Proposed Medium- and Heavy-Duty Vehicle Rules in Vermont

Vermont Agency of Natural Resources

September 2022

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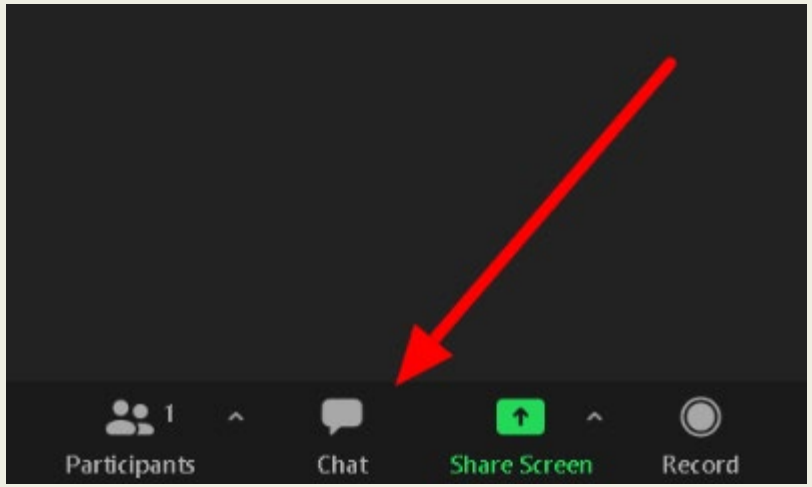
Today's Meeting Logistics

- Meeting is being recorded
- Slides and recording will be made available following the meeting: https://dec.vermont.gov/air-quality/laws/recent-regs
- Hold questions until after the presentation
- Type your name in the chat to be called on to ask a question or make a comment following the presentation



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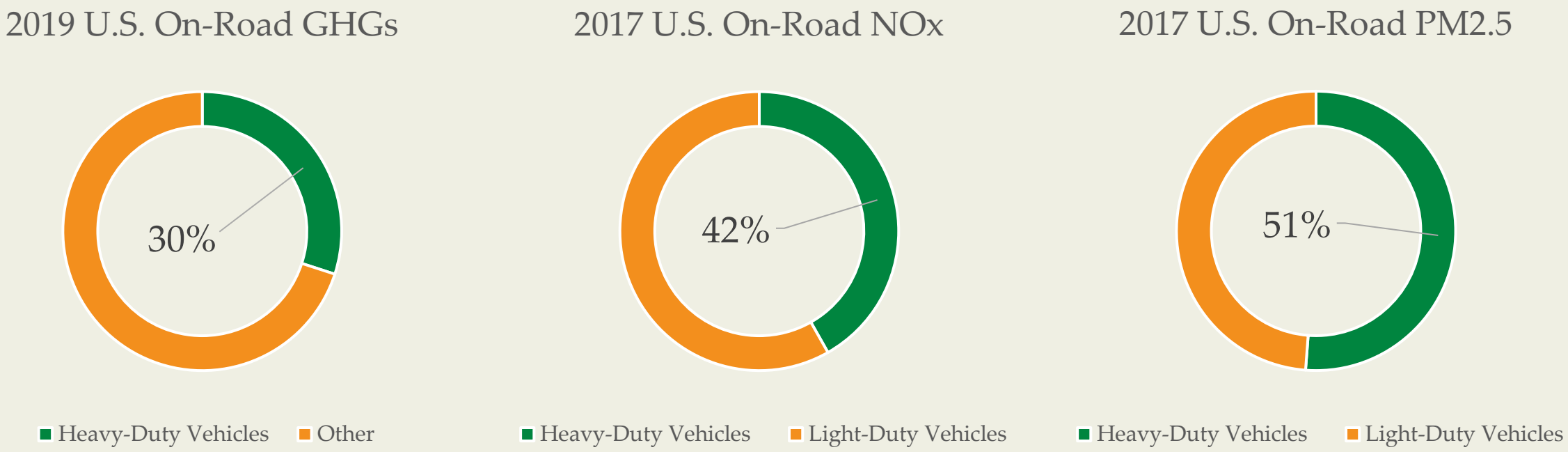
Agenda

- Welcome – Vermont Clean Cities Coalition
- Introduction & background on the proposed rules – Agency of Natural Resources (ANR)
- A closer look at the proposed rules – Northeast States for Coordinated Air Use Management (NESCAUM)
- Impacts & benefits of the proposed rules - ANR
- Questions and Discussion

What is the rule about?

- These rules are requirements for vehicle manufacturers to sell MHD zero emission vehicles as an increasing percentage of their annual sales.
- These rules are requirements for manufacturers to deliver for sale new MHD vehicles and emit less particulate matter, ozone-forming contaminants, and greenhouse gases.
- These rules allow for continued sale of fossil fueled vehicles beyond 2035.
- This is NOT an electric vehicle purchase mandate.

Medium- and Heavy-Duty Vehicles Disproportionately Contribute to Emissions



Sources: U.S. EPA, U.S. Greenhouse Gas Emissions and Sinks 1990-2019 (Apr. 2021), https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2019; and U.S. EPA, 2017 National Emissions Inventory: January 2021 Updated Release, Technical Support Document (Jan. 2021), https://www.epa.gov/sites/default/files/2021-02/documents/nei2017_tsd_full_jan2021.pdf.

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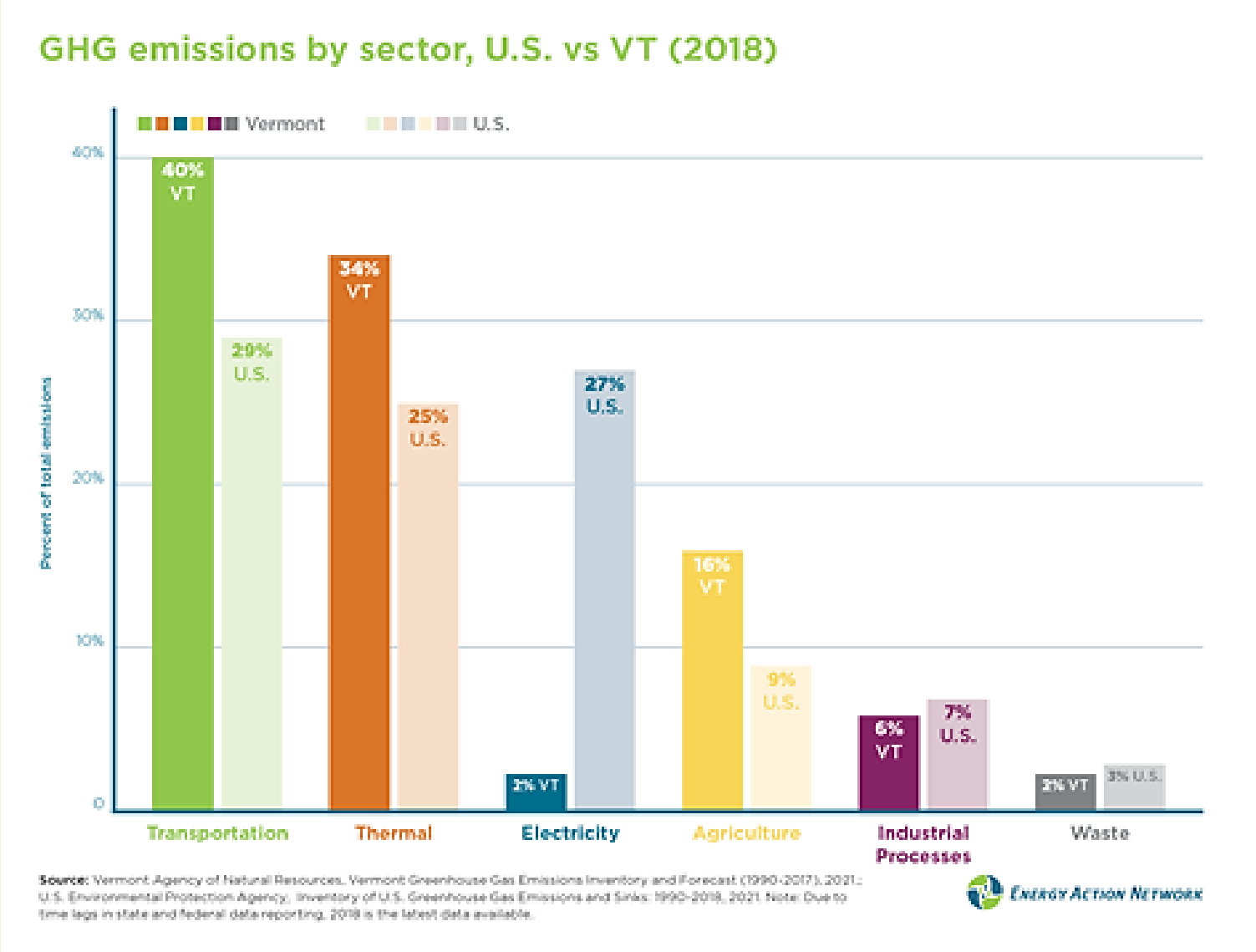
Why is reducing vehicle emissions important?

