

ISSUE BRIEF: CLEAN TRUCKS HIT THE ROAD IN TEXAS

Opportunities for Clean Trucking in Texas

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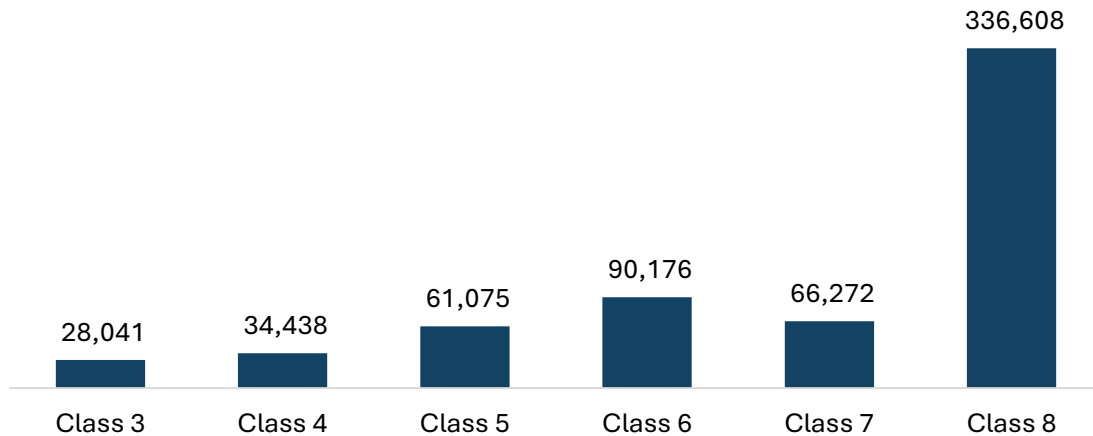
Acknowledgments

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Introduction

Trucking is the economic heart of Texas. More than one million Texans work in trucking to ensure the continuous flow of raw materials and finished products around the United States and worldwide. According to a study conducted by the Texas Department of Transportation (TxDOT) using data from 2018, [1.5 billion tons of freight worth \\$1.2 trillion](#) moves within and through Texas annually, and \$562.6 billion in gross state product. There were over 616,000 trucks registered in Texas in 2019, and most were class 8 vehicles per Figure 1. To date, a small share of them run on clean fuels like electricity or hydrogen.

Figure 1: Medium and Heavy Duty (MDHD) Trucks Registered in Texas, 2019



Vehicle class draws from Federal Highway Administration FHWA class categories. Class 3 to 6 are medium-duty and class 7 and 8 are heavy-duty.

Source: [Atlas EV Hub](#)

The value of this movement of goods is undeniable. Just as undeniable, however, is its environmental impact. Considerable air pollution and greenhouse gas emissions are

generated by the fossil fuel-powered fleet of medium- and heavy-duty (MDHD) vehicles that zig zag across the state. In 2021, transportation made up [over a fifth](#) of total U.S. greenhouse gas emissions, with medium- and heavy-duty trucks emitting 23 percent of all transportation emissions. In Texas, the transportation sector generates [over 215 million metric tons](#) of carbon dioxide annually, 20 percent [more than any other state](#).

There are significant potential benefits in transitioning to clean zero-emission vehicles (ZEVs), which include battery electric and fuel cell vehicles. There are also risks, however, if agencies, utilities, and industry do not plan, invest, and seize opportunities now.

Benefits from Decarbonization

The benefits of decarbonizing transportation are significant. According to [modelling](#) by the American Lung Association, Texas would see more than \$100 billion in public health benefits by 2050 from vehicle electrification (including light, medium and heavy duty vehicles). The emissions benefits of clean MDHD vehicles are just as considerable according to [research](#) from the University of Houston. Holding the current electricity mix in Texas constant, if ZEVs made up “all new sales by 2040, emissions from on-road vehicles would decline by about 35 percent for Light Duty Vehicles (LDVs) and 52 percent for M/HDVs” by 2050. In the case that the grid is net-zero by 2050, emissions reductions for MDHD vehicles could be 76 percent. This research notes that the transition will require significant investments in EV charging infrastructure, retiring gasoline infrastructure, upscaling a clean vehicle workforce, and shifting supply chains. According to the same research, Texas would gain somewhere between 40,000 and 180,000 net jobs by 2050 in the transition to clean vehicles. The researchers found that the more aggressive the electric vehicle (EV) targets led to greater job creation and the jobs would be in the “transportation, electricity, advertising, retail, data and networking, and maintenance sectors.”

