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Clean energy is blowing in the wind
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By Steve Raabe

Denver - Amid gusting winds and spinning wind turbines, officials Thursday unveiled a $2 million research project to use wind energy to produce hydrogen fuel.

The technology proposes to take clean energy to a new level, using a renewable resource, wind, to make a nonpolluting fuel, hydrogen, in one of the nation's first attempts to combine the two energy resources.

It's part of President Bush's $1.2 billion hydrogen fuel initiative designed to help wean the U.S. from imported oil.

The concept is simple: Make hydrogen when the wind is blowing, then store the fuel for use whenever it is needed.

The science behind the concept is nearly as simple. Electricity from wind turbines is used to break down water into hydrogen and oxygen. The hydrogen is captured and stored, then used to generate power or as a high-tech fuel for vehicles.

The research is a joint project of Xcel Energy and the Golden-based National Renewable Energy Laboratory. Officials said the process may not be commercially feasible for at least eight years.

"Today we begin using our cleanest source of electricity - wind power - to create the perfect fuel: hydrogen," Xcel chief executive Dick Kelly said at the federal laboratory's National Wind Technology Center south of Boulder.

"Converting wind energy to hydrogen means that it doesn't matter when the wind blows," he said, "since its energy can be stored on-site in the form of hydrogen."

The research project is expected initially to generate only relatively tiny amounts of hydrogen - about 17 kilograms a day. Each kilogram has roughly the same energy content as a gallon of gasoline.

The produced hydrogen will be used to generate small amounts of electricity. In the future, if commercial-scale production can be achieved, scientists say hydrogen's most economical use will be as a vehicle fuel, for either internal combustion engines or fuel cell-powered cars.

Fuel cells use a chemical process to convert hydrogen to electricity.

Energy lab and Xcel officials said initial hydrogen production costs are expected to be about $8 per kilogram, making the process more than three times as expensive as using gasoline to run a car.

But by 2020, or perhaps earlier, they expect costs to drop to $2-$3 per kilogram, in the range of current gasoline prices.

The added benefit of using hydrogen to power fuel cells is there are no emissions and the only byproduct is water.

"It has the potential," said renewable energy lab director Dan Arvizu, "to point the way to a completely emissions-free system of making, storing and using energy."