the road at the same time.<sup>40</sup> The standard would catalyze adoption of MHDEVs for use cases that are viable for electrification, but would not do away

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<sup>36</sup> <https://www.edf.org/sites/default/files/2023-05/Electric%20Vehicle%20Market%20Update%20April%202023.pdf>

<sup>37</sup> <https://www.fleetowner.com/emissions-efficiency/media-gallery/21269714/amazon-now-has-5000-rivian-electric-delivery-vans-in-us-fleet>

<sup>38</sup> <https://www.newscentermaine.com/article/tech/wex-to-invest-100-million-in-electric-vehicle-transition-portland-maine/97-0c1ffa34-d4c6-4592-a636-403a510ba733>

<sup>39</sup> <https://theicct.org/publication/tco-alt-powertrain-long-haul-trucks-us-apr23/>

<sup>40</sup> <https://theicct.org/wp-content/uploads/2022/09/HDV-fact-sheet-ME-092122.pdf>

with MHD ICE vehicles or prevent businesses from purchasing ICE vehicles for the foreseeable future.

**The ACT sales thresholds are achievable in Maine**

Maine is a rural state with unique characteristics and unique industries. However, medium and heavy duty vehicle sales data in Maine show clearly that while adopting the ACT program will provide an important benefits for Maine in terms of emissions reductions, health improvements, and cost savings for vehicle owners, the standards will not have a negative impact on existing MHD vehicle owners no matter their vehicle needs.

In 2019, approximately 9,000 medium and heavy duty vehicles were sold in Maine. Of those, 7,900, or 88% were class 2B and 3 vehicles, 692, or 8% were class 4-8, and 390, or 4% were class 7-8 tractors. An NRDC analysis projected that under the ACT, the actual number of MHDZEVs sold in Maine remains modest. In model year 2027, when the ACT as proposed would take effect, there would be 1,388 class 2B and 3 ZEV trucks and vans sold, 32 class 4-5 ZEVs sold, 119 class 6-7 ZEVs sold, and only 69 class 7-8 tractor ZEVs sold, for a total of 1,619 vehicles.

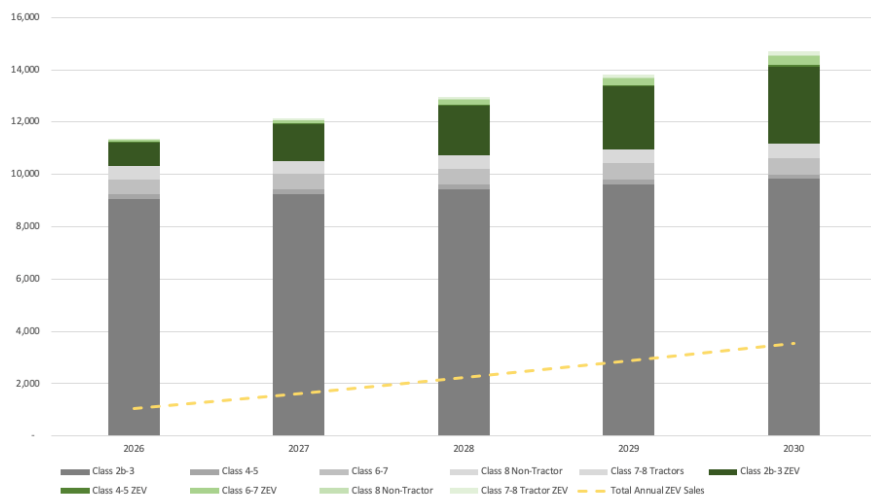
**Projected Maine ZEV ACT Sales: 2026-2030**

	Class 2b-3	Class 4-5	Class 6-7	Class 8 Non-Tractor	Class 7-8 Tractors	Class 2b-3 ZEV	Class 4-5 ZEV	Class 6-7 ZEV	Class 8 Non-Tractor	Class 7-8 Tractor ZEV	Annual ZEV Sales
2026	9,075	159	585	52	448	907	21	76	7	45	1,056
2027	9,256	162	596	53	457	1,388	32	119	11	69	1,619
2028	9,441	165	608	54	466	1,888	49	182	16	93	2,230
2029	9,630	168	620	55	475	2,408	67	248	22	119	2,864
2030	9,823	172	633	56	485	2,947	86	316	28	145	3,522

The analysis further finds that through the end of the decade, combustion engine MHD vehicle sales actually continue to grow slowly, with MHDZEV sales taking up most of the rest of vehicles sales growth.