Consumers in Texas may potentially see a lower cost overall in utilizing heavy-duty EVs compared to other parts of the country specifically due to the lower relative cost of electricity in the state. In 2022, according to an [analysis](#) from the International Council on Clean Transportation (ICCT), electric trucks are about 15 percent more expensive than diesel trucks on a total cost of ownership (TCO) basis (including fuel, maintenance etc.). However, the ICCT estimated that by 2030 the TCO of an electric long-haul heavy-duty vehicle will be the most cost-effective option, beating out diesel as well as hydrogen options due to the falling price of trucks, improved fuel economy over time and the build out of MDHD charging that means electric trucks can be equipped with smaller batteries.

Encouraging fuel switching via adoption of MDHD ZEV technologies also has significant distributional equity impacts. “Air quality is disproportionately lower in lower income areas

and areas that are more minority dense,” Harry Tenenbaum from EVOolve Houston said in an interview for this brief. “Oftentimes, we find that it’s industry generating this — trucking, idling vehicles, traffic through ports, and commerce highways that cut through these neighborhoods.”

These emissions and other air pollutants lead to both environmental and public health impacts which disproportionately burden Black and Brown communities, given the historical [construction of highways](#) through their neighborhoods. Highway expansions—including an [expansion of Texas’s Interstate 45—displace the communities](#) that abut congested roadways and subject those who remain to [increased air pollution](#). Electrifying fleets operating in these neighborhoods, particularly MDHD vehicles, can help reduce these emissions and, in turn, improve air quality, reduce public health detriments, and reduce urban heat.

Given the benefits of clean MDHD vehicles and the long [lead time](#) required to build out clean MDHD infrastructure, it is important that Texas invests in infrastructure now. Cue much-needed funding from the Inflation Reduction Act (IRA) and Infrastructure Investment and Jobs Act (IIJA) to support the transition. [Hundreds of millions of dollars](#) in direct spending, grants, and financial incentives will flow to Texas to support the deployment of clean MDHD vehicles.

Texas Begins to Electrify

Deployment of clean MDHD vehicles in Texas is nascent, and trails investment in other regions. Other more advanced states are supporting the transition with both investments and regulations. In July 2023, California and leading truck manufacturers and the Truck and Engine Manufacturers Association [announced](#) they would partner to further the penetration of ZEVs in commercial trucking. The “unprecedented partnership” is evidence that industry sees a bright future for clean trucking.

Texas should plan now so that it does not miss taking advantage of the considerable resources afforded by IIJA and IRA and can prepare for the future that industry has signaled. Take HOLT Truck Centers for instance. The company, based in Irving, Texas, just outside Dallas, reportedly was the first company [to deploy](#) battery-powered trucks in November 2022. The company highlighted the cost savings of operating these ZEVs, explaining that a full charge costs between \$30 and \$50 while a full diesel fill costs between \$250 and \$300. Moreover, EV trucks have significantly lower maintenance costs. Although electric trucks have shorter ranges, they are effective at fulfilling local and regional needs. HOLT Trucking still relies on diesel trucks for long-distance deliveries, but they are seeing more clients and potential clients pledge to decarbonize the movement of

goods and want to remain ahead of these changes. HOLT [sells](#) Navistar trucks. Navistar [already](#) produces class 6 to 8 battery electric trucks and internal combustion engine trucks, and [expects](#) that nearly 50 percent of all trucks produced in its San Antonio, Texas facility by 2030 will be ZEVs.

Elsewhere, Port Houston is in the process of being electrified. The Port [deployed](#) its first electric truck for container operations in June 2022, and [has a goal](#) of carbon neutrality by 2050. Port Houston's [climate action plan](#) notes the potential implementation of charging infrastructure.

Also in Houston, GTI Energy was the recipient of \$1.25 million awarded through IJA to plan for a hydrogen-dependent corridor project. The corridor will run 1,600 miles from Houston to Los Angeles, linking the Port of Los Angeles, the Port of Long Beach, and Port Houston, three of the largest ports in the country. In addition, the project incorporates a further 600 miles to plan for the triangle taking in Austin, Houston, Dallas-Fort Worth, and San Antonio. In two years, the project [will result in](#) “a flexible and scalable blueprint plan for an investment-ready hydrogen fueling and heavy-duty freight truck network” that could also inform the build out of corridors around the country. In an interview for this issue brief, GTI Energy R&D managers Bart Sowa and Nico Bouwkamp noted that the low cost of hydrogen in Texas is expected to make alternative fuel transportation more competitive than in other regions. Meanwhile, [charging startup](#) TerraWatt announced in October 2022 it was planning a charging route for electric MDHD vehicles from Long Beach, California, to El Paso, Texas. The company [has plans](#) to build seven charging centers along the Interstate 10 highway. Relatedly, AES Corporation and Air Products [announced](#) an initiative in December 2022 to fund a \$4 billion green hydrogen production facility in Wilbarger County, Texas. This facility could produce green hydrogen to support hydrogen powered MDHD vehicles.

