# The New Energy & Transportation Technology Revolution: Can Pennsylvania Adapt?

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(by **Jim Chen**)

Published in January of this year, the U.S. Energy Information Administration ("EIA") Short-Term Energy Outlook ('STEO') forecast shows a rising trend in energy production across all sectors. These trends include not only an increase in oil and gas production, but also a rise in alternative energy generation such as wind and solar, supported by battery storage technology that increases by 14 gigawatts this year and 9 gigawatts next year for a total installed capacity of 40 gigawatts by 2025. Overall, these trends are a net positive for the United States as the country diversifies energy sources in the United States and the means by which electricity is generated. Diversification of our energy supply matters – not simply from a supply side calculus, but for reasons of national security, technology leadership, economic prosperity and growth, and the environment. An "all-of-the-above" strategy is simply smart policy for the United States.

From an economic perspective, reliance on a single source of energy leaves the country vulnerable to price shocks and shortages when inevitable issues arise. Petroleum should be a particular focus as the United States is the largest consumer of oil in the world at over 20 million barrels per day. Of that amount, 66.6% is consumed in the transportation sector, 43% for motor gasoline alone. As a result, diversification can be beneficial and reduce risk in the transportation sector as part of the overall energy mix.

The national security and economic implications of an overreliance on a single source of energy are significant, regardless of the U.S. rate of domestic production. For example, oil is a global commodity subject to volatile price fluctuations based on world events. When Russia invaded Ukraine in February 2022, oil prices surged significantly with prices for West Texas Intermediate crude increasing by over 50% and Brent crude by over 55%. As a result of objections over the Russia invasion, U.S. allies in Europe faced significant challenges in weaning themselves off of Russian oil and gas – which amounted to 45% of all natural gas imports into Europe. Even today, Europe continues to face challenges in sourcing reliable supplies of gas, petroleum and coal that are not reliant on Russia. Domestic liquefied natural gas (LNG) production from the U.S. has helped our European allies make up some of the shortfall.

Price shocks and supply threats from global events continue as some of the largest oil reserves remain in the most volatile areas of the world. The Israel-Palestine war, along with agreed upon cuts by OPEC nations, threatens to upend world oil prices. The World Bank warned in October of last year that "the outlook for commodity prices would darken quickly if the [Israel-Palestine] conflict were to escalate." Energy price increases would not only impact commodity prices, but food supplies as well. Fortunately, the United States and other countries have more diversity in their energy supply.

Introducing renewable energy into the mix of energy sources simply makes sense. Diversification of the energy in the United States can reduce dependence on imported energy and promote economic development through creation of jobs in manufacturing, installation and maintenance. The International Energy Agency predicts that renewables will make up more than one-third of the world's total electricity generation by early 2025. This higher trend is a net positive given that global electricity demand is expected to grow at an ever-increasing rate, due in part to the rise in use of electrification in technologies such as heat pumps and battery electric vehicles. Pennsylvania has very much been a part of the growth in renewables with nearly 4% of the Commonwealth's in-state electricity generated by such technologies in 2022. Governor Josh Shapiro has stated his support for the goal of 30% of all energy sold in Pennsylvania to come from renewable

sources by 2030.

While the Governor's campaign position is a good start, Pennsylvania now has an opportunity to continue its legacy of leadership in energy innovation by diversifying energy generation in the Commonwealth. This leadership can also include support for the new technologies using that energy, like electric vehicles. Last year, electric vehicles made up 7.6% of all new vehicles sales in the United States; up from 5.9% in 2022. That figure equated to 1.2 million electric vehicles sold in 2023. With ever increasing improvements in range, performance, reliability and choice, electric vehicles are proving to be competitive with the incumbent technology of internal combustion engine equipped vehicles. Add in the lower maintenance costs and favorable total cost of ownership and electric vehicles make a compelling cost and performance case. Electric vehicles also provide the platform for the next generation of technology with connectivity and autonomy as gateways to break throughs in human/machine interface and artificial intelligence.

Transportation electrification and its accompanying technological improvements have broad benefits beyond the products themselves. Economically, the surge in electric vehicles and attendant demand has encouraged manufacturers to invest back into the United States. Traditional manufacturers like Hyundai and BMW have begun building new plants or expand existing plants in the United States to build new electric vehicle line ups. New technology companies like Tesla, Lucid, Rivian, Scout, and Lion Electric have built or are building new or refurbished plants, also in the United States, to produce the next generation of electric vehicles. Today, there are about 30 battery factories either planned, under construction or already operating in the United States with more on the way. All of these investments have led to job growth and increased economic activity here at home. In a review of the automotive industry and electric vehicles under the past two administrations, the Washington Post reported that automotive jobs have increased substantially with auto manufacturing jobs at their highest point since 2006.

With all the positives coming from the diversification of the United States' energy mix and the growth of the electric vehicle industry, careful consideration must be made regarding policies and legislation that impact these promising new technologies. For several sessions, the Pennsylvania legislature has debated the imposition of an electric vehicle "fee" in addition to traditional registration of vehicles in the Commonwealth. Currently working through the legislature, Senate Bill 656 (SB 656) would impose an annual fee of $290 on top of the standard registration for every electric vehicle registered in Pennsylvania. Proponents argue that this fee is fair because electric vehicle owners do not pay gas taxes, which support road infrastructure fees. The $290 figure represents the average cost of what a Pennsylvania driver pays in gas taxes. Opponents would note, however, that this proposal does not consider the fact that electric vehicle owners already do pay taxes – on the electricity they use to recharge their vehicles. In addition, opponents note that the share of electric vehicles on the road is miniscule compared to the number of combustion engine equipped vehicles. As a result, careful review of all the impacts of proposed legislation like SB 656 needs to be conducted.

To be sure, the issue of funding public infrastructure is a very real issue. Supported by federal and state levied gas taxes, the funding of road maintenance and care for the United States' aging infrastructure is vital. But shortfalls in funding for infrastructure have a number of complex root causes, including improvements in vehicle efficiency that have resulted in a decrease in the amount of taxes collected. In 1984 (the earliest year EPA figures were available), a gas-powered Ford F-150 4WD vehicle with a 5.8L, 8-cylinder engine and automatic transmission achieved a combined EPA fuel economy rating of 10 miles per gallon. Today, a comparable model year 2023 Ford F150 with a 5.0L, 8-cylinder engine and automatic transmission achieves a combined EPA fuel economy rating of 19 miles per gallon – nearly double its 1984 predecessor. Accordingly, the issue of supporting infrastructure through a single source of revenue – gas taxes – may be difficult to sustain in the long term. Other states have considered a range of solutions to the infrastructure funding issue. For example, states such as Oregon and Virginia are experimenting with a vehicle-miles-traveled ("VMT") approach that levies fees on drivers based on the actual mileage put on vehicles – agnostic of the type of power train involved. These other options that directly address the root cause of the issue should be taken into consideration.

Policy and legislation are powerful tools that when used appropriately, can help promote new technologies and achieve laudable societal goals. Pennsylvania has long been a leader in energy and transportation technology. Careful consideration of all aspects of new legislation in support of desirable policy goals is paramount. Anything less would not

be in keeping with the Commonwealth's long-standing position as a leader in energy generation, innovation and technology.

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