ATLAS PUBLIC POLICY

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Hearing on

It's Electric: A Review of Fleet Electrification Efforts

Electrifying U.S. Transportation

Key Drivers, Challenges, and the Role of the Federal Government

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Introduction

Chair Crawford, Ranking Member Norton, and members of the committee, thank you for the opportunity to speak today about the electrification of U.S. transportation. My name is Nick Nigro, and I am the founder of Atlas Public Policy, a policy and data research firm based right here in Washington, DC. Atlas equips businesses and policymakers to make strategic, informed decisions that serve the public interest. We build analytical tools and dashboards using accessible technology and offer advisory services to tackle the pressing issues of the day, with a particular focus on transportation electrification.

I greatly appreciate the opportunity to speak to you about the most important transportation challenge we face in this century. For more than one hundred years, powering our transportation system has depended largely on the extraction, refinement, and burning of petroleum-based products to move goods and people throughout our road network.

In the last 15 years, our innovative businesses, with support from all levels of government and civil society, have made great strides to take on a once-in-a-century challenge to transition the country off oil to a more sustainable, secure, and economical fuel, electricity.

Make no mistake. This transition will take decades to complete, but we have too much at stake to sit on the sidelines and lose the future of mobility to our competitors in China and Europe, which collectively made up 85 percent of global EV sales in 2023 [1].

The Alliance for Automotive Innovation estimates that the automotive sector supports nearly 10 million jobs and over $700 billion in worker income every year in the United States [2]. Nearly 65 percent of car and light truck sales in 2023 were from companies who have committed to electrify all their vehicle offerings by 2035 or 2040. And the International Energy Agency estimates that global EV sales could reach 17 million in 2024 [1], more than all passenger vehicles purchased in the United States last year.

Passenger vehicles often steal the headlines, but truck and bus electrification are well underway as well. By 2040, the three truck manufacturers that make up 70 percent of the medium and heavy-duty market—Daimler Truck, Volvo Group, and Navistar—aim to sell only zero emission vehicles. These manufacturers, along with large national fleets, logistics companies, charging infrastructure developers, and electric utilities, formed PACT, a comprehensive coalition focused on one of the most critical barriers to accelerating the uptake of zero emission commercial vehicles: the deployment of medium- and heavy-duty truck zero emission charging and refueling infrastructure [3].

We aren’t just racing against foreign nations to lead the development of 21st century vehicle technology. We’re also in a race to mitigate the worst effects of climate change on the planet and

tailpipe pollution on human health. The American Lung Association estimates that transitioning trucks to zero emission could lead to $735 billion in public health benefits and more than 65,000 fewer premature deaths by 2050 [4]. Moreover, unmitigated climate change is a looming threat to the global economy. The National Oceanic and Atmospheric Administration estimates that climate-related disasters have cost us nearly $2.7 trillion since 1980, with costs significantly increasing with each decade [5].

Finally, in terms of the drivers to an electric future, I'd be remiss if I didn't bring up the major factor that brought me to Washington nearly 15 years ago. You see, I studied electrical and computer engineering in the late 90s and took a job in the booming high-tech sector in Massachusetts in 2001. Applying my engineering education and building popular consumer products was a rewarding experience. But while I was sitting pretty in Boston, the country was in a deepening national security crisis, which I believe was driven in part by our dependence on oil. I was motivated to change the direction of my career, and my life, by going back to school, learning energy policy, and putting my engineering brain to better use. All of the evidence I've analyzed over the past 15 years has led me to the clear conclusion that electrifying our transportation sector is vital to our national security, and it's near impossible to put a price tag on that.

State of Play

As I've summarized here with you today: the days of the combustion engine are numbered. We must finish the job by setting up a policy framework that puts the United States on a better footing globally and helps us regain a leadership position in this vital industry.

The good news is that in the last three years, investments have flooded into all parts of the country, in large part thanks to the Infrastructure Investment and Jobs Act (IIJA) and the Inflation Reduction Act (IRA). Since IIJA was signed into law in November 2021, investments in EV manufacturing facilities totaling about $141 billion have been announced [6]. Notably, at least 80 percent of these investments are flowing to Congressional districts represented by Republicans. These investments are expected to support more than 160,000 jobs in manufacturing operations and cover activity across the EV supply chain, from minerals processing to produce precursor materials for battery production, all the way to EV production and end-of-life battery recycling to recover materials for reuse. To date, Georgia, North Carolina, and Michigan lead the country in announced investments, accounting for nearly $58 billion combined.