There are some existing state level programs to support clean MDHD trucking deployment and complement federal initiatives. Texas Commission on Environmental Quality (TERP) has multiple financial incentives available, though these programs have done little to support electrification and hydrogen for transportation over the past decade, prioritizing other fuel types instead. The Diesel Emissions Reduction Incentive Program (DERI) is the largest of them. Next there is the [Alternative Fueling Facilities Program](#), which is being [monitored closely](#) by TxDOT per Texas's National Electric Vehicle Infrastructure (NEVI) plan. The [Texas Clean Fleet Program](#) has also supported clean vehicles, though [only five percent](#) of the funding from 2009 through 2022 went to EVs, and all of that funding was for buses.

There are signs of change, however. In 2023, the Clean Fleet Program announced it would spend more than \$8 million to [support the purchase](#) of more than 50 electric trucks. Meanwhile in 2023, the Texas Council on Environmental Quality made available \$87 million for electric trucks and other electric cargo equipment. As of November 1, 2023, nearly \$5

million has been [awarded](#) to support freight and drayage trucks. Lastly, there is the new [Texas Hydrogen Infrastructure, Vehicle and Equipment Grant Program](#), which supports eligible counties in rolling out hydrogen vehicles and refueling infrastructure.

Federal Funding To Speed Deployment

To date, Texas has awarded very little public funding for clean MDHD trucks, but IIJA and IRA programs and tax credits will pump unprecedented investment into MDHD vehicle deployment in Texas, per Table 1.

Table 1: IRA and IIJA Programs that can support clean MDHD vehicles

Program	Funding	Type of Funding	MDHD Focus
Congestion Mitigation and Air Quality Improvement Program	\$13.2 billion	Formula	ZEVs
Carbon Reduction Program	\$6.4 billion	Formula	ZEVs
NEVI	\$5 billion	Formula	EV charging
Qualified Commercial Clean Vehicles (45W)	\$3.6 billion	Tax credit	ZEVs
The Clean Ports Program	\$3 billion	Competitive	ZEVs
Environmental and Climate Justice Block Grants	\$3 billion	Block grant	Environmental justice-related deployment
Port Infrastructure Development Program	\$2.3 billion	Competitive	Port infrastructure
Alternative Fuel Vehicle Refueling Property Credit (30C)	\$1.7 billion	Tax credit	Charging/hydrogen refueling infrastructure
Clean Heavy-Duty Vehicle Program	\$1 billion	Competitive	HD ZEVs

Program	Funding	Type of Funding	MDHD Focus
Reduction of Truck Emissions at Port Facilities	\$400 million	Competitive	Port electrification and infrastructure

Texas may also use RAISE funding, State Energy Program, the Greenhouse Gas Reduction Fund, Diesel Emissions Reductions competitive grant, and other programs to support clean MDHD vehicle deployment. The tax credits are not capped and the funding amount is an estimate is drawn from the Congressional Budget Office [Cost Estimates](#) from September 2022.

Source: [Climate Program Portal](#)

Two key tax credits support the vehicle purchase and charging and fueling installation for ZEVs. The [Commercial Clean Vehicle credit](#) applies to vehicles that are purchased to replace a non-ZEV. Vehicles powered by fuel cells, batteries, and plug-in hybrids are eligible. For vehicles heavier than 14,000 pounds, businesses are eligible for a tax credit of up to \$40,000 for ZEVs. Meanwhile, the [Alternative Fuel Vehicle Refueling Property credit](#) offers tax credits for individuals or businesses installing charging infrastructure or hydrogen fuel cell refueling stations servicing low-income or rural census tracts. Individuals can obtain up to \$1,000 per charger and businesses can gain up to \$100,000 per charger with a base credit of six percent per property. If prevailing wage and apprenticeship provisions are met, the credit is boosted to 30 percent. These tax credits will be transformative for years to come as they will be open to vehicles purchased before 2033.

The [Clean Heavy-Duty Vehicle Program](#), created by IRA, earmarks \$1 billion in competitive grants and rebates for states, local governments, tribal governments, school transportation associations, and eligible ZEV contractors. Grantees may utilize the money to build out infrastructure, fund workforce development and training, planning, or the direct purchase of heavy-duty ZEVs. Notably, \$400 million has been set aside for communities in nonattainment areas (i.e., areas with air quality worse than the National Ambient Air Quality Standards set by the U.S. Environmental Protection Agency).

Next, the [Congestion Mitigation and Air Quality Improvement \(CMAQ\) Program](#). CMAQ is a \$13.2 billion formula funding program administered by state departments of transportation with a goal of slashing traffic congestion and improving air quality, and a focus on areas that do not meet air quality standards. In fiscal year 2023, Texas has been allocated [\\$190 million](#). As a result, the program is [key for urban areas](#) that experience congestion and resulting pollution from vehicle emissions. For the first time, CMAQ [includes](#) the “purchase of diesel replacements, or medium-duty or heavy-duty zero emission vehicles and related charging equipment” as eligible activities.

