

Transforming our Transportation Sector: Electrifying Cars, Trucks and Buses for Clean Future

May 29, 2020

A strong economy requires stable, secure energy and a healthy and safe environment. New technologies are coming into the marketplace that can deliver both. Rebuilding better means doing all we can to accelerate their deployment.

Our vision is that by 2050 – thirty years from now – our transportation fleet will have been totally transformed. Our cars will be electric with charging stations prevalent in homes, apartment buildings, office buildings, malls, and parking lots.

Our vision is that by 2050 every child will ride to school in a bus that emits no pollution. The air in every major American city will be cleaner because buses and trucks will be powered by clean electricity, and not by polluting diesel and gasoline. And every package delivered to your door, whether delivered by the Federal Express, UPS, or the Post Office, will arrive to you in a zero emission vehicle.

Over the next four years, we need to create incentives and policies that will make a clean transportation a reality here in America. Our goal is to have the most productive, vibrant economy in the world, with people and goods moving freely from place to place, all without the harmful pollution or dangerous geopolitics that our current oil-based economy imposes on us.

This is especially critical for low income, black, and Latino neighborhoods that now suffer with disproportionately high levels of air pollution. With elevated rates of asthma and other pollution-related conditions, these communities are choking on the dirty fuels that now power our transportation sector.

What's the path for a bold approach to dramatically decrease pollution, create new jobs across the economy, and to clean the air in low income communities?

Let's start with Light Duty Vehicles.

Transforming the Environmental Impact of Light-Duty Vehicles:

The passenger vehicle market is primed for electrification. Manufacturers are investing tens-of-billions to ready for the technology. Scores of models are available or have announced production dates.

There have been many helpful and impressive proposals that would move us toward a cleaner, more modern automobile fleet. Here are some of the key aspects that are critical toward success.

- 1. Set a clear timeframe for 100% zero-emissions fleet:** Certainty is critical for manufacturer investment. Many countries have set timelines for completing the transition to zero-emissions vehicles. General Motors has embraced the vision of a 100% electric future. The next administration should set an ambitious, data-driven timeframe for completing the U.S. transition to zero-emission vehicles.

- 2. Establish clear, enforceable, achievable standards:** The next administration needs to establish the regulatory pathway to achieving the U.S. transition to zero-emission vehicles. A critical step in this will be to direct the U.S. EPA to undertake a phase 3 rulemaking that establishes light-duty vehicle emission standards for 2027-2035 that require increase in zero emissions vehicles at a pace consistent with achieving a 100% clean economy by 2050. The agency should be directed to work in partnership with the California Air Resources Board and other state leaders in this effort.

While pursuing a new generation of transformational standards, the next administration should also concurrently direct the U.S. EPA to the U.S. DOT to reinstate Obama-era light-duty vehicle standards for 2022-2025.

- 3. Accelerate the introduction of clean vehicles and the turnover of the U.S. fleet:** The average age of a light-duty vehicle in the U.S. is 11.8 years – an all-time high. The current pace of fleet turnover means more than half of the U.S. light-duty emissions means that combustion vehicles purchased in 2021 will be locking in emissions until the mid-to-late 2030s. It's imperative that federal policy maximize the uptake of light-duty electric vehicles. Manufacturers are ready for this challenge. The U.S. is expanding rapidly with over 80 models already announced by the end of 2022. Globally, carmakers will spend more than \$135 billion through 2030 developing new electric models. The next administration can immediately impact the pace of electric vehicle adoption and fleet turn over by:
 - Extending and expanding the purchase tax credits for zero-emission vehicles; and
 - Establish a cash-for-clunkers type program specifically supporting the purchase of new zero-emission vehicles. This program could play a critical role to jump-start automotive employment coming out of the economic slowdown
- 4. Support state leadership:** It is critical that the next administration re-establish a strong partnership with states around protective vehicle emission standards. To that end, it should work in partnership with California and other states on the development of a phase 3 program and complementary state-driven programs.
- 5. Encourage the production of passenger Zero Emissions Vehicles:** The next administration should explore extending and expanding manufacturer production credits. Any financial support to the industry should support its transition to producing zero-emission solutions.
- 6. Support the development of appropriate charging infrastructure:** The next administration should work in partnership with states to develop an act plan and funding sources to achieve the charging infrastructure build out envisioned in National Renewable Energy Laboratory September 2017 report: National Plug-In Electric Vehicle Infrastructure Analysis.

