

Executive Summary

The Easiest and Hardest Commercial Vehicles to Decarbonize

Global leaders have set decarbonizing energy consumption as a top priority for public policy and financial investment criteria. The road-transportation sector, being a major energy consumer and therein greenhouse gas (GHG) emissions source, is a focus.

To date, the primary approach for decreasing emissions has been through regulations on vehicle and fuel suppliers to improve vehicle energy efficiency and fuel carbon intensity, respectively. These regulations have mostly been developed for light-duty vehicle markets and technologies. However, the success of these policies in the light-duty vehicle market is prompting replication for the medium- and heavy-duty vehicle (MHDV) market.

While some have embraced this approach, the MHDV market policies, targets, and expectations cannot be the same as those for light-duty vehicles because the MHDV market is vastly more complex. Vehicle types and sizes are diverse, customization is frequent, and operating conditions present myriad and nuanced challenges for various decarbonization solutions. Legislators, regulators, and corporations need to understand this complexity as they set targets for policy and design incentive mechanisms for market suppliers.



To inform the broad community of stakeholders (vehicle suppliers, fuel providers, owners and operators, corporations, policymakers, and regulators) on the nuances of MHDV decarbonization, the Fuels Institute collaborated with Guidehouse Insights to highlight the complexity of the market. To do so, Guidehouse Insights identified the top five and bottom five applications for MHDV decarbonization as a function of technology readiness and quantified each market's impact on the overall U.S. MHDV market and contribution to U.S. MHDV GHG emissions.

The results of the analysis indicate that the top five MHDV applications affect nearly 50% of the market and are responsible for 42% of emissions. Meanwhile the bottom five affect 20% of the market but are responsible for 45% of emissions. While applications within the top and bottom five have attributes conducive to or challenging for decarbonization, each has nuance. This variance makes scaling of any one decarbonization solution a challenge, reinforcing the need for policies to be open to, and enabling of, a variety of solutions.