

**United States House of Representatives
Select Committee on the Climate Crisis**

**Hearing on July 16, 2019
“Solving the Climate Crisis: Cleaning Up Heavy Duty Vehicles,
Protecting Communities”**

Questions for the Record

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The Honorable Kathy Castor

1. In your testimony, you referenced the Advanced Technology Vehicles Manufacturing Loan Program administered by the U.S. Department of Energy. How could this loan program be amended to facilitate greater deployment of zero-emission heavy-duty vehicles?

One of the goals of the Energy Independence and Security Act of 2007, which established the Advanced Technology Vehicles Manufacturing Loan Program (ATVM), is to increase the efficiency of vehicles and improve US energy security. The loan program, however, was limited to the improvement of the use of advanced technologies in light-duty cars and components manufactured in the United States. Manufacturers of heavy-duty vehicles - such as electric public transit buses - are ineligible to apply for the low-interest loans. My understanding is that there is approximately \$16B remaining in this loan program, having successfully helped companies such as Tesla, Nissan and Ford. The loans are currently limited by statute to manufacturers and suppliers of light duty vehicles, the class of vehicles that weigh 8500 pounds or less. Congress should amend this program to allow U.S. heavy duty vehicle manufacturers, like Proterra, to apply for loans that will help them invest in R&D and accelerate product development. The amendment should expand the eligibility to include manufacturers of zero-emission heavy duty vehicles - which weigh more than 8500 pounds - for public transportation that meet certain criteria. I suggest expanding the ultra-efficient vehicle category by adding a new vehicle class. The new class of vehicles must be able to operate as a fully electric vehicle that can carry 28 passengers and pass standard energy economy tests established by the FTA’s Model Bus Testing Program.

2. California’s Gross State Product is over \$3 trillion. If it were a sovereign nation, it would have the 5th largest economy in the world. For those that suggest that decarbonization requires sacrificing economic growth, how would you respond?

Investing in decarbonization promotes economic growth and American leadership in the global economy. Advancement and growth in the clean energy sector is critical to America’s economic competitiveness and is creating good paying jobs across the country. Decarbonization in its various forms has contributed to California’s significant economic growth in the form of investment, venture capital and job creation. California has demonstrated decades of job growth in the clean tech economy – experiencing more job and wage growth than the United States as whole.¹ Today, more than 500,000 Californians are working in clean energy.² Further, by targeting efficiency technologies like LED and electric vehicles, the US economy could create more value with less energy, providing a competitive advantage.

The reality is that encouraging innovation attracts entrepreneurs, which in turn attracts private venture capital funding, which in turn leads to job creation and generates economic growth. In 2017, California attracted \$1.42B of clean technology venture capital funding.³ And the state attracted over \$22B in clean technology venture capital funding from 2007 to 2017 due to the strong ecosystem of innovation that was developed in response to semiconductor, software, energy and healthcare opportunities.⁴ California's share of the clean technology global venture capital funding during this same period has ranged from 48% to 18%.⁵ Proterra alone has raised over \$500M in capital and created more than 575 US jobs while establishing its Corporate HQ and two manufacturing facilities in CA.

Lastly, California's emissions fell 1% in 2017, to 424 million metric tons. But the state's economy grew at 3.6%, higher than the national average, demonstrating that reducing emissions does not hamper economic growth.⁶ According to the California Green Innovation Index, California had greater emissions reductions (-11.1%) than the United States as a whole (-10.2%) between 2006-2016, while also achieving greater economic output.⁷

3. Deploying more electric vehicles, buses, and trucks will add significant demand to the electricity grid. What can Congress do to prepare the grid for large-scale electrification?