Pollutants and Health Impacts:

- Volatile organic compounds (VOCs) and nitrogen oxides (NOx) combine to form ground level ozone (also known as smog) that triggers asthma attacks and damages lung tissue.
- Fine particulate matter (PM2.5) causes respiratory and cardiovascular damage.
- These health impacts tend to have a greater impact on disadvantaged communities and frontline workers in Vermont.

Why are cleaner vehicles important?



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Why do we need to transition to cleaner vehicles?

Climate Change in Vermont: More rain and flooding, changes to agriculture, different forests

Vermont's Commitment to Cleaner Vehicles

1996: Vermont first adopts California Motor Vehicle Emission Standards for cars & light-duty trucks

2000: Vermont adopts the Zero-Emission Vehicle Sales Requirement Rules and adds medium-duty vehicles

2005: Vermont adopts Greenhouse Gas Emission Standards for Motor Vehicles

2012: Vermont adopts Advanced Clean Cars Program

2013: Gov. Shumlin signs Multi-state light-duty ZEV MOU

2020: Gov. Scott signs Medium- and Heavy-Duty ZEV MOU

2022: Vermont proposes to adopt updates to the Advanced Clean Cars and to adopt new rules for medium- and heavy-duty vehicles

To date, 18 states have adopted California's motor vehicle emissions rules

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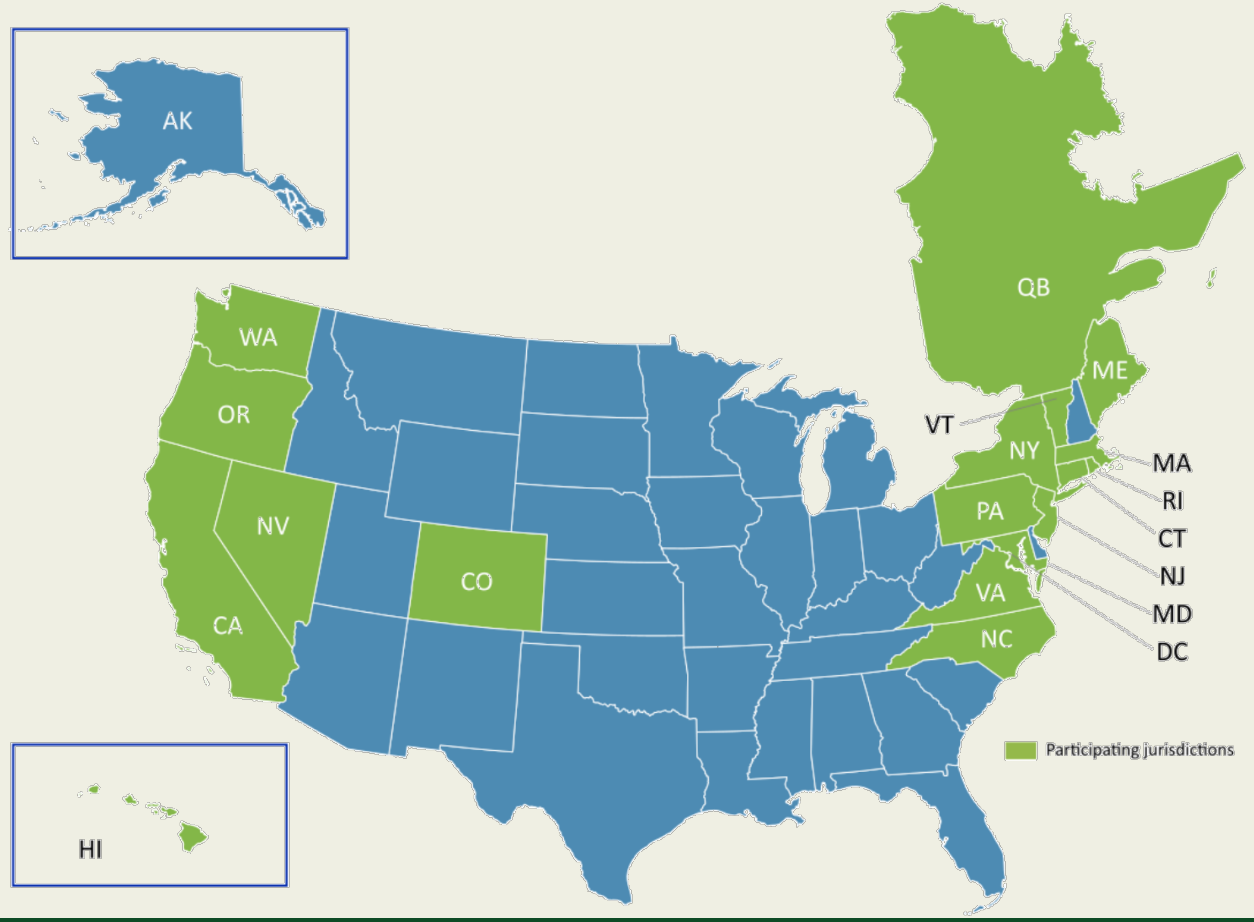
Governor Scott signed on to the Multi-State Medium- and Heavy-Duty (MHD) ZEV Initiative

- 17 states, D.C. and Quebec
- MOU Sets ZEV sales targets
  - 30% sales by 2030
  - 100% sales by 2050
- Directs development of a Multi-State MHD ZEV Action Plan



