XI. SMALL BUSINESS INNOVATION RESEARCH (SBIR) HYDROGEN PROGRAM NEW PROJECTS AWARDED IN FY 2009

XI.0 Small Business Innovation Research (SBIR) Hydrogen Program New Projects Awarded in FY 2009

The Small Business Innovation Research (SBIR) program provides small businesses with opportunities to participate in DOE research activities by exploring new and innovative approaches to achieve R&D objectives. The funds set aside for SBIR projects are used to support an annual competition for Phase I awards of up to $100,000 each for about nine months to explore the feasibility of innovative concepts. Phase II is the principal research or R&D effort, and these awards are up to $750,000 over a two-year period. Small Business Technology Transfer (STTR) projects include substantial (at least 30%) cooperative research collaboration between the small business and a non-profit research institution.

Table 1 lists the SBIR projects awarded in FY 2009 related to the Hydrogen Program. On the following pages are brief descriptions of each.

TABLE 1. FY 2009 SBIR Projects Related to the Hydrogen Program

Title	Company	City, State
XI.1 Integrated Membrane Water Gas Shift Reactor for Hydrogen Production (Phase I Project)	InnovaTek, Inc.	Richland, WA
XI.2 Development of a "4-in-1" Device for Cost Effective and Efficient Production of Hydrogen (Phase I Project)	Materials and Systems Research, Inc.	Salt Lake City, UT
XI.3 Advanced PEM Based Hydrogen Home Refueling Appliance (Phase I Project)	ElectroChem, Inc.	Woburn, MA
XI.4 Unitized Design for Home Refueling Appliance for Hydrogen Generation to 5000 psi (Phase I Project)	Giner Electrochemical Systems, LLC	Newton, MA
XI.5 Design, Optimization and Fabrication of a Home Hydrogen Fueling System (Phase I Project)	Lynntech, Inc.	College Station, TX
XI.6 Development of a Hydrogen Home Fueling System (Phase I STTR Project)	Materials and Systems Research, Inc.	Salt Lake City, UT
XI.7 Hydrogen by Wire-Home Fueling System (Phase I Project)	Proton Energy Systems	Wallingford, CT
XI.8 On-Line Measurement of PEM Electrolyzer Stacks (Phase I Project)	Reactive Innovations, LLC	Westford, MA
XI.9 Modeling of Hydrogen Dispensing Options for Advanced Storage (Phase I Project)	TIAX, LLC	Cambridge, MA
XI.10 Aqueous Phase Base-Facilitated-Reforming (BFR) of Renewable Fuels (Phase II Project)	Directed Technologies, Inc.	Arlington, VA
XI.11 Faradayic ElectroEtching of Stainless Steel Bipolar Plates (Phase II Project)	Faraday Technology, Inc.	Clayton, OH
XI.12 Anode Concepts for SO_2 Crossover Reduction in the HyS Electrolyzer (Phase II Project)	Giner Electrochemical Systems, LLC	Newton, MA
XI.13 Power Generation from an Integrated Biofuel Reformer and Solid Oxide Fuel Cell (Phase II Project)	InnovaTek, Inc.	Richland, WA

PHASE I PROJECTS

XI.1 Integrated Membrane Water Gas Shift Reactor for Hydrogen Production

InnovaTek, Inc.
350 Hills Street
Suite 104
Richland, WA 99354-5511

This project will develop advanced membrane reactor technology for the production of clean hydrogen that can result in economic, energy, and environmental benefits by opening new avenues for energy production, reducing energy consumption, increasing capital productivity, and reducing waste and pollutants.

XI.2 Development of a "4-in-1" Device for Cost Effective and Efficient Production of Hydrogen

Materials and Systems Research, Inc.
5395 West 700 South
Salt Lake City, UT 84104

This project will lead to the development of an economical means to intensify hydrogen production processes for various applications such as transportation, petroleum refinery, military and residential use.

XI.3 Advanced PEM Based Hydrogen Home Refueling Appliance

ElectroChem, Inc.
400 West Cummings Park
Woburn, MA 01801

This project will develop a small appliance for refueling hydrogen vehicles by the homeowner that is low cost and uses inexpensive off-peak electricity to produce hydrogen from water. This appliance will reduce the infrastructure cost for development of the hydrogen vehicle market in both the near and long term.

XI.4 Unitized Design for Home Refueling Appliance for Hydrogen Generation to 5000 psi

Giner Electrochemical Systems, LLC
89 Rumford Aveue
Newton, MA 02466-1311

To enable the transition to a hydrogen economy, the successful implementation of a "unitized" electrolyzer design that can be used as a home refueling appliance will result in a safe, high-efficiency, low capital cost system that will provide competitively-priced hydrogen for fuel-cell vehicles.

XI.5 Design, Optimization and Fabrication of a Home Hydrogen Fueling System

Lynntech, Inc.
7610 Eastmark Drive
College Station, TX 77840

This project will identify infrastructure problems and system requirements to design and fabricate an affordable, safe and energy efficient home hydrogen fueling appliance. It is targeted to meet hydrogen refueling needs of the average U.S. traveler on a daily basis and has potential application as a backup power source in emergencies.

XI.6 Development of a Hydrogen Home Fueling System

STTR Project
Materials and Systems Research, Inc.
5395 West 700 South
Salt Lake City, UT 84104

This project provides a technical and economic means for development of hydrogen home fueling systems featuring hydrogen, power and heat tri-generation.

XI.7 Hydrogen by Wire-Home Fueling System

Proton Energy Systems
10 Technology Drive
Wallingford, CT 06492

One of the most attractive ways to implement a home hydrogen fueling station is the proton exchange membrane (PEM) water electrolysis hydrogen generator. PEM technology can generate the hydrogen fuel from renewable electricity and directly fill a vehicle at home in the user's garage.

XI.8 On-Line Measurement of PEM Electrolyzer Stacks

Reactive Innovations, LLC
2 Park Drive, Unit 4
Westford, MA 01886

This project will develop a sensor to assess the quality of membrane and electrode assemblies before they are incorporated into higher-value electrolyzers. The success of this product innovation will help lower the manufacturing cost for water electrolyzers targeted by the Department of Energy to generate hydrogen for transportation and stationary applications.

XI.9 Modeling of Hydrogen Dispensing Options for Advanced Storage

TIAX, LLC
15 Acorn Park
Cambridge, MA 02140-2301

On-board vehicle hydrogen storage volumetric and gravimetric targets have not been achieved with 35 MPa compressed hydrogen storage. Five promising advanced storage categories have been identified by the DOE, and this project will develop hydrogen dispensing configurations and cost estimates for each storage option.

PHASE II PROJECTS

XI.10 Aqueous Phase Base-Facilitated-Reforming (BFR) of Renewable Fuels

Directed Technologies, Inc.
3601 Wilson Blvd.
Suite 650
Arlington, VA 22201

XI.11 Faradayic ElectroEtching of Stainless Steel Bipolar Plates

Faraday Technology, Inc.
315 Huls Drive
Clayton, OH 45315

XI.12 Anode Concepts for SO_2 Crossover Reduction in the HyS Electrolyzer

Giner Electrochemical Systems, LLC
89 Rumford Aveue
Newton, MA 02466-1311

XI.13 Power Generation from an Integrated Biofuel Reformer and Solid Oxide Fuel Cell

InnovaTek, Inc.
350 Hills Street, Suite 104
Richland, WA 99354-5511