## Projected Maine ZEV ACT Sales: 2026-2030



The slow ramp of MHDZEV vehicle sales requirements and compliance flexibilities built into the program are designed to ensure users with specific needs will have no difficulty finding vehicles that meet their needs as the market continues to grow and mature.

### Compliance Flexibility

The ACT standard employs a number of compliance flexibilities to ensure that manufacturers can hit the annual zero-emission targets every year. The credit system allows manufacturers to bank and trade credits, enabling compliance across manufacturers. Further, class 2b-8 (non-tractor trailer) credits can be used interchangeably, so if a manufacturer excels in producing a certain class (say 2b) over another class (say 4-6), the manufacturer will not be penalized. Class 7 and 8 tractor trailer credits are walled off, but the ramp for those heavy-duty trucks is much less aggressive than the other classes, beginning at 15% for model year 2027 and advancing to 40% by model year 2035.<sup>41</sup> An analysis by the International Council on Clean Transportation shares several compliance examples to demonstrate the flexibility built into the rule for manufacturers.<sup>42</sup> This flexibility also ensures that the use cases that are easiest to electrify will be delivered first, while the use cases that are more challenging to electrify will have more time to reach technological and market maturity.

<sup>41</sup> <https://theicct.org/sites/default/files/publications/CA-HDV-EV-policy-update-jul212020.pdf>

<sup>42</sup> <https://theicct.org/sites/default/files/publications/CA-HDV-EV-policy-update-jul212020.pdf>

Unlike the ACCII, the manufacturer sale numbers under the ACT are based on vehicles sold in the state of Maine to the ultimate purchaser, so manufacturers will only receive credit once the vehicle has been delivered to the person or business that will put it to use. This places no additional strain on dealerships to meet sales requirements. Further, the rule is fuel neutral, which allows for innovation in the market to develop cost-effective ZEV solutions that may not be battery-powered, such as hydrogen fuel cell vehicles.

Here in Maine, over half of all medium- and heavy-duty vehicles are class 2b-3, a market segment that is easily electrified and already has dozens of available models to choose from. The ACT standard is designed to catalyze the transition to zero-emission vehicles, but it will not force any individual or business to purchase a ZEV. Sales requirements never reach 100% for any vehicle class, and the standard incentivizes manufacturers to provide the vehicles that are easiest to electrify first, pushing the market toward ZEVs and reducing emissions and tailpipe pollution without placing undue burden on businesses or forcing premature adoption of use cases that are more challenging to electrify. The following compliance scenarios assembled by NRDC illustrate the various ways a manufacturer could comply with ACT sales requirements. Note that this hypothetical manufacturer sells 2,200 vehicles in Maine, which would equate to nearly a quarter of all current MHDV sales in Maine.

### Example Compliance Scenarios

Annual Sales	Class 2b-3	Class 4-5	Class 6-7	Class 8 Non-Tractor	Class 7-8 Tractor	Total
Truck Maker	2,000	100	50	0	50	2,200 vehicles
MY 2026 Deficit	160 = 2,000*10%*0.8	65 = 100*13%*1	9.75 = 50*13%*1.5	0	12.5 = 50*10%*2.5	234.75 non-tractor deficit 12.5 tractor deficit
Scenario 1	Sold 200 ZEVs = 160 credits (200*0.8 = 160)	Sold 65 ZEVs = 65 credits (65*1 = 65)	Sold 7 ZEVs = 10.5 credits (7*1.5 = 10.5)	0	Sold 5 ZEVs = 12.5 credits (5*2.5 = 12.5)	Class 2b-3 = 200 Class 4-8 = 72 Class 7-8 Tractors = 5 Total ZEVs = 277
Scenario 2	0	0	Sold 157 ZEVs = 235.5 credits (157*1.5 = 235.5)	0	Sold 5 ZEVs = 12.5 credits	Class 2b-3 = 0 Class 4-8 = 157 Class 7-8 Tractors = 5 Total ZEVs = 162
Scenario 3	Sold 300 ZEVs = 240 credits (300*0.8 = 240)	Sold 60 ZEVs = 60 credits (60*1 = 60)	Sold 20 ZEVs = 30 credits (20*1.5 = 30)	Sold 10 ZEVs = 20 credits (10*2 = 20)	Sold 10 ZEVs = 25 credits (10*2.5 = 25)	Class 2b-3 = 300 Class 4-8 = 90 Class 7-8 = 10 Total ZEVs = 400 <i>Can sell or save: 115.25 non-tractor credits 12.5 tractor credits</i>