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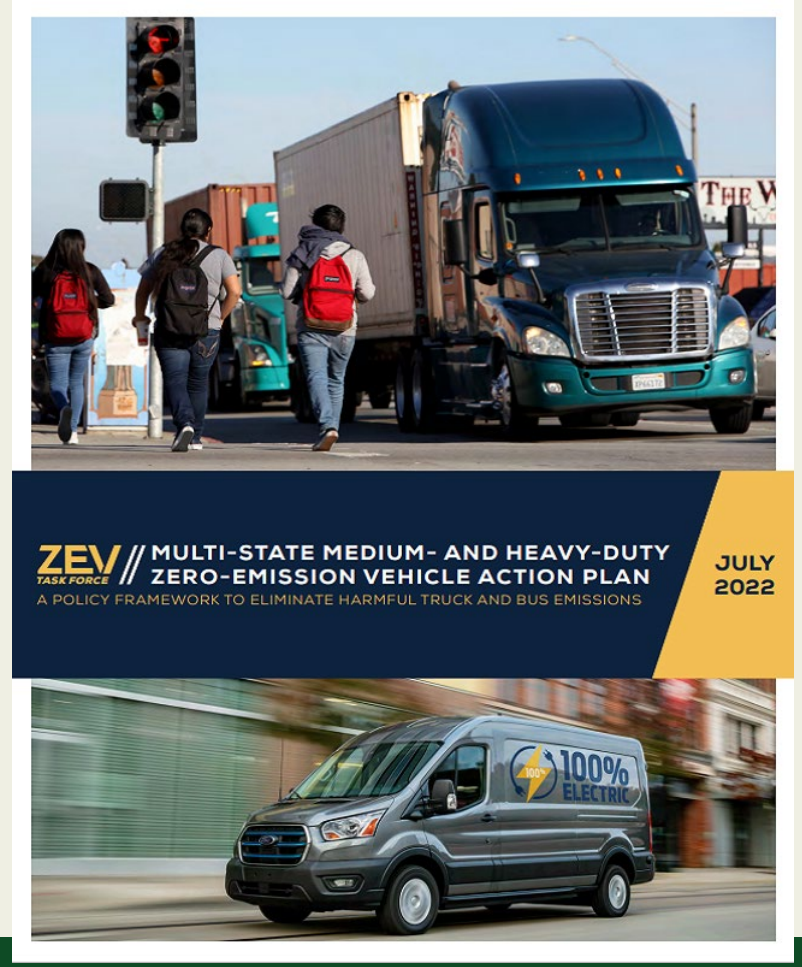
Multi-State MHD ZEV Action Plan

- Includes 65+ recommendations for state policymakers to promote rapid and equitable MHD ZEV deployment
- Highlights disproportionate impacts on overburdened communities; offers principles for a just and equitable transition
- Vermont MHD ZEV Action Plan will be developed with stakeholder input



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Positive Market Developments

UPS invests in Arrival and orders 10,000 Generation 2 Electric Vehicles

Amazon Will Buy 100,000 Rivian Electric Delivery Trucks

Lion Electric Receives Conditional Purchase Order from Student Transportation of Canada for 1,000 Electric School Buses

Maersk to add 300 electric trucks to North America network

Walmart orders 5,000 electric delivery vans from GM's BrightDrop

Charging Ahead: FedEx Receives First All-Electric, Zero-Tailpipe Emissions Delivery Vehicles from BrightDrop

Pride Group Enterprises Orders 6,320 Workhorse C-Series Delivery EVs

Fluid Truck Orders 600 Lightning Electric Vehicles

VT: New electric buses servicing Rutland area

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NESCAUM

Overview of the ACT, HD Low NOx Omnibus, and Phase 2 GHG Regulations

VERMONT STAKEHOLDER MEETING

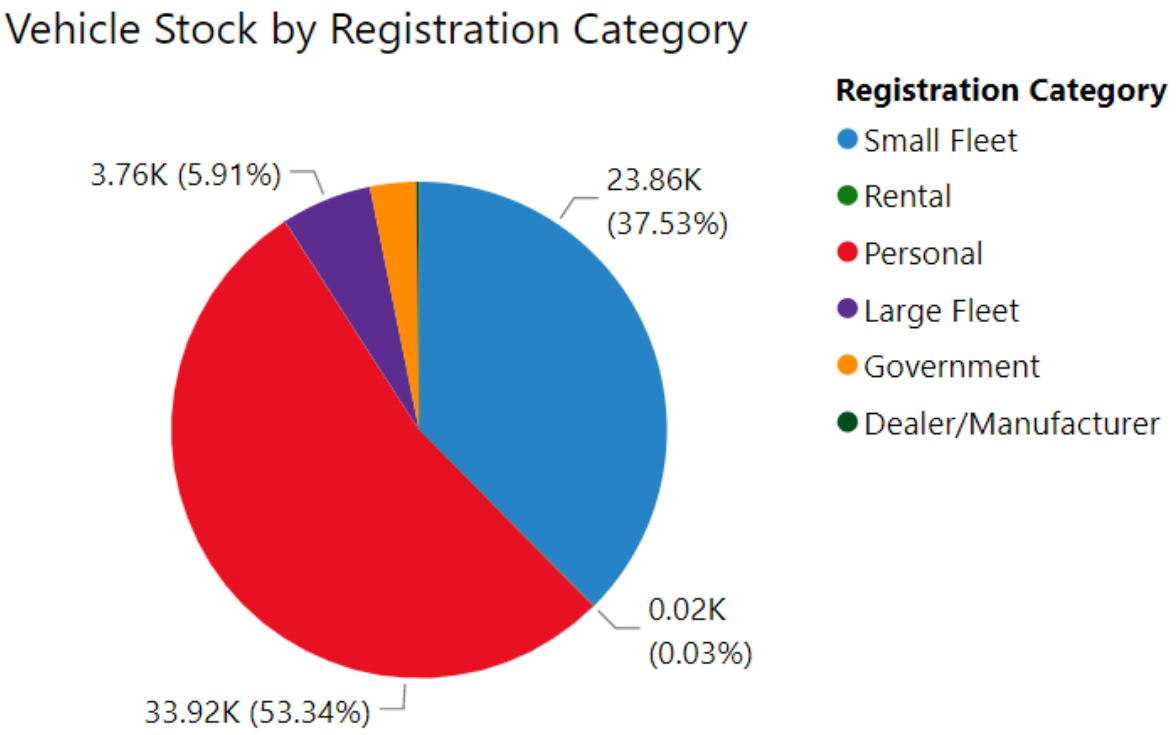
PRESENTED BY:

Jeremy Hunt
Clean Transportation Policy Advisor & Analyst

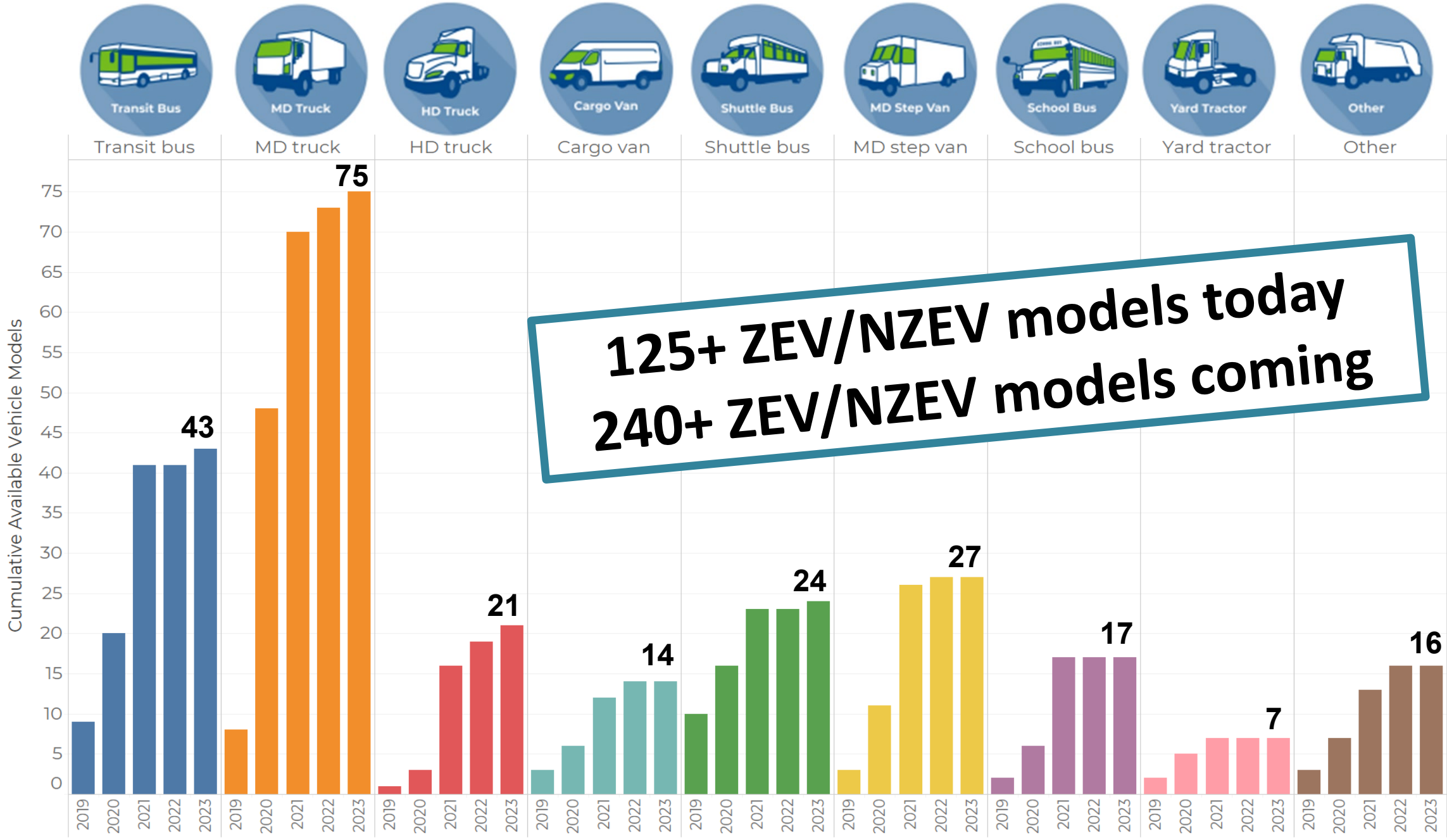
September 6, 2022

2019 Snapshot of Class 2b-8 Vehicles in Vermont

Class by GVWR	# of Vehicles
2b	29,444
3	13,279
4	1,443
5	2,879
6	3,074
7	4,934
8	8,535
All Classes	**63,588**



Source: IHS Markit via Atlas Public Policy's EV Hub, Trucks and the ACT Regulation in Vermont (Dec. 31, 2019), https://www.atlasevhub.com/materials/trucks-and-the-act-regulation/.



125+ ZEV/NZEV models today
240+ ZEV/NZEV models coming

Source: CALSTART (2022): Drive to Zero's Zero-emission Technology Inventory (ZETI) Tool Version 7.0. Available online at https://globaldrivetozero.org/tools/zero-emission-technology-inventory/.