Where these investments and jobs are sited, and who they are impacting, are also important factors in the EV transition. Twenty thousand announced manufacturing jobs will be in Energy Communities, defined by the federal government as places with former fossil fuel industrial sites, including power plants, mines, and oil and gas wells [6]. Additionally, more than 59,000 jobs

announced will be located in disadvantaged communities. As the clean economy ramps up, communities that have historically been left behind are finally being prioritized.

The investments announced boast big numbers, but they go well beyond press releases. In fact, 66 percent of investments are at facilities currently in operation or under construction. At least 90 facilities are on track to go into operation by 2024 or 2025, representing 80,000 manufacturing jobs.

In the passenger vehicle market, 2023 was a banner year for electric vehicles. More than 1.4 million new EVs were registered last year. For comparison, it took the country nearly eight years to reach the first million EV sales [7]. Fast charging stations, a critical part of making an EV as easy to own as a gas vehicle, are experiencing a similar surge in popularity. More than 25 percent of all fast-charging ports currently operational were installed in 2023, reaching a rate of 250 per week in the fourth quarter [8].

It's not all smooth sailing though and we should expect the market to ebb and flow as the technology progresses, consumer interest evolves, and new and entrenched businesses are challenged. To illustrate, new EV sales for the three months from December 2023 to February 2024 are up 20 percent over the previous year's figures; however, these figures are down from the 50 percent growth we saw in all of 2023 [9]. This is not evidence that the EV market is struggling per se, but it does reveal that vehicle offerings must meet consumer expectations and that automakers must continue to innovate to drive interest.

Economists describe "creative destruction" as the process where innovation delivers progress and new products make the existing ones obsolete. There are countless examples of this in consumer electronics, whereas until recently the vehicle market has experienced gradual progress over many decades. EVs are the first major disruption to how vehicles are built and powered in more than a century, and there will be winners and losers. I'm confident in American know-how and ingenuity, but we need to keep our eyes on the ball and manage our resources.

Charging Infrastructure

For many Americans, charging an EV can be as easy as plugging in your cell phone every night. More than 65 percent of Americans live in single family homes, many of which have garages and easy access to power [10]. Electric utilities across the country have deployed charging programs to support consumers and encourage them to charge at times of day that are good for the electrical grid and their wallets. The convenience of charging at home and cost effectiveness of doing so, thanks in part to utilities, helps explain why most experts expect EV drivers to only rely on public charging for a small fraction of their trips, particularly as EV ranges continue to climb.

While most EV drivers won't use the infrastructure very often, they consistently cite a lack of reliable public charging as a primary barrier to EV adoption [11]. The lack of near-term demand for

public charging services combined with the expectation of its widespread, reliable access make the charging business model challenging. The federal government has historically played a constructive role in addressing market transition opportunities like this and EVs are no different.

Combined, the National Electric Vehicle Infrastructure (NEVI) program and the Charging and Fueling Infrastructure Grants (CFI) funded through IIJA is the single largest investment in charging in U.S. history. These programs take a thoughtful, complementary approach to building out the nation's charging infrastructure, helping to ensure Americans can use their EV to go anywhere they want. Over the last two years, state departments of transportation (DOT) across the country have created strategic plans, built capacity, introduced themselves to their local utilities in some cases, and stood up this brand-new program that is quickly becoming an integral part of the DOT's operations. As of late April 2024, six states have stations open to the public, one state's first station is under construction, 13 states have issued awards, and 15 states are currently issuing or evaluating proposals. By the end of 2024, we can expect NEVI-funded stations to be open or under construction in most states.

State DOTs are largely engineering-focused institutions, and as an engineer, I can tell you that we like to plan and make sure we get everything right before committing major resources to a project. The first 12-18 months of NEVI were just that; many state DOTs had never funded an EV charging project and had to hire new staff or bring in outside help. All of this takes time, but these planning and capacity building activities are critically important to ensure the goals of NEVI are realized and that these and future funds are used in a way that is transparent, efficient, and equitable.

NEVI is doing more than building out fast charging along the Interstate Highway System. The requirements related to power, charger count, and reliability are transformational for the industry. At each NEVI-funded station, EV drivers can expect at least four ports, each delivering 150 kilowatts of power, that are available and operational nearly all of the time [12].[1] These requirements raise the bar for a nascent industry and provide much-needed certainty on where companies must go to deliver a customer experience akin to gasoline refueling.

