



Fleet Electrification

December 12, 2023



Decarbonizing Medium & Heavy-Duty On-Road Vehicles

CARB
Regulations Driving
Zero Emission
Technology

ACT
Advanced Clean Truck

ACF
Advanced Clean Fleet

TRU
Transport Refrigeration
Unit

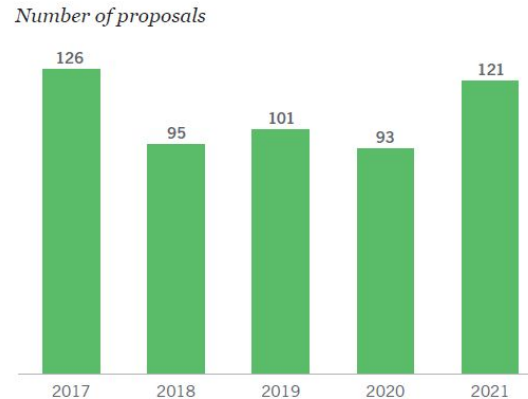
Investors want to hear from companies about the value of sustainability

McKinsey & Company Sept 15, 2023

85% of chief investment officers surveyed state ESG is an important factor in their investment decisions

Investors demand greater detail

Figure 1: The number of environmental and social shareholder proposals is increasing



Data source: ISS Shareholder Proposal Data, votes pending as of 05 Mar 2021.

Harvard Law School Forum

Harvard Law School Forum

Figure 2: Climate proposals shift focus from transparency to action



Data source: ISS Shareholder Proposal data and Ceres Resolution Tracker.

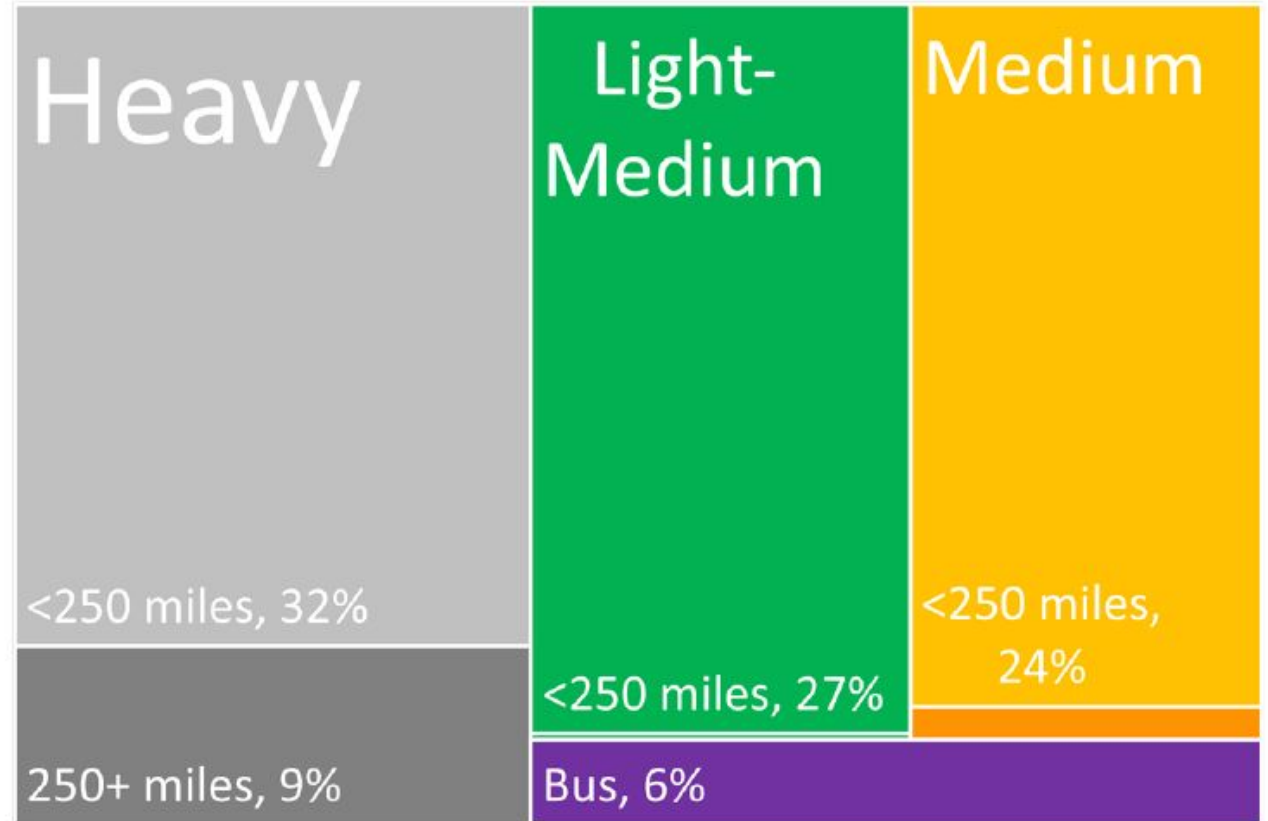
“ Investors representing literally tens of trillions of dollars support climate-related disclosures because they recognize that climate risks can pose significant financial risks to companies, and investors need reliable information about climate risks to make informed investment decisions. ”