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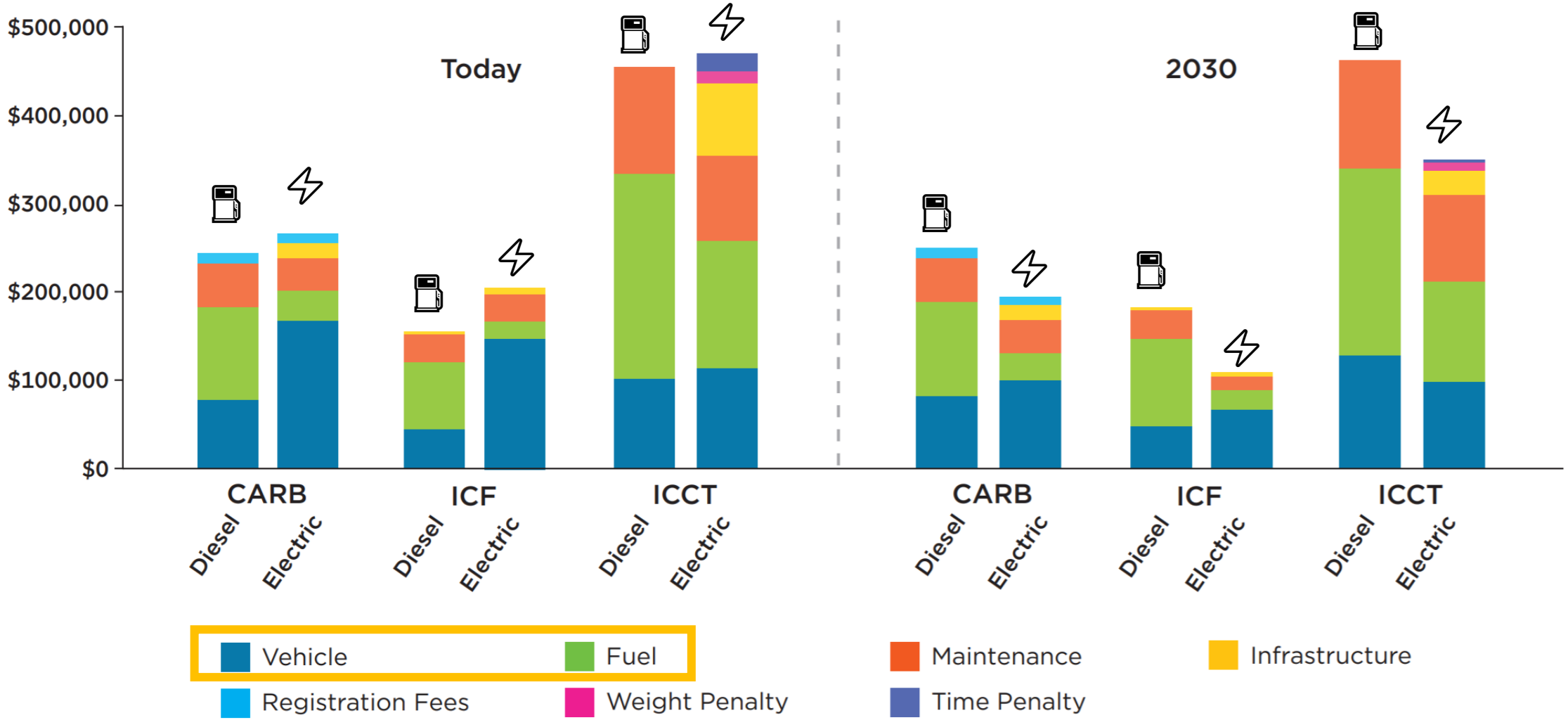
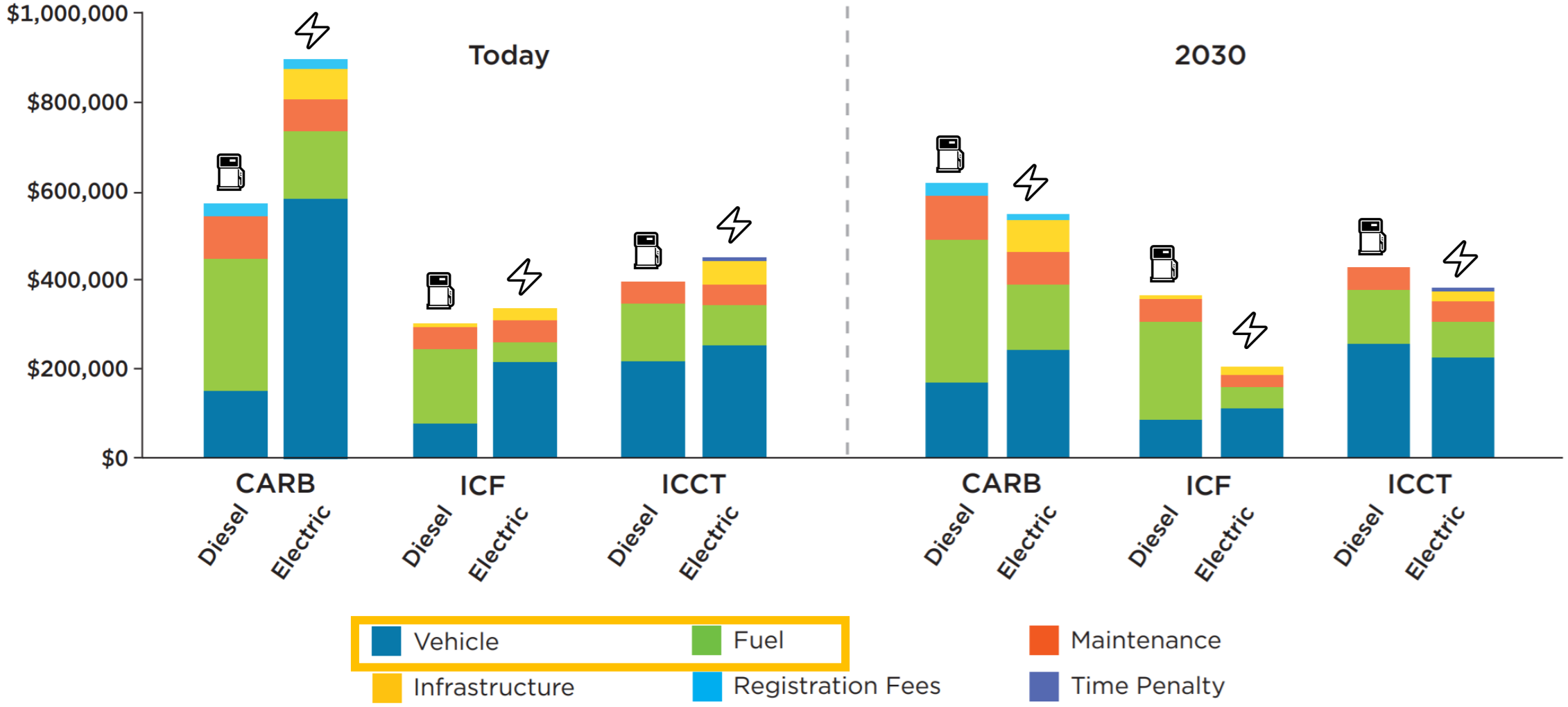
Total Cost of Ownership Comparisons: Class 6 Delivery Trucks



Total Cost of Ownership Comparisons: Class 8 Short-Haul Trucks



Advanced Clean Trucks (ACT) Regulation

What is the ACT Rule?

