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## XIII.0 Small Business Innovation Research (SBIR) Hydrogen Program New Projects Awarded in FY 2011

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 research and development (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 2011 related to the Hydrogen and Fuel Cells Program. On this and the following page are brief descriptions of each.

**TABLE 1.** FY 2011 SBIR Projects Related to the Hydrogen and Fuel Cells Program

	<b>Title</b>	<b>Company</b>	<b>City, State</b>
XIII.1	Ultra-Lightweight High Pressure Hydrogen Fuel Tanks Reinforced with Carbon Nanotubes (Phase I Project)	Applied Nanotech, Inc.	Austin, TX
XIII.2	Alternative Fiber Evaluation and Optimization of Filament Winding Processing (Phase I Project)	Quantum Fuel Systems Technologies Worldwide, Inc.	Irvine, CA
XIII.3	New High Performance Water Vapor Membranes to Improve Fuel Cell Balance of Plant Efficiency and Lower Costs (Phase I Project)	Tetramer Technologies, LLC	Pendleton, SC
XIII.4	Fuel Cell Range Extender for Battery-Powered Airport Ground Support Equipment (Phase I Project)	Innovatek, Inc.	Richland, WA

### PHASE I PROJECTS

#### XIII.1 Ultra-Lightweight High Pressure Hydrogen Fuel Tanks Reinforced with Carbon Nanotubes

Applied Nanotech, Inc.  
3006 Longhorn Blvd.  
Austin, TX 78758

One effective way to lower the weight, thus decreasing the carbon fiber usage and lowering the cost, of a carbon fiber reinforced plastic (CFRP) tank is to improve the mechanical properties of the CFRP composite resin matrix using nano-reinforcement. This project will reduce the cost of the carbon fiber by 30-40% by reducing the weight of the CFRP composite by 30-40% reinforced with carbon nanotubes used in the structure of the high-pressure hydrogen fuel tank, while maintaining or improving the performance of the tank at the regular weight while the fuel efficiency is significantly improved.

## **XIII.2 Alternative Fiber Evaluation and Optimization of Filament Winding Processing**

Quantum Fuel Systems Technologies Worldwide, Inc.  
17872 Cartwright Road  
Irvine, CA 92614-6217

In an effort to improve emissions, reduce the carbon footprint and decrease the dependency on oil, this project will investigate alternative methods to lower the cost of hydrogen storage vessels.

## **XIII.3 New High Performance Water Vapor Membranes to Improve Fuel Cell Balance of Plant Efficiency and Lower Costs**

Tetramer Technologies, LLC  
657 South Mechanic Street  
Pendleton, SC 29670-1808

This project will reduce the U.S. dependence on foreign oil and reduce hydrocarbon emissions, by lowering the cost of fuel cell technology for both stationary and transportation applications.

## **XIII.4 Fuel Cell Range Extender for Battery-Powered Airport Ground Support Equipment**

Innovatek, Inc.  
3100 George Washington Way, Suite 108  
Richland, WA 99354-1663

InnovaTek will develop a fuel cell power system that operates on bio-jet fuel to facilitate the replacement of fossil fuels with renewable fuels for airport ground service equipment thereby improving environmental conditions at airports and their locals as well as improving energy security and sustainability for airport operations.