

Hydrogen & Fuel Cell Technical Highlights

Fuel Cell Backup Power Geographical Visualization Map

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Accomplishment: The National Renewable Energy Laboratory (NREL) developed a time-lapse geographical visualization map of early market use of fuel cells for telecommunications backup power. This map synthesizes data being analyzed by NREL's Technology Validation team for the U.S. Department of Energy (DOE) Fuel Cell Technologies Program with DOE's publically available annual summaries of electric disturbance events.¹

Context: Correlating fuel cell operation with grid outages enhances knowledge of backup system requirements and backup power operation strategies that may advance how systems are designed and how best to utilize their capabilities. NREL's analysis of early market use of fuel cells for backup power at telecommunications towers supports DOE's market transformation goals by investigating real-world applications and usage patterns and validating technology status, which can accelerate industry growth in places where fuel cells can compete with traditional technologies.

Significance of Accomplishment: The animated map² (Figure 1) integrates 2.5 years of fuel cell backup power operation data analyzed by NREL's Technology Validation team with annual summaries of electric power system disturbances and incidents from 2010 to 2012. The major grid outages are overlaid with installation locations and dates as well as operation data for select fuel cell backup units and synthesized into a time-lapse geographical visualization map. The interactive map allows the user to click or play through the highlighted events to analyze usage patterns in conjunction with major grid outages.

Most of the more than 300 DOE-funded fuel cell backup power sites are in the 4–6 kW range, include a single fuel cell system or several smaller units, and can be customized to the site needs. During the project period there has been a significant increase in fuel cell deployment and industry experience, including an operational reliability of 99.5% with more than 1,525 successful starts.

Backup power for key infrastructure elements can aid emergency response during major storms or other devastating events and prevent loss of productivity, time, and money for other grid incidents. Compared to equivalent traditional backup power technologies, fuel cells offer a lighter-weight, smaller-size, and environmentally-friendly backup power option with the potential for extended run times, low maintenance, and remote monitoring.

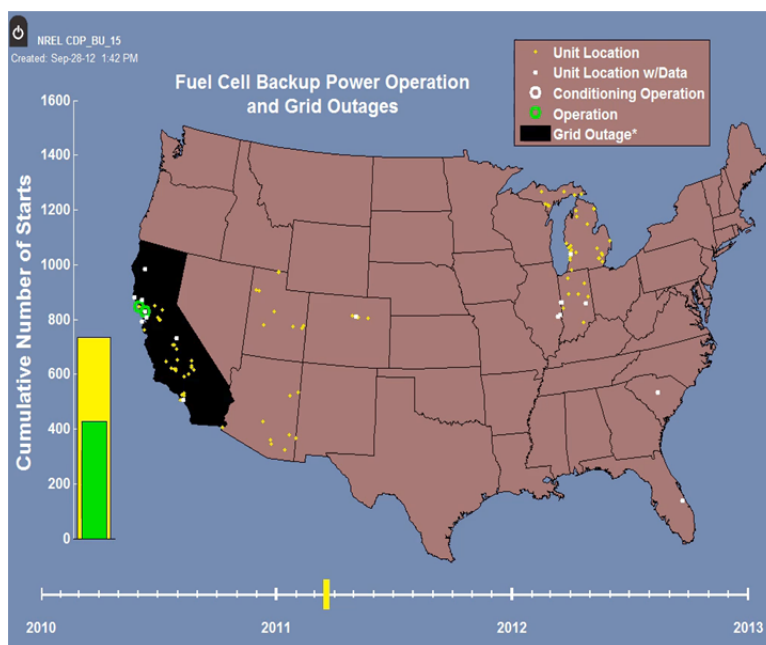


Figure 1. Snapshot of the fuel cell backup power visualization map

For more information and the latest analysis results from NREL's fuel cell and infrastructure projects, visit the Fuel Cell and Hydrogen Technology Validation website at www.nrel.gov/hydrogen/proj_tech_validation.html.

¹ Electric Disturbance Events (OE-417) are recorded by DOE's Office of Electricity Delivery & Energy Reliability. Annual summaries are available at <http://www.oe.netl.doe.gov/oe417.aspx>

² Available at www.nrel.gov/hydrogen/proj_tech_validation.html