Manufacturer sales requirement – not a purchase requirement

Guarantees a minimum supply of ZEVs in Vermont

Credit/deficit system for compliance flexibility

NESCAUM

Vehicle Groupings Used in ACT

Class 2b-3	Class 4-8	Class 7-8 Tractors

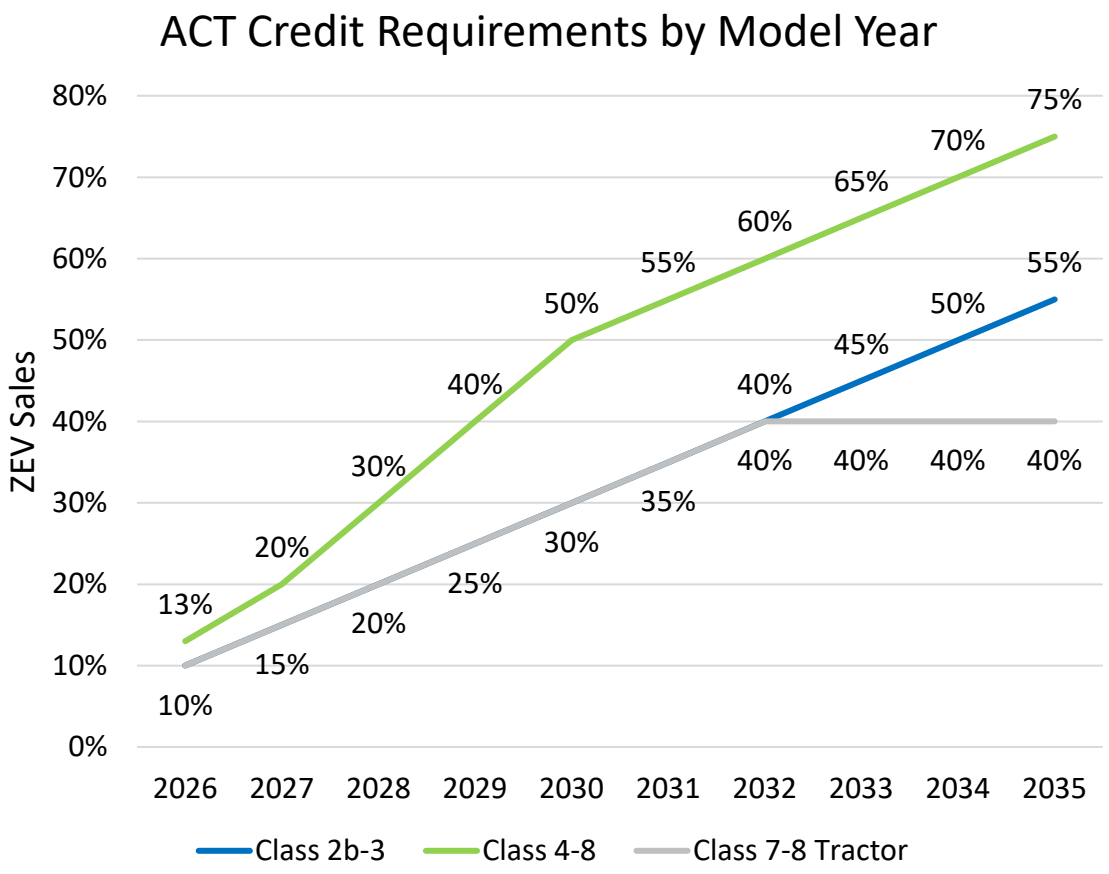
ACT ZEV Sales Requirements for OEMs

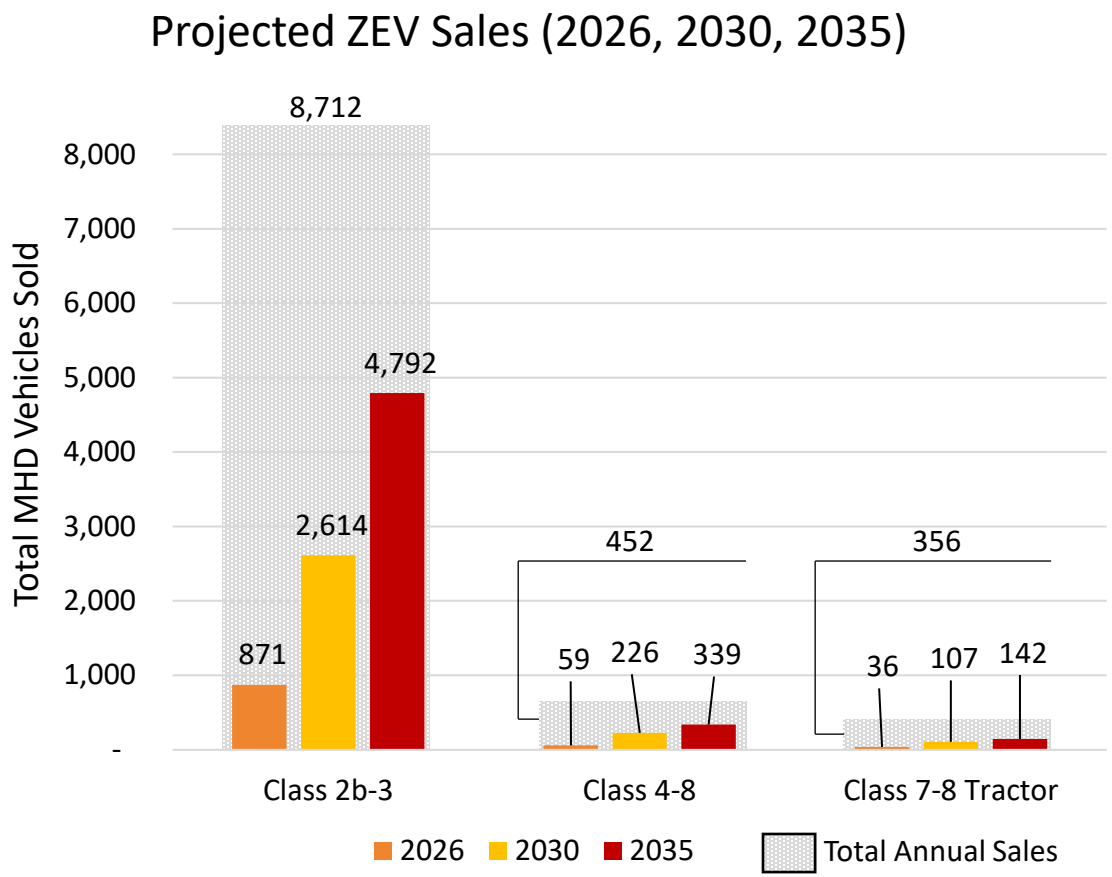
- Advanced Clean Trucks (ACT) uses a credit and deficit system
  - OEMs generate deficits for ICE vehicles sold in Vermont
  - OEMs generate credits for ZEVs or NZEVs sold in Vermont
- OEM sales numbers are based on vehicles sold and delivered to an ultimate purchaser in Vermont
- OEMs may bank and trade credits
- OEMs have one model year to make up a deficit, failure results in a penalty per deficit
- OEMs must report all vehicles delivered for sale/purchased in Vermont and credit transfers 90 days after the end of each model year

Model Year (MY)	Class 2b-3	Class 4-8	Class 7-8 Tractors
2026	10%	13%	10%
2027	15%	20%	15%
2028	20%	30%	20%
2029	25%	40%	25%
2030	30%	50%	30%
2031	35%	55%	35%
2032	40%	60%	40%
2033	45%	65%	40%
2034	50%	70%	40%
2035+	55%	75%	40%

ICE = internal combustion engine, ZEV = zero-emission vehicle, NZEV = near zero emission vehicle