Weight Class Modifiers				
Class 2b-3	Class 4-5	Class 6-7	Class 8 Non-Tractor	Class 7-8 Tractor
0.8	1	1.5	2	2.5

### Infrastructure Investment and Readiness

Maine’s EV charging network is rapidly expanding alongside the state’s population of EVs. MHDZEVs have larger batteries than light-duty EVs, however many vehicle classes, including the class 2b and 3 trucks and vans, will use the same charging infrastructure.

In 2019, Maine had 164 public charging stations (357 ports, Level 2 or DCFC).<sup>43</sup> As of July 2023, that number has risen to 435 charging stations (915 ports, Level 2 or DCFC)<sup>44</sup>, with more coming online regularly thanks to Maine's Plan for Electric Vehicle Infrastructure Deployment (PEVID).<sup>45</sup> That plan outlines Maine's EV charging goals and deployment strategy, identifying a total need of \$42 million to attain the EV charging goals outlined in Maine's Climate Action Plan.<sup>46</sup> \$19 million of that total has already been attained through a successful National Electric Vehicle Investment (NEVI) grant award funded through the Bipartisan Infrastructure Law in 2022. MainedOT, Efficiency Maine, the Governor's Office of Policy Innovation and the Future, the Governor's Energy Office, and the Maine DEP are currently assembling an application, due in the fall, to receive an additional \$15 million through the Charging and Fueling Infrastructure (CFI) discretionary grant program.<sup>47</sup>

MHDZEVs' larger battery capacities will consume more energy and thus demand more from the electric distribution grid than light-duty EVs, however the demand from MHDZEVs, will not exceed Maine's grid capacity. Total demand from MHDZEVs by 2030 is not projected to exceed 1 percent of today's retail electricity sales, and 85 percent of the energy needs of long-haul tractors by 2030 can be met national charging network of electric truck depots with an average capacity of 10 MW (2.9-22 MW) along the National Highway Freight Network, which is already in direct alignment with Maine's EV charging network expansion under NEVI.<sup>48</sup> Further, current battery electric tractor trailers achieve around 13 miles per gallon in diesel equivalent, relative to 7 miles per gallon for their diesel counterparts, with that number expecting to grow to 18 miles per gallon by 2030.<sup>49</sup> Even in the use cases that are most challenging to electrify, MHDEVs are outperforming their ICE counterparts.

## Grid Readiness

Transitioning to an electrified transportation sector will require significant attention to Maine electricity system as end-use energy moves from gasoline and diesel to electricity. In some cases, additional demands from EV charging could eventually strain the distribution grid in some locations. There is, however, also significant opportunity to increase grid reliability and lower ratepayer costs by taking advantage of the significant distributed energy storage capacity in EV batteries, smoothing electricity demand through managed or timed charging, and by spreading fixed grid costs over a larger volume of electricity sales.<sup>75</sup> For example, many EVs will be charged at home overnight, which could give EV owners access to lower rates, as well as take advantage of new renewable energy sources like offshore wind power, which generates the most

<sup>43</sup> [https://www.maine.gov/future/sites/maine.gov.future/files/inline-files/MaineWontWait\\_OneYearProgressReport\\_SinglePgs.pdf](https://www.maine.gov/future/sites/maine.gov.future/files/inline-files/MaineWontWait_OneYearProgressReport_SinglePgs.pdf)

<sup>44</sup> <https://www.efficiencymaine.com/charging-station-locator/#/analyze?fuel=ELEC&region=US-ME>

<sup>45</sup> <https://www.maine.gov/mdot/climate/docs/pevid-2022.pdf>

<sup>46</sup> <https://uploads.mainedotpima.com/e477f241-67ab-4054-b753-4cab7697dbe7.pdf>

