Sharing the Road: Policy Implications of Electric and Conventional Vehicles in the Years Ahead - Testimony

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Good morning, Chairman Shimkus and Ranking Member Tonko. My name is Dr. David Reichmuth and I am a Senior Engineer with the Union of Concerned Scientists, a non-profit advocacy organization whose primary mission is to ensure that policy is crafted based on the best available science.

Thank you for the invitation to talk to you about the benefits of electric vehicles or EVs. The promise of EVs are clear: drivers can save money, harmful emissions are reduced, and the use of petroleum can be minimized. Reducing emissions means public health benefits, economic benefits, and avoiding the worst impacts of climate change. Transportation is now the leading source of carbon dioxide emissions in the United States. Addressing the emissions from this sector is a critical piece in moving towards a more sustainable economy and way of life not for just the United States, but worldwide.

Switching fuels from petroleum to electricity can produce significant emissions reductions. My colleagues and I have compared the climate emissions from driving on electricity versus gasoline. To do so, we considered all of the global warming emissions from fueling power plants and getting electricity to an EV and compared that to the emissions created extracting crude oil, refining gasoline, distribution to filling stations, and combustion in a vehicle's engine.[1] Our most recent analysis shows that cars driving on electricity in the US have emissions equal to

[1] "Cleaner Cars from Cradle to Grave," R. Nealer, D. Reichmuth, and D. Anair. Union of Concerned Scientists, Cambridge, MA: 2015. https://www.ucsusa.org/clean-vehicles/electric-vehicles/life-cycle-ev-emissions

what a gasoline car that gets 80 MPG would produce.[2] It's true that emissions from EVs vary depending on where in the US they are driven, as the emissions from electricity generation varies regionally. For example, using data released earlier this year from the US Department of Energy and the EPA, charging on the grid that includes Oregon, the average EV has emissions equal to a car that gets 96 MPG, while in a some of the best regions like California and upstate New York, an EV is better than a 100 MPG car. Overall, seventy-five percent of people in the US now live in places where driving on electricity is cleaner than a 50 MPG gasoline car. And these figures are for the average EV. The most efficient EVs are even cleaner, better than 80 MPG equivalent in areas like Texas and the Carolinas.

Not only are EVs cleaner than gasoline cars, the gap is growing as electricity generation shifts away from dirtier fossil fuels to sustainable, lower emission resources. From 2007 to 2017, coal generation dropped from nearly 50 percent to 30 percent of all power generation. At the same time, renewable sources (not including hydropower) like utility-scale solar and wind power have grown to make up almost 10 percent of US electricity generation.[3] The result is that EVs are getting cleaner across America. And unlike gasoline cars, even used EVs get cleaner as the grid gets greener.

We also examined the difference in emissions between manufacturing an electric car and a similar gasoline-powered vehicle. Our results show that while there are slightly higher global warming emissions from producing an EV (due primarily to battery manufacturing), these emissions are dwarfed by the savings realized when driving on electricity instead of gasoline.

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[2] "New Data Show Electric Vehicles Continue to Get Cleaner," D. Reichmuth. Union of Concerned Scientists Blog, 2018, https://blog.ucsusa.org/dave-reichmuth/new-data-show-electric-vehicles-continue-to-get-cleaner

[3] This excludes hydropower. Renewable energy and hydropower combined to produce 17 percent of US electricity. https://www.eia.gov/tools/faqs/faq.php?id=427&t=3

The emissions "debt" from EV manufacturing is repaid over the first 6-16 months of operation, depending the size of the EV's battery (assuming the average US electricity grid). Also, auto companies have an opportunity to further reduce their emissions from manufacturing vehicles through using renewable electricity to power their factories. For example, Tesla is installing a large rooftop solar installation to power its growing battery manufacturing facility in Nevada.

EVs also have air quality benefits when paired with clean sources of power. A study by the Electric Power Research Institute and the Natural Resources Defense Council showed the potential to for EVs to reduce ground-level ozone and particulate matter in both urban and rural areas across the country.[4]

But EVs are not just cleaner than gasoline vehicles, they are also cheaper to refuel and maintain. In a recent UCS analysis, we compared the cost to refuel with gasoline to the cost to recharge an EV.[5] Looking at the electricity providers in the 50 biggest US cities, recharging an EV is cheaper than a refueling with gasoline in every city. Compared to the average new gasoline vehicle, driving an EV would save on average almost $800 per year on fuel costs. In addition to lower fuel costs, the price of residential electricity is much less volatile than gasoline prices. EV drivers can enjoy lower fuel spending and avoid unexpected shocks to their household budgets from spiking gasoline prices. Drivers of battery electric vehicles also can have significantly lower maintenance costs. These cars have no engine, so no oil changes, spark plugs, or engine air filter to change. Instead, the electric motors and batteries require little to no attention. This means less time and money spent on routine car maintenance. Comparing the

[4] "Environmental Assessment of a Full Electric Transportation Portfolio," EPRI, Palo Alto, CA: 2015. https://www.epri.com/#/pages/product/3002006881/

[5] "Going from Pump to Plug," D. Reichmuth, Union of Concerned Scientists, Cambridge, MA: 2017. https://www.ucsusa.org/clean-vehicles/electric-vehicles/ev-fuel-savings

Chevy Bolt EV to the Chevy Sonic gasoline car, the Bolt owner will spend over $1,500 less on scheduled maintenance over the first 150,000 miles. An American Automobile Association (AAA) study found that electric vehicles have the lowest annual maintenance and repair costs of any vehicle class examined.[6]

It is important to note that while EVs are a solution to reducing emissions and petroleum use, the national fuel economy and emissions standards do not require automakers to produce electric vehicles. On the contrary, automakers can meet the current standards through 2025 primarily by improving gasoline-powered vehicles using technologies like lighter and stronger materials, smaller but more powerful turbocharged engines, and more efficient transmissions. Biofuels, more efficient gasoline cars, and electric drive vehicles all can be and need to be part of the solution to reduce emissions. These tools to clean up transportation are not in conflict with each other. Many of the cars and trucks on new car dealer's lots over the next decade will be gasoline-powered, so making those vehicles as efficient as possible is important.

EVs are an important tool to improve public health and economic vitality, but the EV market, infrastructure, and technologies are still relatively new. It has been less than eight years since the Chevy Volt and Nissan LEAF began sales in the US, marking the start of mainstream EVs in the US. And the availability of long-range, lower-cost battery electric vehicles only started last year. So, while there is strong growth in EVs – both in the number of models available and sales volume – it is far too early to end public-sector investments in EVs and needed infrastructure. Removing support prematurely will delay the adoption of EVs, at a time where we need to be doing exactly the opposite, accelerating the transition to cleaner

[6] "Your Driving Costs." American Automobile Association, Orlando, FL: 2017 https://newsroom.aaa.com/auto/your-driving-costs/

transportation. Other countries around the world are moving to incentivize and require electric vehicles, and manufacturers will need to respond in order to compete. Last year, 4 of the 5 top-selling EV models in the US came off of American assembly lines. Making policy choices in the US that inhibit the growth of EVs will place domestic carmakers at risk of falling behind, hurt American drivers, and harm US manufacturing.

EVs are an important solution to improve air quality and reduce climate-changing emissions. They also allow US drivers to use a cheaper fuel with lower variability in price. The EV market is young but is growing. The investments that the US government, states, automakers, and utilities have made in EVs will pay dividends if we continue to have smart EV policies.

Thank you for the invitation to share UCS's perspective on electric vehicles and I am happy to speak to those issues or anything else of which is of interest to the committee.