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Energy & Science

Gates-Backed Startup for Electric Grid Data Helps Boost Renewables

Reactive Technologies makes it possible to maximize solar and wind power while keeping the grid stable

By [Akshat Rathi](#)
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The surge in renewable energy means power operators have to manage changes in energy generation across hundreds of wind and solar farms, without causing wobbles on the grid that could potentially lead to blackouts.

Reactive Technologies, a U.K. and Finland-based company, is trying to solve the problem. The startup has raised \$15 million from investors including the Bill Gates-backed climate fund, Breakthrough Energy Ventures.

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Most electric grids run at very specific frequencies that have to be managed with exacting precision, sometimes down to 1/100000th of a Hertz. It's imperative that operators keep the balance between the supply and demand of power stable: Moving out of the correct frequency range or shifting frequencies too quickly could damage electrical equipment.

Keeping that balance is a relatively easy task when the grid is full of thermal plants powered by coal, gas or nuclear. All those facilities have turbines that turn at set frequencies. But solar and wind power don't generate electricity in the same way. A solar panel doesn't have physical moving parts, and wind turbines rotate at varying speeds depending on how the wind blows.

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On top of that, energy generation from renewable assets can change in a manner of minutes. For example, a cloud crossing over could cause a sudden decline in generation from a solar plant. Keeping the frequency stable requires observing these changes across hundreds of power-generating assets and responding with injections of electricity just in time to meet the changes.

That's where Reactive's technology plays a role. "We describe it as sonar for the grid," said Chris Kimmet, the company's director of power grids. Reactive sends a tiny pulse of electricity from one location of the grid and tracks the tiny frequency changes that it causes across the grid in order to tell operators how to react.

"For someone interested in power grids, it's like the Hubble telescope," said Duncan Burt, who was director of operations at the U.K.'s National Grid ESO during the years when Reactive was testing its technology there.



The level of precision that Reactive's data provides grid operators has no parallel in the industry yet, he said. That's one reason why National Grid ESO, which has had days when more than 80% of its power came from renewables, is now paying Reactive 6 million pounds (\$8.3 million) for a six-year contract.

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Reactive has also worked with grid operators in Australia, Italy, Japan and New Zealand. The company's main goal is to ensure as much renewables can be on a grid as possible without affecting its operation, says Kimmett.

— *With assistance by Will Mathis*