Vermont ZEV ACT Projections by Year

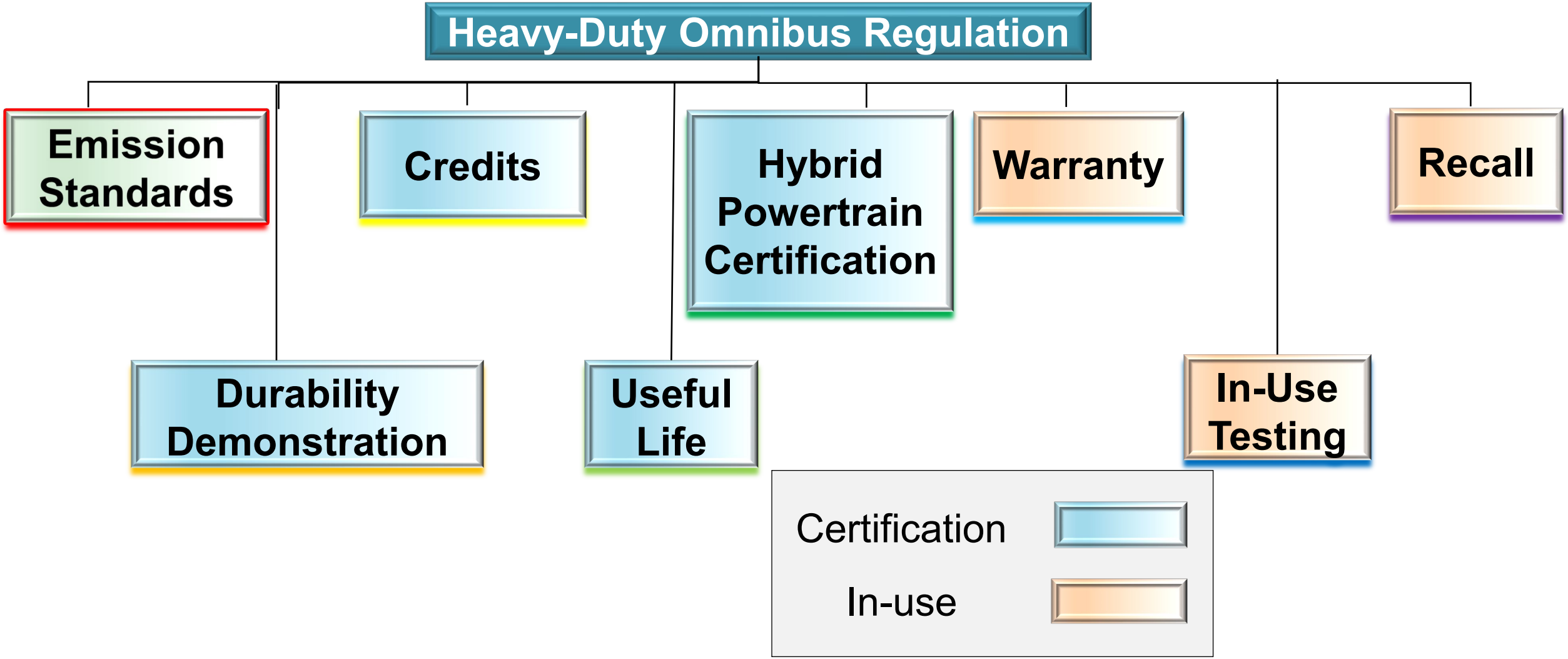




Source: IHS Markit, Available on Atlas Public Policy's Medium- and Heavy-Duty Vehicle Registration Dashboard, https://www.atlasevhub.com/materials/medium-and-heavy-duty-vehicle-registrations-dashboard/

Heavy-Duty Low NOx Omnibus Regulation

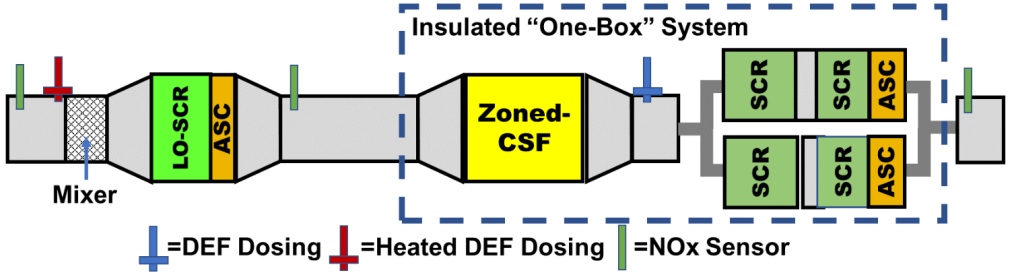
Major Program Elements



More information: https://ww2.arb.ca.gov/our-work/programs/heavy-duty-low-nox.

HD Omnibus Regulation

- Lowers NOx standards
  - 75% in 2024 model year
  - 90% in 2027 model year
- New low-load cycle testing
  - Verify low emissions in all modes of operation
- Lengthened useful life and warranty
- Improved in-use testing and warranty reporting
- Credits available for early action and ZEVs

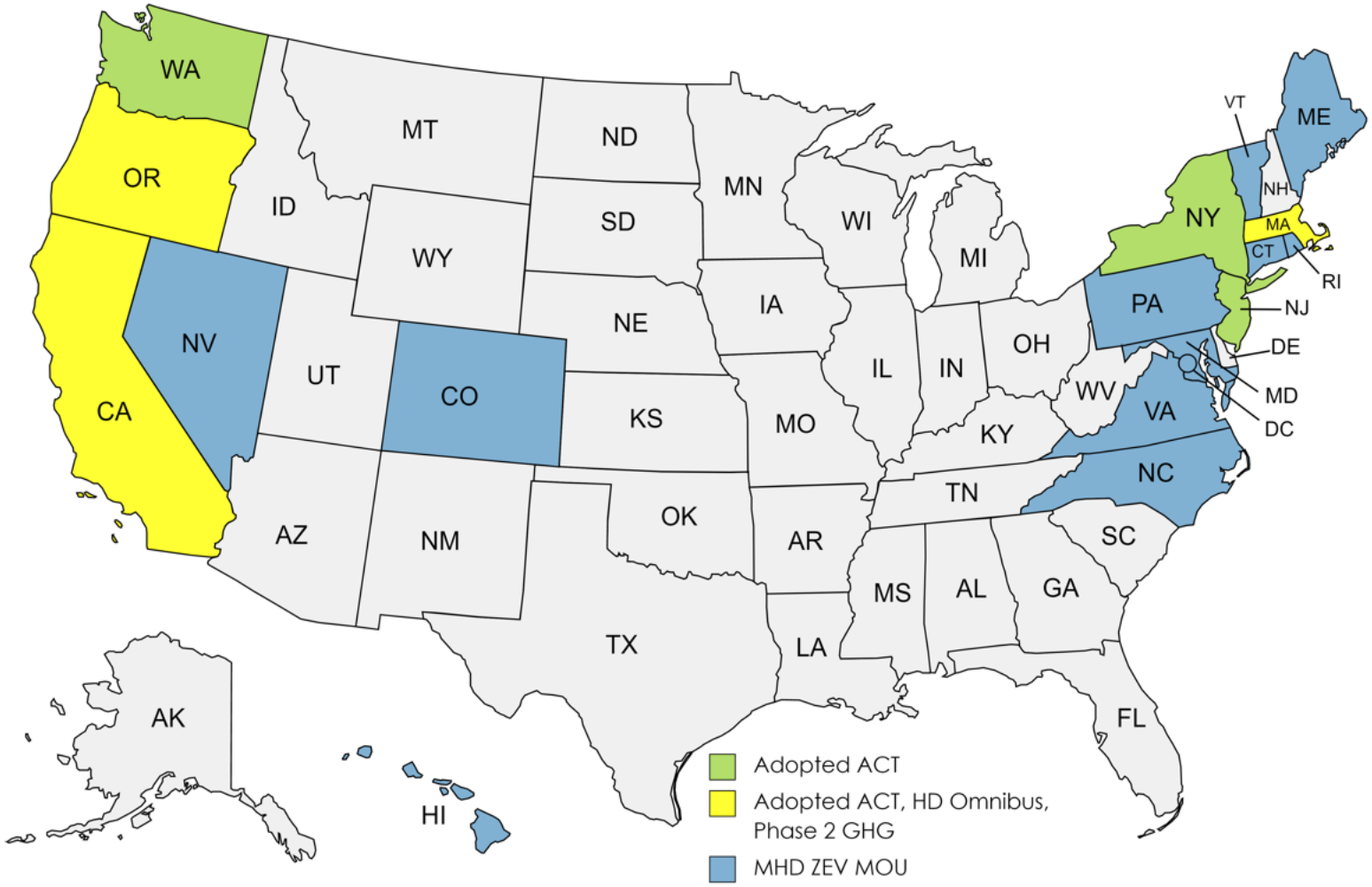


Phase 2 GHG Regulation

Phase 2 GHG Regulation

- Harmonize with structure, timing, and stringency of federal Phase 2 GHG emission standards for MHD engines, vocational vehicles, and HD pick-up trucks and vans, and applicable tractors and trailers
- Applicable to 2026 model year and newer Class 2b-8 MHD vehicles and engines
  - For vocational vehicles, requirement based on grams of CO_2 carrying a ton of cargo over distance of one mile (g/ton-mile)
  - For HD pick-up trucks and vans, requirement based on work factor attribute (payload and towing capacity) with an added adjustment for 4-wheel drive vehicles
  - For Class 7-8 tractors, requirement applies to 10 subcategories of tractors
  - For trailers, separate standards apply to full aero box vans, partial aero box vans, non-aero box vans, and non-box trailers

What is the Status of MHD Regulatory Adoption in the MHD ZEV MOU States?



