MEMBER NEWS

Xcel Energy and NREL Dedicate New "Wind to Hydrogen" Facility

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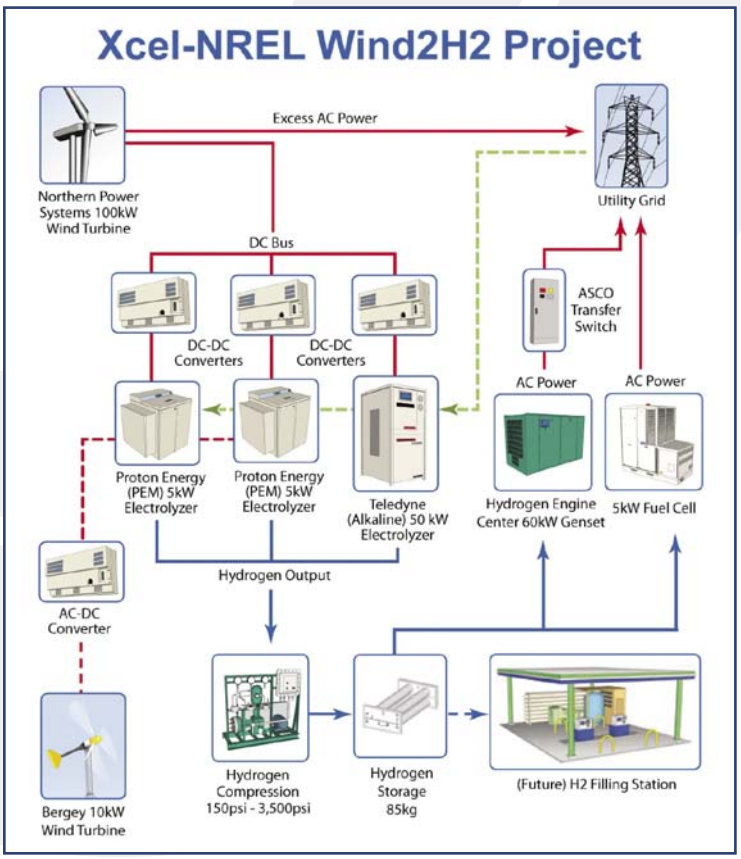
Xcel Energy and the U.S. Department of Energy's National Renewable Energy Laboratory (NREL) recently unveiled a unique facility that uses electricity from wind turbines to produce and store pure hydrogen, offering what may become an important new template for future energy production.

"Today we begin using our cleanest source of electricity—wind power—to create the perfect fuel: hydrogen," said Richard Kelly, Xcel Energy chairman, president and CEO. "Converting wind energy to hydrogen means that it doesn't matter when the wind blows since its energy can be stored on-site in the form of hydrogen."

The facility links two wind turbines to electrolyzers, which pass the wind-generated electricity through water to split the liquid into hydrogen and oxygen. The hydrogen can be stored and used later to generate electricity from either an internal combustion engine turning a generator or from a fuel cell. In either case, there are no harmful emissions - the only by-product from hydrogen fuel is water.



Layout of Xcel-NREL wind to hydrogen project

Located at NREL's National Wind Technology Center near Boulder, Colo., the new facility is designed to help researchers:

1) Achieve efficiency gains though unique, integrated AC-to-DC and DC-to-DC power electronics-based connections between the wind turbines and the electrolyzers. These should reduce duplicative components in the wind turbine and electrolyzers to decrease cost and increase overall system efficiency.

Xcel Energy CEO Dick Kelly dedicates the system while NREL Director Dan Arvizu (right) and members of the media, government officials and others look on.

2) Compare multiple electrolyzer technologies, including alkaline and proton exchange membrane electrolyzers, to gauge their efficiencies and abilities to be brought on- and off-line quickly.

"Advancing knowledge and sharing innovation are among NREL's primary goals," NREL Director Dan Arvizu said. "Our growing strategic partnership with Xcel Energy helps us reduce the time and effort between research discoveries and sharing the benefits of what we learn with energy consumers."

Currently, there are limitations to both wind power and hydrogen. Wind farms only generate electricity when the wind is blowing, which is about one-third of the time in the United States. This creates the need for backup generation, which is usually fossil-fueled. Hydrogen, while the most common element in the universe, isn't found in its pure form on Earth and must be either electrolyzed from water or stripped out of natural gas, which are energy-intensive processes that result in greenhouse gas emissions.

"By marrying wind turbines to hydrogen production, we create a synergy that systematically reduces the drawbacks of each," Kelly said. "Intermittent wind power is converted to a stored fuel that can be used anytime, while at the same time offering a totally climate-friendly way to retrieve hydrogen, to power our homes and possibly cars in the future."