While it's best for the grid and household budgets for EV drivers to charge overnight where they park, many households do not have this opportunity today. Millions of families rent, live in large apartment buildings, park on public streets, or otherwise don't have the ability to deliver power to where they park. A lack of public, fast charging can make it hard for those drivers to consider an EV. Here, NEVI and CFI are filling another important charging access gap.

Charging infrastructure will continue to be a challenge for the EV industry in the near term as more everyday Americans buy EVs. The bar for the charging experience will rise because these drivers will not be as forgiving as early adopters have been with regards to technical glitches or other unexpected issues. The good news is that programs like NEVI, CFI, and many state and electric

[1] NEVI requires an average annual uptime of 97 percent or greater for each port.

utility programs nationwide, are fostering a vibrant private charging market. Future programs focused on fast charging should continue to raise the bar through higher power requirements and offering more ports per station.

Electrifying Commercial Trucks

Like passenger vehicles, the zero-emission commercial truck market in the United States is experiencing significant growth and transformation, driven by increasing demand for sustainable transportation solutions and the need to reduce greenhouse gas emissions in the logistics sector. As the market evolves, we must understand the status quo, key drivers, challenges, and the role of the federal government in supporting the accelerated deployment of zero-emission trucks.

Currently, as more models become available the zero-emission truck market is seeing a surge in sales. As of December 2021, only 1,215 zero-emission trucks had been deployed in the United States, but by June 2023 that number had climbed to over 17,500, including deployments in every state [13, 14].

Manufacturers are introducing a variety of battery-electric and hydrogen fuel cell trucks to cater to different applications, from last-mile delivery to long-haul transportation. For example, some urban delivery trucking fleets are already saving money by deploying zero-emission vehicles [15]. Health and climate benefits aside, the lower operating costs, reduced maintenance requirements, and improved driver experience have made zero-emission trucks an attractive option for last-mile delivery operations.

In new markets like this, incentive funding at the state and, particularly, the federal levels play a crucial role in offsetting the higher upfront costs and encouraging fleet adoption. Additionally, numerous demonstration programs across the country, such as the North American Council for Freight Efficiency's Run on Less Electric events, have showcased the real-world performance and benefits of zero-emission trucks [16]. These programs provide valuable insights into the operational capabilities and cost savings potential of zero-emission technologies. Furthermore, the increasing demand from shippers and logistics companies to reduce emissions across their supply chains has created a strong market pull for zero-emission trucks.

Despite this progress, the zero-emission truck market still faces several barriers to widespread adoption. One primary challenge is the lack of truck-specific recharging and refueling infrastructure, such as pull-through spots designed to accommodate larger vehicles. The absence of a comprehensive network of charging stations and hydrogen fueling facilities has hindered the deployment of zero-emission trucks, particularly for long-haul operations.

Moreover, the economics of zero-emission trucks remain challenging due to the higher upfront costs of vehicles and the need for significant, expensive investments in charging infrastructure.

User acceptance is another barrier, as the trucking industry is known for its risk-averse approach to adopting new technologies. Specifically, there is a misconception that zero-emission technologies are unproven in terms of durability and reliability, which has slowed down their adoption. Lastly, the lack of parking facilities for commercial trucks, especially tractor-trailers, presents an opportunity to address both the infrastructure and parking challenges simultaneously [17]. As a result, investing in the development of truck parking facilities equipped with chargers and amenities, such as showers and convenience stores, can support the deployment of zero-emission trucks while improving driver comfort and safety.

The federal government plays a vital role in supporting the accelerated development and deployment of zero-emission trucks through several programs, such as those in IIJA and IRA. To ensure that we remain competitive in the global zero-emission truck landscape, we must focus on domestic manufacturing and supply chain development for both vehicles and infrastructure.

The federal government can continue to provide incentives, grants, and low-interest loans to encourage investments in zero-emission truck manufacturing and the establishment of a robust charging and refueling infrastructure network. Additionally, the government can support research and development efforts to improve battery and fuel cell technologies, enhance vehicle efficiency, and reduce costs. Programs like NEVI, CFI, and Rebuilding American Infrastructure with Sustainability and Equity (RAISE) grants help take equipment from the laboratory to the field and are essential to fostering a nascent market like electric trucks. Collaboration between the public and private sectors, along with targeted investments in workforce training and education, can help build a strong ecosystem for zero-emission trucks in the United States, such as in state-sponsored workforce development programs and the U.S. Department of Energy's Electric Drive Vehicle Battery Recycling and 2nd Life Apps Program.

