

V.G.1 International Stationary Fuel Cell Demonstration

John Vogel

Plug Power
968 Albany Shaker Road
Latham, NY 12110
Phone: (518) 782-7700 ext. 1937
E-mail: john_vogel@plugpower.com

DOE Technology Development Manager:
Kathi Epping

Phone: (202) 586-7425; Fax: (202) 586-9811
E-mail: Kathi.Epping@ee.doe.gov

DOE Project Officer: Reg Tyler

Phone: (303) 275-4929; Fax: (303) 275-4753
E-mail: Reginald.Tyler@go.doe.gov

Technical Advisor: Walt Podolski

Phone: (630) 252-7558; Fax: (630) 972-4430
E-mail: podolski@cmt.anl.gov

Contract Number: DE-FG36-07GO17016

Subcontractor:

E-Tek, Somerset, NJ

Project Start Date: May 1, 2007

Project End Date: April 30, 2009

Objectives

- Achieve projected total system cost of < \$750/kW in production volumes.
- Increase electrical efficiency to 35% - with improvements identified to achieve 40% - and overall system efficiency of 85%.
- Achieve system durability of 40,000 hours.
- Develop modular and scaleable system design concepts.
- Develop combined heat and power (CHP) hydraulics concepts.

Technical Barriers

This project addresses the following technical barriers from the Fuel Cells section of the Hydrogen, Fuel Cells and Infrastructure Technologies Program Multi-Year Research, Development and Demonstration Plan:

- (A) Durability
- (B) Cost
- (C) Performance

Technical Targets

This project is directed at using high-temperature proton exchange membrane (PEM) fuel cell membrane technology (polybenzimidazole) in an integrated, stationary fuel cell application, operating on reformato to meet the DOE 2011 targets for fuel cells.

This project is not yet started so the current 2007 status is “to be determined (TBD)”.

TABLE 1. Progress Towards Meeting Technical Targets for Fuel Cells

Characteristic	Units	2011	Project 2007 Status
Electrical energy efficiency @ rated power	%	40	TBD
Combined Heat and Power (CHP) energy efficiency @ rated power	%	80	TBD
Cost	\$/kW _e	750	TBD
Durability @ <10% rated power degradation	Hours	40,000	TBD
Noise	dB(A)	<55 @ 10 m	TBD

Approach

Our approach to developing a fuel cell system capable of meeting the DOE technical targets is to identify the best application, assemble and leverage the expertise of an international consortium of technology partners, design, build, test, and operate three systems for six months.

Plug Power will act as the lead for the DOE portion of the program and Vaillant will act as the lead for the European Union (EU) (see Figure 1).

Accomplishments

This project has not yet started.

	DOE			EU	
	Plug Power US	PEMEAS E-TEK	Valliant	Plug Power Holland	PEMEAS Germany
DOE Program Management (Lead)					
Task 1.0 Modular/Scalable Architecture	█				
Task 2.0 Catalyst Development		█			
Task 3.0 Cathode Development		█			
Task 4.0 Anode Pt. Reduction		█			
Task 5.0 Cathode/Anode Scale-up		█			
Task 6.0 Stack Development	█				
Task 7.0 Thermal Management Module	█				
Task 8.0 Inverter Design	█				
Task 9.0 Software and Controls	█				
Task 10.0 Fuel Cell System Integrated Design	█			█	
Task 11.0 System Build Verification	█				
Task 12.0 6 Month Demonstration	█		█	█	
European Program Management (Lead)					
Task 13.0 Membrane improvements			█		
Task 14.0 Sulfur Tolerance				█	█
Task 15.0 Fuel Processing Design and Development				█	
Task 16.0 Gas and Air Delivery				█	
Task 17.0 European Inverter, Energy Manager, CHP Integration			█		

FIGURE 1. Breakdown of Tasks for International Consortium