One of the largest IJA programs providing funding for the decarbonization of transportation in Texas is the [Carbon Reduction Program](#) (CRP), which dispenses formula funding to individual states to implement projects to reduce transportation emissions. The Department of Transportation has allocated about [\\$641 million to Texas](#), to be expended over the course of five years, more than any other state. States may use funding for a [number of purposes](#), including deployment of alternative fuel vehicles, charging and alternative fuel vehicle infrastructure, technologies supporting port electrification, and other “efforts to reduce the environmental and community impacts of freight movement.” Per program rules, TxDOT will allocate 65 percent its federal funding to [localities’ Metropolitan Planning Organizations](#) (MPOs) while the remaining 35 percent can be implemented at the discretion of the state. Advocates have raised concerns that the state is not doing enough to assist the transition based on the TxDOT [draft plan](#) released in October 2023. The plan proposed transferring more than \$110 million of the state’s formula funds to a highway program. This program illustrates a risk that Texas will not make the most of the decarbonization formula funds headed its way.

The Grants to Reduce Air Pollution at Ports program, also known as the [Clean Ports Program](#), is an IRA-created \$3 billion program to address emissions at ports with zero-emissions equipment and technologies via competitive grantmaking. A technical Request for Information for the program [sought input on](#) how class 6 and 7 ZEVs could be deployed for drayage services and their associated fuel infrastructure, although this program does not include class 8 vehicles. Phillip Martin from EDF, who also sits on the new taskforce planning Texas’s deployment of EV charging infrastructure, added in an interview that Port Houston would benefit from this program, as the range of 250 miles per charge is well-suited for drayage truck activities.

Next is the IJA-created, \$400 million [Reduction of Truck Emissions at Port Facilities](#) program. Its first round of funding to minimize truck emissions at ports closed in July 2023. In addition to doling out funding to specific ports seeking to make electrification and efficiency improvements, the program integrates a study on how ports would benefit from reduced emissions, as well as the best way to weave in new technologies to reduce idling truck emissions.

The final port-related program is the [Port Infrastructure Development Program](#) is awarded competitively to ameliorate the “safety, efficiency, or reliability” of product movement within and around ports. Future applicants may draw learnings from these successful applicants to expand port electrification and deployment of zero-emission drayage trucks. In [2022](#) and [2023](#), six projects received awards in Texas, though none of them made mention of ZEV technologies.

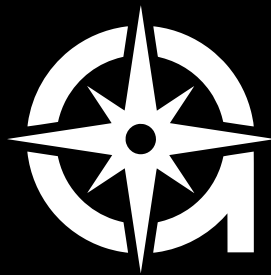
The National Electric Vehicle Infrastructure (NEVI) is a formula program initiated by IIJA to kickstart America's EV charging network. [Administered](#) by the Federal Highway Administration (FHWA), states will distribute funding through fiscal year 2026. Texas's [FY2024 NEVI plan](#) was approved on September 29, 2023. With over \$400 million to disperse, the state plans to build new fast charging at more than 50 locations over the next five years. In the first stage of deployment in the NEVI plan, the direct current fast charging stations will not have pull-through spaces for heavy-duty clean trucks and trailers. In the second stage of deployment, TxDOT hopes to build out charging along MDHD freight corridors and to add charging at the southern border—where about 30 percent of trucks end up traveling from Texas.

One program that will deliver benefits amid equity concerns arising from diesel-dependent freight is the [Environmental and Climate Justice Block Grants](#) program. This \$3 billion funding program is aimed at projects that benefit underserved communities and includes \$200 million for technical assistance. Six entities in Texas have [received](#) \$2.2 million to support environmental justice efforts in early funding rounds. Recipients may use funding to reduce the disproportionate burden of air pollution and its resulting health detriments through clean MDHD trucking deployment. Coordinating with local actors and activists will be crucial to rolling out just and effective equity initiatives.

Most of these programs are competitive and so if Texas wants to maximize funding impact, it should consider bolstering technical assistance services to encourage Texan applicants.

To Secure Benefits, Texas Must Act

Texas has awarded and been awarded very little public funding for clean MDHD trucking to date. As a result, Texas has not yet seen the air quality improvements, environmental justice initiatives, greenhouse gas emissions reductions, creation of jobs, and other key benefits of the transition. With tens of billions of dollars available to decarbonize transportation, IIJA and IRA will change the equation. Funding will support charging infrastructure build out and vehicle deployment. Texas governments and other entities should plan now to ensure the state secures its fair share of funding via collaboration between public, private, and nonprofit groups and, in doing so, the people of Texas see their fair share of the benefits.



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