It is worth noting that Tesla reports deploying approximately 14,000 "super chargers" in North America of power levels ranging from 75 kW to 150 kW and, as I understand, without any stress on the overall grid. <https://www.tesla.com/supercharger>. Tesla has made local investments to distribution hardware (transformers and switch gear) to facilitate super charger locations in many areas, but they haven't required more power plants. The Tesla example is relevant because those "super chargers" are the approximate power level of a bus charger, meaning we have a proof point that approximately 14,000 electric buses worth of plug-in chargers has already been installed without impact to the grid. To put this into perspective, the load of the entire US public transit fleet (approximately 70,000 buses) charging at 100 kW simultaneously would be 7 gigawatts, or less than the average annual capacity increase from 2007-2017.⁸

I believe that planning for and managing demand on the grid is the primary responsibility of utility companies. Recent studies have shown that, overall, there's not a near capacity scarcity and EVs have the potential to help balance loads and improve the resiliency of our nation's electricity infrastructure.⁹ That being said, it is imperative we take a collaborative approach to proactively managing grid demand as we move towards large-scale electrification. Congress can help in the following ways:

- Expand the Alternative Fuel Tax Credit (26 U.S.C. §6426(d)) to make fuel neutral by including electricity as an alternative fuel. By including electricity as an alternative fuel, Congress will level the playing field by making the credit fuel neutral, promote competition on the merits for alternative technologies and further promote conversion to alternative fuels, thereby reducing U.S. dependence on foreign oil and encouraging creativity and innovation in the marketplace.
- Expand federal funding for energy research and development, and in particular for the Department of Energy's Office of Energy Efficiency and Renewable Energy (Vehicle Technologies Office) and Advanced Research Projects Agency-Energy.
- Provide additional federal funding support for infrastructure projects that will support medium- and heavy-duty vehicle fleet deployments at the state and local levels including school bus and transit bus projects.
- Increase federal agency research on electrification, automation, and connectivity technologies and deployment strategies.
- Fund vehicle-to- grid integration and stationary battery storage demonstration projects to promote grid resiliency and smart cities demonstration projects.

- Fund research and development of battery-electric technologies and create incentives to further investment in primary battery cell development and manufacturing in the United States to support a domestic supply chain for stationary storage and vehicle applications.
- Encourage more collaboration between the Federal Energy Regulatory Commission and the state regulators (including state Public Utility Commissions and state energy offices) on electric vehicles, electric vehicle infrastructure and other emerging grid technologies to ensure better planning and coordination.
- Help cities and utilities plan so that they can identify the structural needs to support the integration of vehicles and infrastructure into city and utility operations.
- Encourage North American electric vehicle charging connection standardization by working with private standard setting organizations, such as the Society of Automotive Engineers (SAE).
- Encourage the adoption of a new Transportation Infrastructure bill that includes funding for heavy-duty electric vehicle fleets and the accompanying electric vehicle infrastructure.
- Support investment in infrastructure, storage and smart technologies that enable demand management and promote grid resiliency.
- Support or create incentives for power companies to accelerate transition of the grid from point-to-point to electric distribution as a network.

The Honorable Garret Graves

1. I assume you are competing against Chinese bus manufacturers. How well do you compete against them and what is your biggest concern about having to compete with them in the U.S. market? What can Congress do to help?

One of our competitors is the Chinese-manufacturer Build Your Dreams (BYD) and we compete throughout the United States for electric bus deployments for public transit agencies. Published reports show that BYD benefits from aggressive Chinese subsidy programs to lower prices in order to win business. We believe this reflects a strategy to price below market costs to eliminate competition and dominate the market in the United States and around the globe – which is the goal of Made in China 2025. To address this practice, Rep. Harley Rouda recently introduced a bill (HR 2739) that would prevent federal transit funds from being used by transit agencies to purchase rail cars or buses manufactured by Chinese owned, controlled, or subsidized companies. The same bill was introduced in the Senate by Senators Cornyn and Baldwin (S 846). Both bills were made part of the National Defense Authorization Act (NDAA) for Fiscal Year 2020. Section 6015 of the Senate NDAA retained Rouda bill language that would preclude funding for Chinese-supported rail and bus rolling stock. Unfortunately, section 896 of the House NDAA did not and limited the restriction solely to rail rolling stock. Congress should pass the Senate version in the NDAA conference report so that buses are included. A final NDAA bill that includes buses will ensure that U.S. manufacturers like Proterra and its domestic suppliers do not face unfair competition from companies that receive support from the Chinese government. Prohibiting federal transit funds from being expended on Chinese rolling stock would have the added benefit of protecting our national security and transportation and electric grid infrastructure from the threat that China poses and improving cybersecurity in public transportation.

