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Electrify vehicle fleets and transportation sector will follow

COMMENTARY

By Damir Novosel

One widely remarked upon consequence of putting our world on hold to combat the spread of coronavirus is the literal clearing of the air. With transportation traffic and industrial activity vastly reduced, we have seen measurably cleaner air detected around the world.

In April, for example, a National Aeronautics and Space Administration satellite measured a 30 percent drop in air pollution over the northeastern United States, using atmospheric nitrogen dioxide as a proxy for overall air pollution.

A reduction in transportation significantly contributed to a cleaner atmosphere. For example, U.S. personal travel dropped by 48 percent in the week of April 4-10, 2020, and Italy's travel decreased by 65 percent overall. We all want transportation and industrial activity to pick up as fast as possible to get world economies back to normal. However, we have gotten a glimpse of the possibilities to improve air quality and increase the speed of decarbonization.

The U.S. Energy Information Administration 2020 Report shows that carbon dioxide emissions in the electrical power sector dropped from 2.16 billion metric tons in 2009 to 1.62 billion metric tons in 2020, while in the transportation sector they increased from 1.82 billion in 2009 to 1.89 billion in 2020. Those numbers show that, while we need to continue decarbonizing electrical power generation through increases in renewable generation, we need to address transportation as the main source of CO_2.

The U.S. Environmental Protection Agency reports that in 2017, light-duty vehicles accounted for 59 percent of transportation sector emissions, followed by medium- and heavy-duty trucks with 23 percent, aircraft with 9 percent, and rail, ships, boats and "other" with 9 percent.

The EIA and EPA data make clear what has to happen to realize a sustainable and clean future for humankind. Put simply, the electrification of transportation would have the biggest impact on a cleaner atmosphere.

That imperative was made clear to me on a recent wintry day in New England as I walked from my hotel to a meeting and passed an idling school bus. Sooty smoke billowed around the vehicle as children came and went. This is an avoidable public health issue. My anecdotal observation is backed by a recent study in Chicago that found socio-economic factors at play in exposure to vehicle traffic and other toxic air pollution. The West Side and South Side of Chicago, two historically poor neighborhoods, had the greatest exposure and health impacts.

What kind of society would ignore this opportunity, given an economically and environmentally attractive option to thrive? Particulate pollution and greenhouse gases do not hover over their point of origin. Studies have shown that GHGs emitted in China reach California. When it comes to air pollution and climate change, we're in this together. Fortunately, the solutions we devise can be shared globally as well.

Today we are actually on the cusp of such a transformation. The electrification of transportation ultimately offers a safe, cost-effective and sustainable means of moving people and goods. Focusing on as many of the light-, medium- and heavy-duty vehicles that together comprise 82 percent of U.S. GHG emissions in the transportation sector is the way to go. However, as consumer uptake of electric passenger cars will take time, the main focus needs to be on fleets and buses.

The largest companies that depend on vehicles to distribute goods to warehouses for deliveries typically are public companies with a stake in environmental stewardship and social responsibility. Stakeholders and shareholders increasingly use these values to determine whether to invest or be a customer. State and local governments, which also run fleets, would stand to gain public support by fleet electrification. Add school districts and their bus fleets.

Amazon, FedEx, UPS and others typically have clearly defined routes that maximize efficiency, cut fuel costs and time. For example, UPS determined that eliminating left turns on their routes provided massive efficiencies. Having electrical vehicle charging at well-planned locations would optimize and improve the benefit-cost analysis of electrification. These companies are moving forward with electrification and enjoy massive economies of scale. For example, Ikea has committed to electrifying delivery fleets by 2025. Any efficiencies they develop have a significant payback and will lead to technical and manufacturing breakthroughs that lower the cost of entry for smaller companies.

Electrical utilities have a major role in assuring that the grid will be ready to support transportation electrification. The key for decarbonization is electrification, which requires investments in a resilient, modern grid. The coronavirus has shown that individual organizations cannot act alone. Achieving society and business

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targets requires cooperation from cities, power utilities, policy makers, facility owners, and, in turn, citizens. Together, stakeholders need to develop comprehensive electrification roadmaps (e.g., for "smart cities"), determine incentives, place charging stations in convenient locations, and ensure that the charging load can be handled.

This transformation is already supported by organizations such as the IEEE Power & Energy Society, which has deep technical expertise among its 40,000 members worldwide. The IEEE has always been a neutral party with a focus on technology for humankind and offers an ideal partner for the electrification challenge.

Fleet electrification is the proverbial low-hanging fruit to be picked first. This requires a holistic approach. We'll simultaneously need to reduce the pollutants from power generation by maximizing renewable energy sources, bring down the cost of energy storage, promote energy efficiency measures, reduce and green the energy used in manufacturing, and develop smart infrastructure that moves more people and goods with a smaller emissions footprint.

The disruption caused by the coronavirus pandemic shows a glimpse of a cleaner environment and the actions we need to take to achieve it. Together, we can shape our collective future.

—Damir Novosel is president of Quanta Technology and chair of the IEEE Power & Energy Society Industry Technical Support Leadership Committee.