Answers to Question for the Record

Following a Hearing Conducted by the House Energy and Commerce Committee,

Subcommittee on Environment,

"Sharing the Road: Policy Implications of Electric and

Conventional Vehicles in the Years Ahead"

Question: ***Mr. Remley could you please provide the Subcommittee with additional information regarding the issues that may arise with a transition to wide-spread EV adoption?***

Answer: As the Committee continues to look at the future of electric vehicles (EVs), it is important to consider whether policy actions are advancing the goals we have set: namely, an attempt to address climate change concerns and reduce carbon emissions. While these goals are important to pursue, to date policymakers have not considered the profile of the emissions created through increases in electricity generation needed to power EVs. A recent report from the Manhattan Institute, in fact, found that widespread adoption of EVs will "increase overall emissions of sulfur dioxide, oxides of nitrogen, and particulates, compared with the same number of new internal combustion engines." The report goes on to state, "The simple fact is that, because of stringent emissions standards and low-sulfur gasoline, new gasoline-powered cars and trucks today emit very little pollution, and they will emit even less in the future."[1] Before we spend significant time and resources promoting EVs, we ought to be sure that they will help fix the issues we are aiming to address. There has not been enough study of these issues to make us confident in the answer to that question.

Furthermore, as we examine more wide-spread EV adoption, it is important to note the challenges posed by increasing use of these vehicles. In addition to the issues presented in my written testimony, further problems that may arise with regard to wide-spread EV use include the capacity strain they may put on electric grids and the potential energy independence and security issues that could arise from promoting use of EVs as a primary form of transportation to the exclusion of other types of automobiles.

The U.S. electric grid is an enormous and complex system—with more than 7,700 power plants and 5.5 million miles of local distribution lines—that delivers power to about 135 million Americans.[2] The grid, however, is not an endless reservoir of power; the energy it provides is generally capable of meeting current usage levels, but grids can be disrupted. For example, a recent analysis from the Institute for Energy Research noted that in Texas, the simultaneous charging of just 60,000 EVs at the wrong time could threaten the state's grid. While 60,000 EVs may seem like a lot, Texas registers about 24 million vehicles annually, so that number represents merely one quarter of one percent of all registrations in a year. As such, it is feasible

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[1] Jonathan A. Lesser, *Short Circuit: The High Cost of Electric Vehicle Subsidies*, Manhattan Institute (May 15, 2018), available at https://www.manhattan-institute.org/html/short-circuit-high-cost-electric-vehicle-subsidies-11241.html

[2] Department of Energy. (2017). *Valuation of Energy Security for the United States*. Washington, DC: DOE. Retrieved from https://www.energy.gov/sites/prod/files/2017/01/f34/Valuation%20of%20Energy%20Security%20for%20the%20United%20States%20%28Full%20Report%29_1.pdf [*hereinafter* Valuation Report]

that there could easily be 60,000 or more owners of EVs in Texas, and if enough of them look to charge at overlapping times, they could disrupt the grid.[3]

The Department of Energy (DOE) notes that EVs might impact the grid in several other ways, most notably, "reduction in transformer life expectancy, accelerated wear and tear of feeder networks, power quality considerations, and capacity upgrades at the substation level to handle the incremental charging demand."[4] DOE also reports that, "Unlike the stationary loads on the grid today, [EVs] are mobile loads able to appear at any charging point, adding complexity to the modeling of the grid and load forecasting."[5] This can be an issue because depending on the model, "the load from one electric vehicle model can be as much as 19 kilowatts, which is more than the load for most large, single-family homes."[6] Grids may not be prepared to handle this kind of power demand, particularly at unexpected or peak times.

In addition to the challenges that EVs pose to the grid, there is also a danger of over-relying on electricity. We have seen in recent natural disasters that electricity can be out for extended periods of time over large geographic areas. For example, according to the Energy Information Administration, during Hurricane Irma last year, more than 60 percent of Florida had power outages for more than a day and outages in some areas lasted more than a week.[7] Those types of events could make it impossible for people to escape disasters if we do not consider the role of other transportation fuels.

Some of these same considerations may come into play in the event of a cyber attack. It is critical to the U.S.'s continued energy independence and security that we are able to compensate for any losses in one form of energy through energy diversification.[8] As such, while much is made of EVs increasing our energy independence and security by reducing dependence on other sources of energy, focusing on EVs to the exclusion of other types of automobiles runs the risk of making the U.S. overly dependent on electricity instead. This could be dangerous for our continued national security.

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[3] *Study: Electric Vehicle Charging Could Present Grid Challenges*, Institute for Energy Research (January 3, 2018), https://www.instituteforenergyresearch.org/analysis/study-electric-vehicle-charging-present-grid-challenges/

[4] Department of Energy. (2017). *National Plug-In Electric Vehicle Infrastructure Analysis*. Washington, DC: DOE. Retrieved from https://www.energy.gov/sites/prod/files/2017/09/f36/NationalPlugInElectricVehicleInfrastructure Analysis_Sept2017.pdf

[5] Robert L. Graham, Julieta Francis, and Richard J. Bogacz. (2017). *Challenges and Opportunities of Grid Modernization and Electric Transportation*. (Report No. DOE/EE-1473). Retrieved from https://www.energy.gov /sites/prod/files/2017/06/f34/Challenges_and_Opportunities_of_Grid_Modernization_and_Electric_Transportation.p df

[6] Department of Energy. (2014). *Evaluating Electric Vehicle Charging Impacts and Customer Charging Behaviors – Experiences from Six Smart Grid Investment Grant Projects*. Washington, DC: DOE. Retrieved from https://www.energy.gov/sites/prod/files/2014/12/f19/SGIG-EvaluatingEVcharging-Dec2014.pdf

[7] *Hurricane Irma cut power to nearly two-thirds of Florida's electricity customers*, EIA (September 20, 2017), Available at https://www.eia.gov/todayinenergy/detail.php?id=32992

[8] In fact, DOE lists "diversification of energy fuels, sources and routes" as a main principle of energy security. *See supra* note 2, Valuation Report