2. What are some of the challenges of electrification for long-haul agriculture and food supply vehicles? Do you see potential concerns for farmers, the food supply chain, and to food safety, animal welfare?

The challenge for long-haul agriculture and food supply vehicles, as I see it, revolves around vehicle range and charging infrastructure deployment. Range is impacted by the use of auxiliary items like refrigeration and HVAC systems to provide humane conditions for animals being transported. Electrification in the food sector would have to accommodate refrigeration in many applications, which will impact the range of those vehicles. Short distance food supply vehicles would require careful route analysis and planning to ensure that they were able to meet their daily routes while accommodating the energy needs for refrigeration. High power and high-speed charging could solve that problem if vehicles were able to charge mid-day. Mid-day charging could top off the batteries on longer routes. However, this raises a second challenge involving the right placement of high power, high-speed chargers for long-haul agriculture and food supply vehicles.

That being said, we see opportunities for EV technology to improve economic productivity in the agriculture sector, and to reduce emissions exposure and health care costs for workers in the agricultural economy. The bus & truck sector share many components and supply chains with the off-road commercial vehicle sector, which includes mining, construction and agricultural vehicles like tractors and harvesting equipment. In the near-term, the first opportunities for EV technology to provide benefits to the agricultural sector will be in fleet-based farm and ranch vehicles. These EVs will enable farmers to reduce their dependency on a single fuel type, and in many cases allow farming operations to self-generate much of their energy, as we increasingly see farms deploying solar and wind energy to diversify their revenue and gain more self-sufficiency. In terms of food safety and animal welfare, zero emission electric vehicles used in the agriculture sector will reduce the level of diesel pollution in crops and livestock, enabling a healthier food supply for America. In the long-term, zero emission freight trucks and trains could enable low-cost, zero emission freight shipments between major agriculture markets. Long-haul electric trucks are already being introduced by major manufacturers including Freightliner, Tesla and Volvo. Long-haul will require more infrastructure investment that may include on-road charging similar to what has been demonstrated in Northern Europe. But the near-term opportunities for farm, construction and mining electric vehicle technology offer the most immediate economic, health and environmental improvements for the agricultural sector.

References Page

1. 2018 California Green Innovation Index, Next 10 (10th Ed.); <https://www.next10.org/2018-giiE>; *see also* Energy Efficiency, Innovation and Job Creation in California, David Roland-Holst, UC Berkeley. https://are.berkeley.edu/~dwrh/CERES_Web/Docs/UCB%20Energy%20Innovation%20and%20Job%20Creation%2010-20-08.pdf
2. Clean Jobs California 2019. <https://www.e2.org/reports/clean-jobs-california-2019/>; *see also* Many Shades of Green: Diversity and Distribution of California's Green Jobs, Next 10, U.S. Metro Economies: Current and Potential Green Jobs in the U.S. Economy, U.S. Conference of Mayors. http://actrees.org/files/Research/Many_Shades_of_Green_1209.pdf;
3. 2018 California Green Innovation Index, Next 10 (10th Ed.); <https://www.next10.org/2018-gii>
4. *Id.*
5. *Id.*
6. Clean Energy Powers California Climate Emissions Drop, J.D. Morris, Bix & Tech (Aug. 14, 2019). <https://www.sfchronicle.com/business/article/California-cuts-greenhouse-gases-but-14299117.php>
7. 2018 California Green Innovation Index, Next 10 (10th Ed.); <https://www.next10.org/2018-gii>
8. https://www.eia.gov/electricity/annual/html/epa_04_02_a.html
9. Connecting Electric Vehicles to the Grid for Greater Infrastructure Resilience, National Renewable Energy Laboratory. April 20, 2017. <https://www.nrel.gov/news/program/2017/connecting-electric-vehicles-to-the-grid-for-greater-infrastructure-resilience.html>