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U.S. Power Heavyweights Unveil Hydrogen Power to Power Demonstration

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WHAT IT COVERED

Duke Energy, GE Vernova and Sargent and Lundy teamed on a project to demonstrate an end to end system producing, storing and combusting 100 percent renewable hydrogen at Duke Energy's DeBary solar plant in Florida.

MY ROLE

Wrote and placed the announcement for a technically complex first of its kind project.

The original capture follows this page.

GAS

U.S. Power Heavyweights Unveil Hydrogen Power-to-Power Demonstration

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Duke Energy, GE Vernova, and Sargent and Lundy will team up on a pioneering project to demonstrate an end-to-end energy system that produces, stores, and combusts 100% renewable hydrogen at Duke Energy's DeBary solar plant in Florida.

Duke Energy on Oct. 27 said construction on the project, a "one-of-a-kind end-to-end" system, will begin later this year and could be installed within a one-year timeframe. "Duke Energy anticipates the system will be installed and fully functioning in 2024," it said.

The demonstration comprises two parts: It will source hydrogen from a production facility planned at the 74.5-MW Debary plant in Volusia County, Florida., a 2020-opened solar PV farm that features 300,000 panels. The hydrogen production plant, which will utilize power from the solar farm, will run on two 1-MW electrolyzer units.

The renewable hydrogen will then be delivered to "nearby, reinforced containers for safe storage." However, during times when energy demand is highest, the integrated system will serve as a dedicated "peaking" facility, delivering stored hydrogen to a combustion turbine (CT) that will be upgraded using GE technology to combust a natural gas/hydrogen blend or up to 100% hydrogen. "This will be the nation's first CT in operation running on such a high percentage of hydrogen," Duke Energy said.

The DeBary Solar Power Plant in Volusia County, Fla., began serving customers on May 14, 2020. The facility is 74.5 MW with 300,000 panels. *Courtesy: Duke Energy*

A Project to Demonstrate Hydrogen's Dispatchable Power Role

The project marks a pivotal juncture in U.S. power industry-led efforts to develop carbon-free dispatchable energy sources. Duke Energy, in a statement on Friday, underscored hydrogen's growing role. "Readily available hydrogen is a *dispatchable* energy source, meaning it is available on demand. It can be turned on and off at any time and is not dependent on the time of day or the weather, like sun, wind, or other renewable energy sources known as *intermittent,"* it said.

"Duke Energy anticipates hydrogen could play a major role in our clean energy future," said Regis Repko, senior vice president of generation and transmission strategy for Duke Energy. "Hydrogen has significant potential for decarbonization across all sectors of the U.S. economy. It is clean energy also capable of long-duration storage, which would help Duke Energy ensure grid reliability as we continue adding more renewable energy sources to our system."

In addition, by introducing the country's first end-to-end system, the project suggests a solution to one of the renewable energy sector's most pressing challenges: ensuring consistent energy supply even when the sun's energy is diminished while optimizing solar energy resources for extended periods of high demand. "Relying on intermittent energy sources without available dispatchable energy sources would put our future electric system at risk of having insufficient energy to serve customer demand," Duke Energy said.

According to Duke Energy, the project will prioritize several operational features, including "safe, quiet energy generation and storage." Cost-effectiveness is also a priority. The end-to-end demonstration "could provide cost-effective decarbonization," it said.

The industry collaboration behind the project is also notable. Duke Energy, the nation's biggest utility, has explored several options as part of a sustainable strategy to achieve a "net-zero" target, aiming to produce zero

carbon emissions from electric generation by 2050. Sargent and Lundy, a leading engineering, procurement, and construction contractor, and GE Vernova, an original equipment manufacturer and a major international player in the gas turbine market, are deeply entrenched in efforts to enable customers to achieve decarbonized operations.

An illustration that shows a potential hydrogen production facility at Duke Energy's Volusia County solar facility. *Courtesy: Duke Energy*

A New End-to-End Prospect

Duke Energy said the demonstration will be the first in the U.S. to integrate a full 100% hydrogen production value chain with a dedicated power output at a single site. But when it comes online in 2024, it will soon be followed by another much-watched project, Advanced Clean Energy Storage Hub (ACES Delta), which is underway in Delta, Utah, and rapidly making incremental progress. The hub, which recently received its first electrolyzers and gas separators, is slated to begin operation in 2025.

The massive 300-GWh integrated hydrogen hub, spearheaded by Chevron and Mitsubishi Power, is designed as a complete "end-to-end" solution that will capture excess renewable energy during off-peak hours from the West, convert it to renewable hydrogen via a 220-MW alkaline electrolyzer bank, and store it in two gigantic solution-mined caverns.