Transforming the Environmental Impact of Medium- and Heavy-Duty Vehicles:

Transforming our automobile fleet is critically important but it is not enough. We also have opportunities with Medium and Heavy Duty Vehicles.

If this seems like a distant dream, know that the technology for electric buses, delivery vans, short haul trucks is here today. U.S. truck manufacturers are investing billions to develop electric vehicles for nearly all market segments. Thomas, IC, and Blue Bird are producing quality electric school buses, which eliminate children's exposure to harmful diesel emissions. All told there are over 100 truck and bus models here in the US already in service or announced for production within the next three years. Best of all, they are cheaper and easier to maintain than gasoline or diesel fueled alternatives.

But China and Europe aren't sitting still. They are developing technologies of their own and forging ahead in manufacturing and deployment. A few cities in China have already made the switch to 100% electric buses and taxi cabs. Meanwhile, the United States – with great technology to offer - is failing to scale up domestic manufacturing because we are falling behind in deployment here at home. Barriers to adoption include reducing the upfront cost of the vehicle (recovered over time through fuel and maintenance savings) and deploying the infrastructure necessary to keep them conveniently charged.

What steps do we need to move us toward global leadership and cleaner air?

1. Clear Goals and Standards

- a. **100% zero-emission trucks and buses on the road by 2050:** Certainty is critical for industry. In the absence of leadership at the federal level, heavy-duty vehicle manufacturers are defining a future path for themselves. Daimler Trucks North America, parent of Detroit Diesel and Freightliner, has declared that it will only sell carbon-neutral vehicles after 2039. Cummins has set a 2050 target "to power customer success by powered by carbon neutral technologies that address air quality." As important as these aspirations are, manufacturers are most able to drive product development in the presence of a market-wide target, which requires public-sector leadership.
- b. **Establish clear, achievable, enforceable emissions standards:** The next administration can direct the U.S. EPA to finalize combined GHG and NOx standards for new vehicles starting in 2027 and extending to 2035 or beyond. These standards should drive the adoption of zero emissions vehicles at a pace consistent with achieving a 100% zero emission trucks and buses on the road 2050.
- c. **Embrace State Leadership:** States are advancing critical policies for reducing pollution from trucks and buses. Leadership actions include the Advance Clean Truck Program in California and the development of zero-emission truck action plans under way in eight other states. The federal government should encourage state leadership, partner with states, and grant any waivers required under the Clean Air Act.

2. Expand Incentives to Accelerate Fleet Turnover.

Trucks and buses are long-lived assets, which means incentive programs are required to hasten the pace of fleet turn over. There are at least three near-term policy opportunities to ensure that at least 75% of all new buses and 33% of all new trucks sold in the United States by 2030 – ten years from now – are 100% emission free.

- a. For transit buses, the DOT Federal Transit Administration (FTA) Low-No Emission Vehicle Program provides grants for the purchase of zero- and low emission transit buses and infrastructure. Given that electric buses are a viable option for much of the nation’s fleet and will further expand their appeal as battery costs continue to fall, this program should be expanded. The Green Bus Act, introduced by Rep. Brownley, would increase the funding for this program from \$85 million in 2019 to \$900 million in 2029 and require all new transit buses to be zero-emission by 2029.
- b. For school buses, the Clean School Bus Act – introduced in both the House (Rep. Hayes) and the Senate (Sen. Harris) would authorize \$1 billion over five years at the Department of Energy to fund a Clean School Bus Grant Program, which would award funding on a competitive basis to replace existing school buses with ZEV models. This bill should expand to include support through 2030 and include a program that supports rural school district electrification, because every American kid deserves to breathe clean air.
- c. For commercial trucks, there are a wide range of commercial trucks with viable electric alternatives on the road or nearing production, including delivery vans, yard trucks, large box trucks, and freight tractors for regional operations. Significant uptake of electric vehicles is possible in these segments over the coming decade. Progress in these sectors will drive technology improvements that will further unlock process is longer and heavier haul operations. Targeted federal programs can advance the uptake of these vehicles.
 - i. First, the federal government should suspend the federal excise tax on zero-emission trucks. New heavy-duty trucks pay a 12% federal excise tax to provide funding for the Highway Trust Fund. This tax is based on the purchase price of the vehicle and therefore exacerbates the current upfront cost discrepancy between diesel and ZEVs. The U.S. should waive this tax for ZEVs through the mid-2020s, when the upfront cost of diesel and ZEVs are expected converge.
 - ii. Second, the federal government should establish a National Zero-Emission Voucher program, modeled on the many successful state voucher programs already in operation. To date, state-based voucher programs have delivered more than \$600 million in California, Illinois and New York for zero emission truck deployment. A federal program which incentivized establishment of programs in all 50 states through federal matching grants, similar to how the Federal Transportation Trust

