

Roadmap To Zero Harmful Emissions

Founded in February 1998, the NFCRC facilitates and accelerates the development and deployment of fuel cell technology and fuel cell systems; promotes strategic alliances to address the market challenges associated with the installation and integration of fuel cell systems; and educates and develops resources for the various stakeholders in the fuel cell community. The NFCRC was established at the University of California, Irvine by the U.S. Department of Energy and the California Energy Commission with the goal of both developing and transitioning to a form of power generation that is energy efficient, resilient and environmentally sensitive



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FUEL CELLS FOR POWER AND HEAT GENERATION

Clean Efficient Resilient Sustainable



The National Fuel Cell Research Center provides a roadmap for stationary fuel cell evolution that paves the way to resiliency and zero emissions for energy systems around the world. Stationary fuel cells comprise the only known clean, high efficiency, dispatchable power and heat generation class that can achieve zero harmful emissions to complement solar, wind, and other intermittent sources.

Photo: Bloom Energy Fuel Cell System. Courtesy of Bloom Energy, www.bloomenergy.com

Fuel cells convert chemical energy into electricity

and are the ideal source for power and heat generation because they:

- Reduce greenhouse gases, such as methane and carbon dioxide
- Improve local air quality
- Support 100% renewable energy
- Produce massive clean energy storage
- Mitigate disruptions in the electrical grid by improving reliability
- Manage and complement clean energy, like wind and solar generation
- Provide electricity in areas not served by an electrical grid



For more information, check out the video at

nfcrc.uci.edu/RoadmapVid

MID-TERM

YEAR

2035

Utility planning and procurement of fuel cell systems supports renewable power generation

Fuel cells accelerate deployment of microgrids

> Tri-generation of power, heat and hydrogen is prevalent

Production of renewable hydrogen from electrolysis enables massive and seasonal storage for a zero-carbon economy

SHORT-TERM

Fuel cells deliver GHGreduction with natural gas and biogas

Fuel cells improve community air quality by replacing local primary and backup combustion power generation

Distributed resource planning and tariffs support the use of fuel cell systems

LONG-TERM

YEAR

2050

Fuel cells facilitate renewable, resilient and balanced grids

Fuel cells and electrolyzers enable significant improvements in air quality with local and utility generation