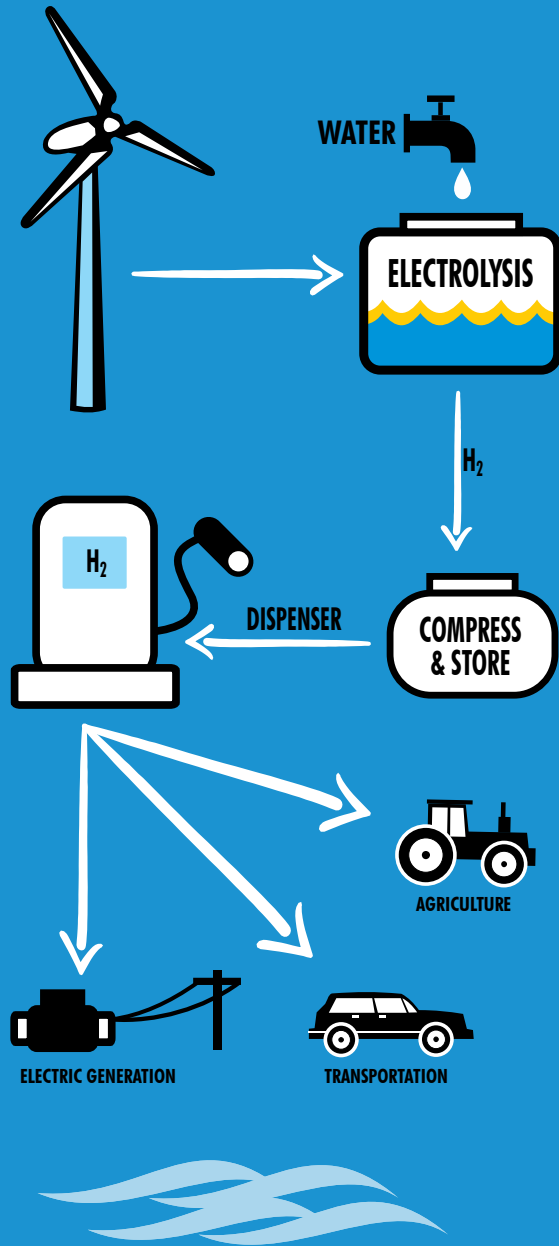


HERE IS HOW IT WORKS



Project sponsors and participants:

Basin Electric Power Cooperative
U.S. Sen. Byron L. Dorgan
U.S. Department of Energy
Central Power Electric Cooperative
Verendrye Electric Cooperative
Cooperative Research Network
NDSU North Central Research Extension Center
Butler Machinery Company
Ryan Chevrolet
North Dakota State University
Energy & Environmental Research Center
AFVTech Inc.
Hydrogenics
Electric Utility Supply Company
Jim Ressler Trucking Inc.
N.D. Department of Commerce
N.D. Department of Transportation
North Prairie Rural Water Association

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Basin Electric Power Cooperative, with U.S. Department of Energy funding arranged by U.S. Sen. Byron L. Dorgan, has developed a cutting-edge research project to turn intermittent wind energy into a value-added energy source that can be stored and used as needed.

The Wind-to-Hydrogen project uses energy from Basin Electric's wind resources to produce hydrogen (H_2) through the electrolysis of water. Electricity from wind is dynamically scheduled over the electrical system to an H_2 electrolyzer located at North Dakota State University's North Central Research Extension Center south of Minot, ND. The electrolyzer will be operated through dynamic scheduling to match H_2 production with the ups and downs of wind energy.

The project includes a bulk H_2 storage system and H_2 fuel dispenser to allow for fueling of vehicles and equipment modified to burn H_2 fuel.

What is H_2 ?

H_2 gas is the simplest and lightest fuel. It can be created from a variety of resources.

How is H_2 made?

H_2 can be produced using electricity, nuclear power or by thermochemical processes from feedstocks such as gas, coal or biomass.

What is an electrolyzer?

An electrolyzer produces H_2 gas through the electrolysis of water using electricity to extract the H_2 molecules from water. The byproduct of this process is oxygen.

How will H_2 be used by this innovative project?

The H_2 fuel will be used to fuel three full-size pick-up trucks, a tractor, and a H_2 -powered generator, which will generate electricity to the power grid during peak demand periods.

Electrolyzer facts:

- 1 kilogram of H_2 is equal to 1 gallon of gasoline
- Production of H_2 at full load: 64 kilograms per day
- Electrolyzer size: rated at 175 kilowatts
- Electricity needed to produce 1 kilogram of H_2 : 60 kilowatt-hours
- Water needed to produce 1 kilogram of H_2 : 5.8 gallons
- H_2 storage pressure: 6,200 psi



Wind to H_2 project cost:

Approximately \$2 million

What are the benefits of H_2 ?

- Helps address concerns about energy security, global climate change and air quality
- Increases energy efficiency
- Fuels vehicles
- Has fuel cell applications

Is H_2 safe?

With proper knowledge and responsible handling, H_2 is no more or less hazardous than gasoline, propane or methane.

What about the Hindenburg fire?

The Hindenburg was coated with reactive chemicals, similar to solid rocket fuel, which was easily ignitable by an electrical charge. The outer cover, not H_2 , is to blame for the fire.