Fund operates, would build on this successful model and allow individual states to direct resources toward those truck fleets and types that had the biggest impact on their respective economies.

For example, in states with large port facilities, drayage trucks – which haul goods in and out of ports and rail yards – are often old and poorly maintained. The low-speed, high idling operation of these vehicles exacerbates the shortcomings of diesel emission control equipment. These vehicles also operate in densely populated areas and often in or near disproportionately impacted communities. The combination of these factors results in drayage trucks being a significant contributor to poor air quality in numerous major metro areas. While the technology is ready, deployment has yet to happen. A voucher program could make a key difference in transforming our nation's ports.

3. Encourage the Production of Zero Emission Buses and Trucks in the United States

Smart policies can create the long-term certainty necessary to stimulate production investments from truck manufacturers and component suppliers. The federal government also has an important role in catalyzing the development and scaling of advanced technology solutions through robust R&D investments. One opportunity is to launch a heavy-duty version of the Advanced Technology Vehicles Manufacturing Direct Loan Program. Through this program, the U.S. Government provided direct loans for light-duty vehicle manufacturers to produce fuel efficient cars. This program supported the production of over 4 million advanced technology vehicles and invested \$8 billion into American auto manufacturing. A similar program would enable manufacturers to expedite bringing ZEV trucks to market.

4. Support the development of appropriate charging infrastructure:

A well-developed charging network is essential to accommodating large-scale deployments of electric vehicles of all kinds. This infrastructure should be deployed to effectively alleviate range anxiety, mitigate expensive, unnecessary grid upgrades, and facilitate greater integration of renewable energy. There are many ways the federal government can support the development of this infrastructure, including:

- a. Grant programs that help states and municipalities develop and implement charging programs, and incentivize commercial fleet operators and owners of large, non-government-owned fleet depots to install charging stations.
- b. A federal revolving loan fund for the purchase and installation of electric vehicle charging infrastructure. Such a fund could be targeted at state and local governments and multijurisdictional transit agencies. Separate portions of the funds should be dedicated to creating infrastructure designed for use by light-duty and by heavy-duty vehicles.

- c. Research, develop and fund best practices for depot charging. Given their distinct needs and patterns from light-duty vehicles, heavy-duty vehicles would benefit from dedicated research into how to manage their charging load. the Department of Energy should identify opportunities for heavy-duty vehicle electrification through a report similar in scope to the National Plug-In Electric Vehicle Infrastructure Analysis it conducted in September 2017. DOE should then make grants available to realize the opportunities identified in that report.
- d. Enact an investment tax credit for large-scale storage. Electric school buses and other heavy duty vehicles with irregular and seasonally variable operating cycles can provide valuable grid support services with the right financial incentives and wholesale market structures. Working through Congress and Federal Energy Regulatory Commission, the administration could create value for electric fleet owners and operators by incentivizing bulk electric storage and the wholesale market structures that reward 'vehicle to grid' deployment

5. Invest in the Next Generation of Solutions

The U.S. Government has supported the development of zero emissions truck and bus solutions through critical research, including on batteries. More investment is needed to unlock advanced solutions that will extend the range of truck segments with viable zero-emission solutions. One opportunity is to increase and expand R&D funding for heavy-duty vehicle technologies through the DOE Office of Energy Efficiency and Renewable Energy. This program has supported the Super Truck program, which has played a critical role in accelerating the introduction of vehicle efficiency solutions. Increased funding could be targeted at technology advancements such as enhancing charging systems and advancing battery design to enable lighter, more energy-dense and lower-cost batteries.