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Reducing Carbon Emissions: The Role of Cogeneration

In the November 2022 issue of *ASHRAE Journal*, the article “Reducing Carbon Emissions: The Role of Cogeneration” by Richard Sweetser, Life Member ASHRAE, and Bruce Hedman, Ph.D., raises an important point that is not being discussed as much as it should be. As the authors point out, “The ultimate path to deep decarbonization will need to address the availability and cost of new generation and transmission and distribution infrastructure...” They address that this path will require the support of greatly increased electrical generation capacity and transmission systems to be successful.

Generating capacity, as we already know, is difficult enough to spin up, while large-scale transmission systems will require even more lead time due to land-use and right-of-way issues. That’s not to mention the upcoming technologies that will be needed to support higher voltage capacity transmission systems, which have their own consequences.

These issues are currently not being given the consideration necessary for long-term planning by our clients. Generating capacity in the U.S. is currently capable of supporting overall electric demand under normal conditions. However, during the peak summer months, we still require additional capacity, which is provided primarily by Canadian power generators.

Having served on a local utility advisory board in Texas the last two years, I’ve had a front row seat to what a total electrical system breakdown could look like during the winter storm of 2021 when the state-wide power grid barely avoided such an event. This may seem unrelated, but the continued push to electrify vehicles and heating systems adds additional demands to our current utility capacities.

The move to electric vehicles may seem benign, but adding hundreds of thousands of vehicles per year is then added to the current move toward converting heating and domestic water systems in buildings to electric (an important part of building decarbonization overall). Last year alone, Tesla delivered a record 1.3 million new vehicles. Amazon previously announced that electric truck builder Rivian is contracted to provide 100,000 electric delivery vehicles by 2030, with deliveries already underway.

These continuing increased demands for electrical power will eventually overwhelm our utilities and may lead to increasing congestion on main transmission lines. It will also potentially overwhelm the local power distribution in dense power-consuming areas.

Such areas of concern may include: hospitals and medical districts, college campuses, mixed-use complexes, data centers (often located near each other on main power and communication trunks), manufacturing centers, etc. As trusted advisors to our clients, we should be mindful of the consequences of moving to “electrify” the world around us without fully considering the impact on local utility

capacities and distribution. I’ve seen first-hand what those consequences could look like and recommend we take a long look at those available electrical power resources today and for the near future on behalf of our clients before recommending they proceed along that path.

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THE AUTHORS RESPOND

Full electrification has the potential to provide a range of benefits such as reduced dependence on fossil fuels, reduced emissions and increased energy efficiency. However, as noted by Mr. Riback, it requires massive investment in infrastructure and technology, and there are significant challenges to be addressed such as ensuring reliable and affordable energy supplies and addressing issues around the production of batteries and other components.

We believe this single pathway approach is not sustainable and seek to establish that other pathways are available to decarbonize the economy. Cogeneration (aka combined heat and power [CHP]), in particular, is one important pathway to consider because of its speed to implement, fuel flexibility, energy efficiency, decarbonization potential, resilience and cost effectiveness. Mr. Riback’s letter amplifies the need for multiple pathways to achieve a decarbonized energy future. His focus on the electric grid infrastructure portion of our article is spot on, and this insight, from someone who served as a local utility advisory board member, is invaluable.

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Herndon, Va., and
Bruce Hedman, Ph.D., Alexandria, Va. ■*