As the zero-emission commercial truck market grows and evolves, we must address these barriers and leverage opportunities to accelerate the transition towards sustainable transportation. By implementing market-based policies, investing in infrastructure, and fostering domestic manufacturing capabilities, the United States can position itself as a leader in the zero-emission truck industry while creating jobs, reducing emissions, and driving innovation in the logistics sector.

Transit Bus Electrification

Zero-emission transit buses have been deployed across cities and municipal regions throughout the United States to abate air pollution and greenhouse gas emissions in hard to decarbonize urban areas. A recent study by CALSTART found that the United States has 5,775 battery electric transit buses on the road as of September 2023, an increase of 12 percent since 2022 [18]. More than half of these buses are operating in California (1,760), New York (737), and Florida (464). While the growth rate nationwide slowed compared to 2022, seven states (Illinois, Massachusetts, Missouri,

New York, North Carolina, Ohio, and Oregon) saw their zero-emission bus deployment rise by at least 50 percent.

This marked growth in regions nationwide is expected to accelerate in the near term largely thanks to funding from IIJA. The law supercharged the popular Low and No Emission (Low-No) Program run by the Federal Transit Administration (FTA) with $5.25 billion in funding over five years [19]. Last year, more than $1.2 billion was awarded to 130 projects in 46 states. To put this in perspective, the Low-No funding awarded in the first two years of IIJA was 3.5 times the total amount awarded in the history of the program. Nearly 70 percent of that funding has gone to zero emission technology, and those buses will make a meaningful difference in the health and well-being of the transit workers who will operate them [8].

The transition to zero emission buses will take time. The technology available today, while steadily improving, may not yet meet every use case. For example, cold weather range loss is particularly challenging for regions with harsh winter seasons, and these losses are exacerbated at slower speeds. At 60 miles per hour or greater, on the other hand, recent analyses reveal that temperature has little or no effect [20]. Thus, transit agencies must account for this expected range loss in their route and charging planning. Technological solutions and operational strategies can be used to minimize these impacts, such as pre-heating the interior and battery, installing more efficient heating technology in buses, and creating strategic planning and adaptation guidelines for transportation authorities.

The funding boost from IIJA is coming at the best time as transit agencies nationwide are lining up to commit to a zero emission future. The nation's seven largest transit bus fleets, spanning from Los Angeles to Boston to right here in Washington, DC, make up more than 60 percent of our total transit bus fleet [21]. Each one of these agencies intends to purchase only zero emission buses in the next eight years.[2] It's an ambitious and laudable goal, and they will need continued help from Congress and state governments to deliver on these promises.

Looking Ahead

Electrifying the transportation sector is an opportunity we cannot miss — too much is at stake. The health of Americans, our economy, and our planet demand we decarbonize vehicles as quickly as possible. And effective public policy, at all levels of government, is crucial to decarbonize.

We're in the middle of a global economic competition for the future of vehicle manufacturing. At the moment, the United States is playing catchup to China and Europe but there is still time to for us to

[2] Individual transit agency websites spell out agency goals or state requirements to transition to zero emission vehicles for all new purchases within the next 10 years.

regain a leadership position, and we must, in order to continue supporting millions of U.S. jobs and an industry vital to our economy.

Congress's leadership through the IIJA and IRA has generated a wave of positive momentum in the United States. We are seeing billions in new investments in manufacturing, thousands of new, good paying jobs, and the deployment of advanced vehicle and charging technology nationwide.

Surface transportation reauthorization is a rare opportunity for Congress to redouble its efforts to support electrifying U.S. transportation through continued and expanded funding for charging infrastructure and vehicle deployment. Specifically, Congress should renew the NEVI and CFI programs. Updating NEVI's requirements to meet the needs of current and future EV drivers is a crucial accessibility consideration, and can be done by increasing charger power levels to 350 kilowatts per port and doubling the minimum number of ports from four to eight per station. Second, Congress should support the burgeoning truck electrification market by targeting charging deployment along rights of way and at shared public sites to support small businesses who may not have ready access to a depot. Lastly, Congress should consider updating the Low-No Program to focus funding on zero emission technology, since electrified transportation is the best option for the environment, human health, and our economy.

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