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Is Distributed Generation Really the Future?

If you read the environmental press, clean tech media, or even the *New York Times*, you might conclude that America is on the cusp of a distributed generation (DG) revolution. "Solar power and other distributed renewable energy technologies could lay waste to U.S. power utilities and burn the utility business model to the ground," wrote leading environmental news site Grist last April. "Renewable-energy technologies like solar and wind power," the *Times* wrote, are now "challenging the traditional distribution system."

The utility industry too is taking the threat seriously. The Edison Electric Institute (EEI) recently issued a report titled "Disruptive Challenges," assessing the threat renewables pose to the industry. Utilities and rooftop solar companies are facing off in Arizona and other states over rate subsidies for solar. Former Federal Energy Regulatory Commission Chairman Jon Wellinghoff recently told reporters that, "Solar is growing so fast it is going to overtake everything."

Not So Fast

But the reported death of the centralized electrical grid and the utilities that run it is greatly exaggerated. Solar panel prices have come down, but rooftop solar is still much more costly than centralized fossil generation, nuclear, or even utility scale wind and solar. Whether in Germany or California, solar deployment remains entirely dependent upon a raft of direct public subsidies and indirect rate subsidies.

Despite those subsidies, solar has yet to generate significant electricity anywhere. Germany, the world solar leader, after over a decade and \$100 billion in direct public subsidies, gets only 5% of its electricity from solar. U.S. leader California generated less than 1% of its electricity from solar in 2012.

DG advocates have made much of the recent EEI report, but the report actually concludes that there will be no DG revolution. "In fact, electric utility valuations and access to capital today are as valuable as we have seen them in decades," the authors say, "reflecting the relative safety of utilities in this uncertain economic environment."

Disruptive Policies

If you want to know what utilities actually object to about DG, it is policies that functionally require them to purchase power from solar homeowners at \$0.30/kWh when they don't need it instead of buying it on the wholesale market for \$0.04/kWh when they do. The result is not just less-profitable utilities but also higher rates for the vast majority of ratepayers. A recent California Public Utilities Commission study concluded that by 2020 the state's net metering programs would increase rates by a billion dollars annually.

That's not to say that the growth of renewable energy is not disruptive—just not in the way its advocates claim. Look at just about any place that has achieved significant deployment of re-

newable electricity, and what you find is that the vast majority comes from large, utility scale installations, not rooftop solar or any other behind-the-meter generation source. Even Germany gets over three-quarters of its renewable generation from large-scale wind, hydro, and biomass.

Given the current state of renewable technology and the scale of generation necessary to run a modern economy, these basic dynamics appear unlikely to change anytime soon. Take a peak at any of the dozens of scenarios produced by renewables advocates that claim we can run the U.S., Europe, or the world largely on renewables, and what you find is that most generation comes from massive industrial scale wind and solar developments from North Dakota to the North Sea—not DG.

In fact, a renewables-powered future will probably require more centralized generation, not less. Achieving significantly higher penetrations of renewable energy will require transmitting electricity over hundreds or thousands of miles from where large amounts can be generated to places where it will be consumed. Renewables champions may talk small-scale DG, but what they intend to build is every bit as centralized as the centralized power sources we have today.

Ultimately, what is disrupting the existing utility model is not the distributed nature of renewables, it is their intermittent nature, and the policies necessary to make them viable. Heavy public subsidization of the capital costs of wind and solar, combined with preferential purchase requirements for the power they generate, ensure that the marginal cost of wind and solar will always be lower than just about anything else when the wind is blowing and the sun is shining. Hence, Germany simultaneously boasts the highest retail electricity prices in Europe and the lowest wholesale prices—not because the power costs less to generate but because most of the cost has been shifted elsewhere. In Germany, expensive, highly subsidized, intermittent renewables generation has driven wholesale prices so low that the utilities that must manage the grid and operate conventional power plants can no longer operate profitably. This, not cheap distributed solar, is what is disrupting the utility industry here and abroad.

Just because an electrical system that relies heavily on today's wind and solar is likely to be costly and unreliable doesn't mean we won't build one. Our energy systems are a reflection of our culture, ideology, and politics, not just rational economic and engineering decisions. Germans, for instance, so fear nuclear energy that they prefer to pair expensive renewables with cheap coal. Perhaps the U.S. will do the same with wind, solar, and gas. If so, it will certainly be disruptive of our current electrical system. But one thing it probably won't be is distributed. ■

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