- Colorado: considering ACT in 2023
- Connecticut: considering ACT and HD Omnibus in 2023
- Maine: considering ACT in 2023
- New York: considering HD Omnibus in 2022
- Rhode Island: considering ACT, HD Omnibus, and Phase 2 GHG in 2022
- **Vermont considering: ACT, HD Omnibus, and Phase 2 GHG in 2022**
- Washington: considering HD Omnibus in 2022

MHD ZEV MOU states represent 43% of the U.S. population, 49% of the U.S. economy, and 36% of MHD vehicles in the U.S.

Impacts to individuals and fleet owners

- Upfront cost - currently higher, on average, than a conventional fossil fuel vehicle
- New fueling infrastructure costs
- Enhanced warranty requirement lowers repair costs
- Lengthened vehicle's useful life

Impacts to individuals and fleet owners

Lower and more stable fuel costs

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Vehicles with fewer moving parts requiring less maintenance

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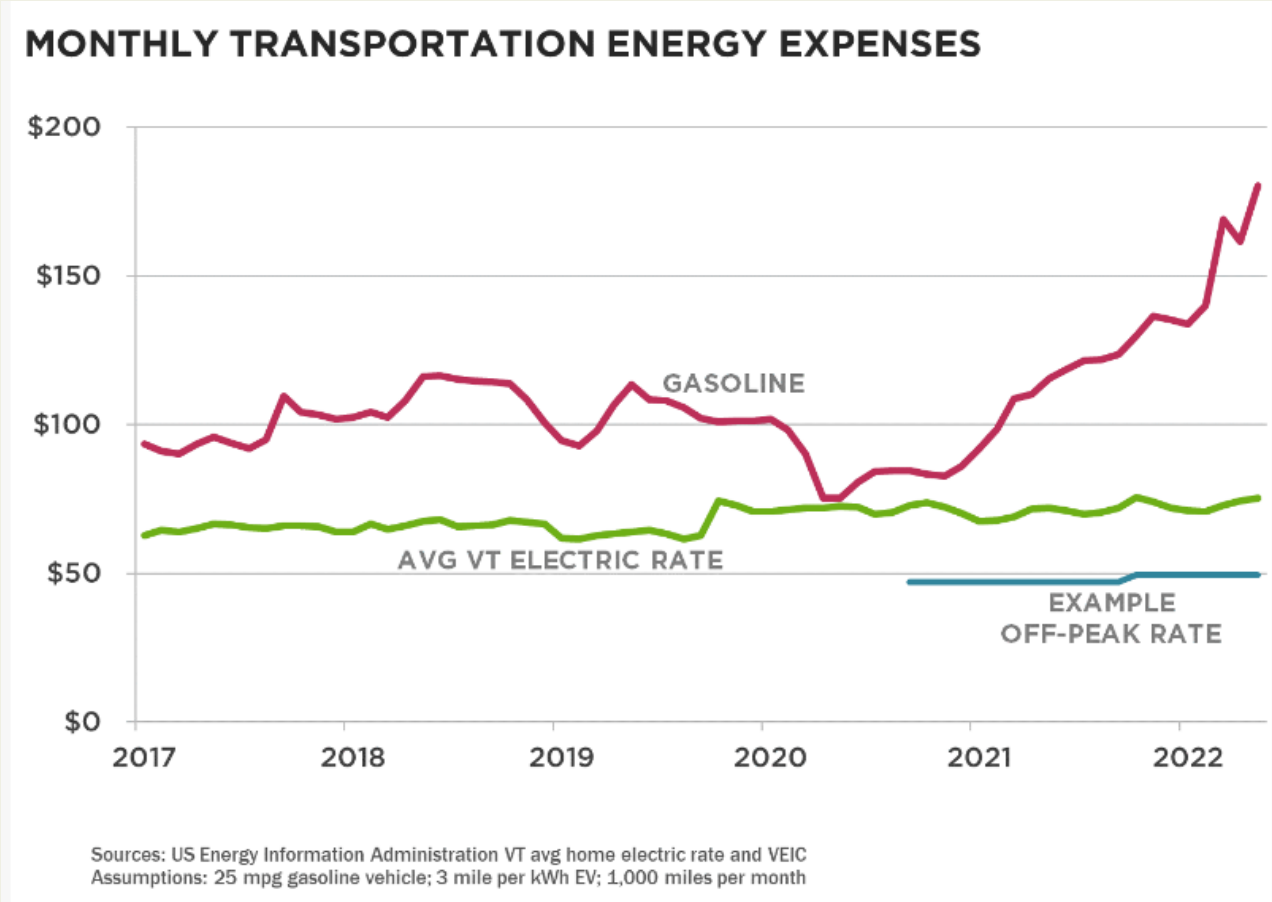
Significant operational savings



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Owner of twenty Class 4-5 trucks saves more than $300K over vehicles' lifetime

Cost line items	Diesel	Battery-Electric	Difference
Amortized Vehicle Price	$ 1,270,361.00	$ 1,747,840.00	$ 477,479.00
Sales Tax	$ 93,280.00	$ 135,896.00	$ 42,616.00
Amotized EVSE Cost	$ -	$ 104,315.00	$ 104,315.00
Amotized Infrastructure Upgrades	$ -	$ 417,261.00	$ 417,261.00
Charger Maintenance	$ -	$ 120,000.00	$ 120,000.00
Fuel Costs	$ 2,220,329.00	$ 947,961.00	$ (1,272,368.00)
Maintenance costs	$ 1,914,913.00	$ 1,436,185.00	$ (478,728.00)
Midlife Costs	$ -	$ 259,200.00	$ 259,200.00
Maintenance Bay Upgrades	$ -	$ 20,000.00	$ 20,000.00
Transitional Costs and Workforce development	$ -	$ 12,564.00	$ 12,564.00
Registration Fees	$ 245,823.00	$ 232,840.00	$ (12,983.00)
Total	**$ 5,744,706.00**	**$ 5,434,062.00**	**$ (310,644.00)**

Benefits for All Vermonters

Estimated costs avoided from proposed MHD rules 2025-2050:

Avoided impacts from lower carbon emissions (cumulative)
Medium and Heavy-duty Trucks: **$638 million**

Avoided health costs from lower particulate emissions (cumulative)
Medium and Heavy-duty Trucks: Up to **$24 million**

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Financial and workforce support to fleets

- Funds are available to assist fleet owners in purchasing EVs and EV charging infrastructure
  - Diesel Emission Reduction Act funding – State & federal opportunities
  - Medium- and Heavy-duty electrification grants – VW Mitigation Funds
  - EPA's Clean School Bus program
- Inflation Reduction Act
  - MHD purchase tax credits to cover difference in purchase cost
  - EV refueling infrastructure tax credits
  - Workforce development support rebate

Public Comment

- ANR is accepting public comments on the proposed rules through September 30, 2022.
- Please email comments to anr.dec.levzev@vermont.gov

Questions and comments

- Please use the **chat** to sign up to ask a question or make a comment.
- To submit written comments, please email anr.dec.levzev@vermont.gov.

Thank you for your participation!

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