<sup>47</sup> <https://uploads.mainedotpima.com/e477f241-67ab-4054-b753-4cab7697dbe7.pdf>

<sup>48</sup> <https://theicct.org/as-commercial-trucks-go-electric-industrial-scale-charging-infrastructure-will-lay-the-foundation-for-zero-emission-freight>

<sup>49</sup> <https://theicct.org/publication/tco-alt-powertrain-long-haul-trucks-us-apr23/>

energy at night. Dan Burgess, the director of the Governor’s Energy Office, testified to the Board of Environmental Protection on July 20<sup>th</sup> that for the next 10 years, Maine’s electric grid had the “headroom” needed to support the adoption of electric vehicles -- including medium and heavy-duty vehicles -- in line with Maine’s climate action plan.<sup>50</sup>

Maine has taken major strides in the past few years in preparing for grid expansion that will inevitably be needed as we continue to electrify our economy. In 2022, Maine passed LD 1959, An Act To Ensure Transmission and Distribution Utility Accountability.<sup>76</sup> In addition to accountability measures for utilities, the bill requires utilities to incorporate climate change into their planned investments in the distribution grid and directs the Public Utilities Commission (PUC) to oversee an integrated grid planning process that projects grid needs given additional demand generated by beneficial electrification. Notably, LD 1959 required the PUC and Maine’s utilities to not only take into account Maine’s greenhouse gas reduction requirements, but explicitly includes the climate policies included in Maine’s climate action plan. As our grid becomes increasingly dynamic through the addition of clean energy like wind and solar produced here in Maine and networked devices like smart EV chargers and internet-enabled thermostats, a distributed network of EV batteries will create additional storage capacity that can be used to increase grid flexibility and lower total cost to ratepayers. Vehicle-to-grid, or bidirectional charging, is an EV capability that is increasingly being shown to be a viable grid management tool.<sup>77</sup> While plugged in to a networked charger, EVs with vehicle-to-grid capability have the ability to send energy back to the grid during times of need and reverse the flow of charge when appropriate to ensure that the vehicle is adequately charged. The larger the battery in the vehicle, the more capacity it has to provide power to the grid when needed.

This legislative session, the Maine Legislature passed LD 519 (Resolve, to Conduct a Vehicle-to-grid Pilot Project Using Electric School Buses).<sup>78</sup> The bill directs Efficiency Maine to design a vehicle-to-grid pilot project using the 11 electric school buses delivered to the Wells-Ogunquit Community School District, which will provide important insights into the value of vehicle-to-grid technology for Maine as we undertake an EV transition.

### **Growing Maine’s Clean Energy Workforce**

In addition to the climate and health benefits accrued through adoption of ACCII, the standard will also play a significant role in growing Maine’s clean energy workforce. A new study by the Economic Policy Institute found that the transition to EVs could create up to 150,000 new jobs nationwide by 2030 if appropriate policies are implemented soon to secure US leadership on EV manufacturing and adoption.<sup>72</sup> Several technical schools in Maine, including Southern Maine Community College and Washington County Community College, have recently launched EV

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<sup>50</sup> Director Burgess offered this testimony in response to a question, however his full presentation on the grid implications of vehicle electrification and the presentations of others is included as Appendix A. Director Burgess’ slides are pages 55-73 of the appendix.

repair programs designed to train technicians how to effectively service EVs at auto repair shops, auto dealers, and other vehicle-related businesses.<sup>73</sup>

While ZEVs require less maintenance than their combustion engine counterparts, routine mechanical upkeep such as rotating tires, braking systems, and body work will continue to be necessary, and can be performed by existing mechanics and auto-body repair shops. Further, even with the ACCII and ACT rules in place, around 60% of vehicles on Maine roads by 2035 are projected to still be ICE vehicles,<sup>74</sup> showing that the need for ICE mechanics and associated jobs will continue to be needed for the foreseeable future. The ACCII standard will bring more EV technician positions into the job market without displacing existing ICE repair positions in the immediate future.