SEC Chair Gary Gensler

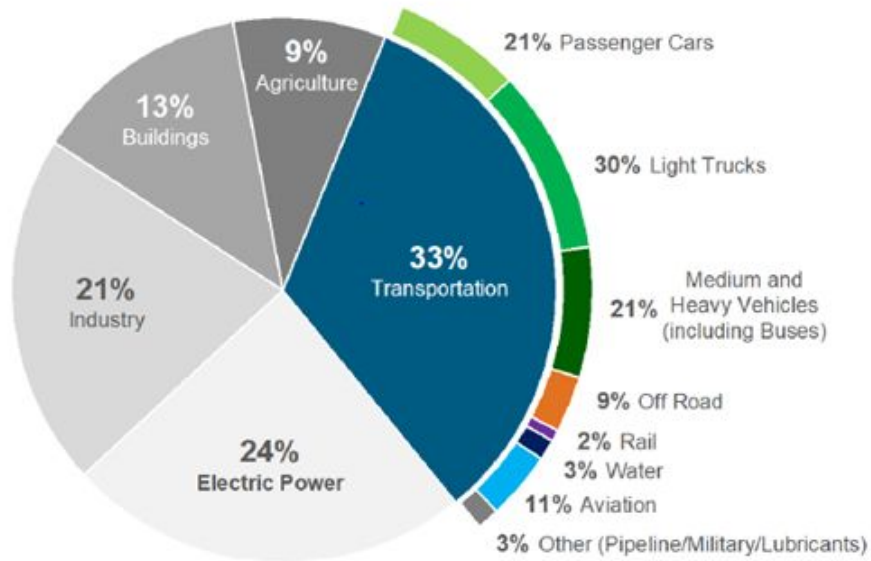


2019 MHDV Stock (13 M vehicles)

■ Light-Medium ■ Medium ■ Heavy ■ Bus



2019 U.S. GHG Emissions



Heavy trucks are ~40% of total vehicle stock but are responsible for about 70% of emissions due to lower fuel economy and greater VMT

CARB Adoption

State	Status	Start	Reporting Date	MOU 2020
California	Adopted	2024	1-Apr-21	Y
Oregon	Adopted	2025	30-Jun-22	Y
Washington	Adopted	2025	30-Sep-23	Y
New Jersey	Adopted	2025	1-Apr-23	Y
New York	Adopted	2025	1-Apr-23	Y
Massachusetts	Adopted	2025	Not required	Y
Vermont	Adopted	2026	Not required	Y
Colorado	Adopted	2025	Novermer 30, 2023; December 31, 2027	Y
Connecticut	Adopted	2027	1-Apr-24	Y
Maine	Rulemaking Process	-	-	Y
Rhode Island	Rulemaking Process	-	-	Y
North Caronlina	Rulemaking Process	Expected 2027	-	Y
Maryland	rulemaking completion Dec - 2023	Expected 2028	-	Y
Illinois	Legislation In Review	-	-	-
Pennsylvania	-	-	-	Y
Washington, DC	-	-	-	Y
Hawaii	-	-	-	Y

Decarbonation MDHD Vehicle

ACTION	INACTION
Reduce GHG emissions Reduce air pollution Reduce TCD	Disproportionally affect disadvantaged communities with air pollution Higher TCD



% of Fleet that Must be ZEV	10%	25%	50%	75%	100%
Box trucks, vans, two-axle buses, yard trucks	2025	2028	2031	2033	2035
Work trucks, day cab tractors, three-axle buses	2027	2030	2033	2036	2039
Sleeper cab tractors and specialty vehicles	2030	2033	2036	2039	2042

"Regarding Clean Transportation, to achieve Greater Boston's climate, health and equity goals, a critical obstacle to collectively overcome in 12 months is _____." **ACCEPTANCE & ADOPTION**

Support Massachusetts

- Awareness Campaign
 - Regulation Clarification
 - Vehicle Availability
 - Infrastructure Needs
 - Planning Horizon
- Toolbox
 - Use Cases
 - Specifications
 - Incentives

Advanced Clean Fleet (ACF) Rule

- Requires fleets to transition medium & heavy-duty vehicles to zero-emission technology by 2042
 - Group 1 – box trucks, vans, two-axle buses and yard trucks
 - Group 2 – work trucks, day cab tractors and three-axle buses
 - Group 3 – sleeper cab tractors & specialty vehicles

Advanced Clean Truck (ACT) Rule

- Manufacturers ZEV Mandate
 - The regulations requires manufacturers of medium and heavy-duty vehicles to product zero emissions vehicles 2024