

## XII.13 Accelerating Acceptance of Fuel Cell Backup Power Systems

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### Introduction

Since 2001, Plug Power has installed more than 800 fuel cell systems worldwide. Plug Power's prime power systems have produced approximately 6.5 million kilowatt hours of electricity and have accumulated more than 2.5 million operating hours. Intermittent or backup power products have been deployed with telecommunications carriers, government and utility customers in North and South America, Europe, the United Kingdom, Japan and South Africa. The low-temperature GenSys fuel cell system provides remote, off-grid and primary power where grid power is unreliable or nonexistent. Built reliable and designed rugged, low-temperature GenSys delivers continuous or backup power through even the most extreme conditions (-5°C to 40°C, altitudes up to 1,000 m, and remote locations). Coupled with high-efficiency ratings (25%-30% depending on the operating point), low-temperature GenSys reduces operating costs making it an economical solution for prime power requirements. Field trials at telecommunication and industrial sites in India, U.S., Asia, and Europe have demonstrated the advantages of fuel cells—lower maintenance, fuel costs and emissions, as well as longer life—compared with traditional internal combustion engines.

### Objectives

- Increase distributed power generation.
- Improve reliability and efficiency of mission critical backup power.
- Decrease fossil fuel dependencies for power generation.

### Relevance to American Recovery and Reinvestment Act of 2009 and DOE Fuel Cell Technology Goals

- Demonstrate market viability and increase pull of hydrogen and fuel cell systems within our government customers/partners.
- Deploy 20 GenSys hybrid, hydrogen start/liquefied petroleum gas (LPG) or natural gas units that provide economically viable backup power in excess of 72 hours.
- Maintain seven United States (U.S.), high-tech jobs in New York State and provide work for U.S. suppliers and field service contractors.

### Accomplishments

- The Robins Air Force Base, Georgia has been developed through detailed engineering and is currently under construction.
- As of June 2011 several engineering and environmental buildings were assessed and considered to be in need of backup power at Ft. Irwin, California.

### Approach

This project will leverage technology from Plug Power's Gensys product line to create a reliable power source that starts fast and runs as long as fuel is available. The project tasks and status are shown below.

Cost Analysis and Commercialization Study	100% complete
Site Planning and Applications Engineering	50% complete
Site Specific Engineering Development	30% complete
System Builds and Factory Testing	90% complete
Field Deployment Go/No-Go	Post-installation
Fleet Operation and Managed Services	Not started
Project Closeout	Not started
Program Management	45% complete

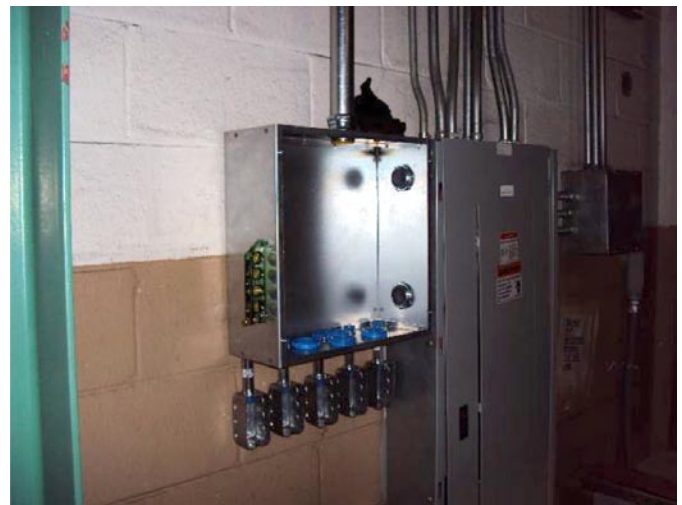
For the past year Plug Power has collaborated with partners Army Construction Engineering Research Laboratory and Warner Robins Air Force Base to demonstrate technical viability and increase market pull of hydrogen fuel cell systems. To date, 45 percent of the project has been completed and barriers are actively being addressed, including: cost, system reliability and market volume.

**Results**

Approximately four of Plug Power’s employees are supporting this effort to deploy 20 GenSys LPG-run units. Commercial suppliers are delivering stack, reformer and balance-of-plant components. In addition, Plug Power licensed this technology to IdaTech and Plug Power has proposed the use of IdaTech as a subcontractor for this project. Plans have been developed with IdaTech to provide resources for service, data analysis, and reliability assessment.

As of March 2011 Plug Power developed a detailed site plan for Robins Air Force Base in Warner Robins,

Georgia. The Warner Robins Air Logistic Center is the proposed building site and the units will be backing up key lighting circuits in the building. The site plan includes power interconnect strategy, operational layout, and site construction plans. A contractor was identified in the second quarter of 2011 and was hired to install infrastructure for the 10 systems. Work has progressed quickly and the site will be ready for systems in July 2011. In parallel, Plug Power has been performing pre-commissioning tests on 10 systems to ensure acceptable quality and performance standards are met. Eight of the systems have completed pre-commissioning tests and the remaining two should be ready in time for installation in July.



**FIGURE 1.** Progress at Robbins Air Force Base: (Left) Final Cement Poured for Systems Pad, (Right) Conduit and Interconnection Wiring



**FIGURE 2.** Backup Power for Engineering Building and Telecom Center will be Proposed: (Left) Engineering Building, (Right) Telecommunication Room.