### **Fire Safety**

Lithium-ion battery fires behave differently than gasoline fires, which has led to confusion and misinformation in the public discourse. It is true that managing a battery fire requires different resources and protocol for emergency responders than combustion engine fires. The National Fire Protection Agency (NFPA) has emergency response guides for more than 35 alternative fuel vehicle manufacturers<sup>79</sup> and has trained more than 250,000 firefighters in the US on how to respond to EV fires through their National Transportation Safety Board (NTSB) recommended training program.<sup>80</sup> There are still many more firefighters that need training, and that training must accompany EV adoption here in Maine. Adopting the ACT program will help to remove any uncertainty in the public safety community that efforts to expand this training should be taken as soon as possible.

However, the data available for cars and light-duty trucks shows that EVs are much less likely to catch fire than their combustion engine counterparts on a unit-to-unit basis. The most recent study conducted by the NTSB found an incidence of 25.1 EV fires per 100,000 EV sales, versus 1,529.9 fires per 100,000 combustion engine sales.<sup>81</sup>

### **EV Battery Recycling and Disposal**

Unlike ICE vehicles that burn through hydrocarbons to generate energy, batteries retain their mineral composition throughout the course of their usable life. An EV battery pack is assumed to be at the end of its life when it has no more than 70-75% of its original capacity (and under ACCII, manufacturers are required to ensure that their vehicles retain at least 75% of original capacity for at least 10 years or 150,000 miles, whichever comes first).<sup>82</sup> Once the end of life is reached, batteries can be recycled to reuse the various minerals contained within to create new batteries. Several battery recycling companies have partnered with EV manufacturers lately to ensure proper recycling and reuse of battery components. For example, the company Redwood Materials received a \$2 billion loan from the US Department of Energy to build a battery recycling facility in Nevada.<sup>83</sup> The Inflation Reduction Act provides massive incentives for domestic battery production in the US, and the domestic requirements for federal EV tax credits

further incentivizes battery recycling. Under the Inflation Reduction Act, while an EV battery's metals may have come from another country when they were first mined, once a U.S. recycler separates the cells back into their component metals, those repurposed minerals are now considered to be from the US and eligible for EV purchase incentives.<sup>84</sup>

It is also worth noting that a typical EV battery can still offer substantial storage when it reaches the end of its usable life in an EV. At 75% capacity, an EV battery still has up to 90 kilowatt-hours of energy storage, enough to power the typical American home for 3 days.<sup>85</sup> A second-use market for old battery packs has not yet been established at scale, but demonstration projects for used batteries have popped up around the world. At this rate, battery prices are so low that it may not be economically viable to repurpose used batteries. Rather, old batteries will be recycled for their component minerals, which can be reused in future batteries.

### **ACT in Other States**

The ACT program has been adopted in 8 other states (California, Washington, Oregon, New York, Vermont, New Jersey, Vermont, and Massachusetts) and is being considered by several others.

If Maine does not adopt ACT this year, manufacturers will prioritize the other states that have already done so, leaving Maine businesses and vehicle operators behind. We know this to be true given evidence following adoption of the zero emission vehicle requirements under the original Advanced Clean Cars (ACC) standard. Between 2011 and 2020, two thirds of total US zero-emission vehicle sales occurred in the 12 states that had adopted ACC.<sup>51</sup> Manufacturers respond to policy incentives, and Maine needs to act this year to ensure more vehicle choices are available for purchase in the state.

### **Conclusion**

NRCM has been working for more than 60 years to protect, restore, and conserve Maine's environment, and today, that means one of our central priorities is addressing the threat of climate change. Adopting the proposed ACT standard before you is an essential part of ensuring that Maine is able to achieve its statutory emissions reduction goals, while also coming with significant clean air and public health benefits for Maine and Maine residents. This proposal is flexible and achievable, and will help ensure that Maine isn't left behind as the auto industry transitions to lower-polluting vehicles that are less expensive to operate and maintain. On behalf of our 25,000 members and supporters, I urge you to adopt this proposal.

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<sup>51</sup> [https://blogs.edf.org/climate411/wp-content/blogs.dir/7/files/2022/04/electric\\_vehicle\\_market\\_report\\_v6\\_april2022.pdf](https://blogs.edf.org/climate411/wp-content/blogs.dir/7/files/2022/04/electric_vehicle_market_report_v6_april2022.pdf) page 14