

Case Study

Yosemite National Park PEM Fuel Cell Demonstration Program

Administrative building exterior wall.

This fence encloses a diesel generator.

The fuel cell will be placed on a pad immediately to the right of this enclosure.



LOCATION

National Park Service Administrative Headquarters, 9030 Village Drive, Yosemite Village, Yosemite National Park, CA 95389

OUTPUT

Provide reliable electrical power and heat for National Park Service Administrative Headquarters building.

ISSUE

Yosemite National Park is located in a remote area, deep in the central Sierra Nevada Mountains of California. The park's management plan gives two primary purposes for the Park's existence - the first being to preserve the resources that contribute to Yosemite's uniqueness, including the mountain environments, rare sequoia groves, the granite domes and the evidence of geological and cultural processes that have taken place in the park. The second purpose is to make these resources available to people for their education, recreation and enjoyment, now and in the future. This fuel cell project focuses on the latter. The park, located in an area ranging from 5,000 and 12,000 feet elevation, experiences severe winter weather that can interrupt power service. Park facilities such as administration, security, food service and lodging require reliable electrical power for their operations. In periods of outages, reliable but environmentally troublesome diesel-fueled generators provide backup power. The liquid petroleum powered proton exchange membrane (PEM) fuel cell demonstration project aims to provide cost effective electrical and heat energy quietly, cleanly and safely.



PROJECT OBJECTIVE

- Evaluate installation methods to help standardize safe and cost effective installation practices
- Evaluate “out of the box” reliability and ease of integration with existing facility infrastructure
- Evaluate actual PEM operating characteristics with Liquid Petroleum Gas - and compare with factory specifications
- Measure operating costs of PEM unit under actual market conditions
- Collect and analyze a wide spectrum of operations data using a newly developed data management/transmission system
- Introduce PEM technology, power distribution and new energy efficiency concepts to the Department of Defense, local stakeholders and the public

POWER PLANT DESCRIPTION

Fuel Cell Type:	Proton Exchange Membrane
Make:	Plug Power Inc.
Model:	GenSys 5P
Power output:	2.5 - 4.5 kW
Voltage:	120 VAC@60Hz
Physical size:	74"L x 32"W x 68.25"H
Installation:	Outdoor
Connection:	Grid Parallel
Waste Heat Output:	4800W, 9700W, 9800W expected for 2.4, 4 and 4.5kW load set points
Fuel Capability:	Propane (HD-5 per GPA Standard 2140.97 - Liquefied Petroleum Gas Specification and Test Standards)

MAJOR PARTNERS

- Plug Power LP Gas PEM Fuel Cell
- US Army Corps of Engineers Construction Engineering Research Lab (CERL)
- Logan Energy Corp.

EMISSIONS AND ECONOMIC ANALYSIS

A thorough economic analysis will be conducted based on a five-year amortization. Cost will include installation, operating costs (water, electricity and LP Gas) and an annual thermal recovery credit. The local Air Pollution Control District will issue the operating permit.