From components and systems to modeling and testing, Argonne's advanced fuel cell technologies offer competitive advantages

Argonne seeks partners for commercial development and licensing of our fuel cell technologies

Whether for stationary or vehicle applications, these fuel cell technologies are available for commercial development under a variety of flexible cooperative research and development arrangements with private industry. For more information on working with Argonne, call the Argonne Office of Technology Transfer at 1-800-627-2596, or e-mail us at partners@anl.gov

Links to online information:

Argonne fuel cell technologies:
http://www.techtransfer.anl.gov/techtour/batteries.html

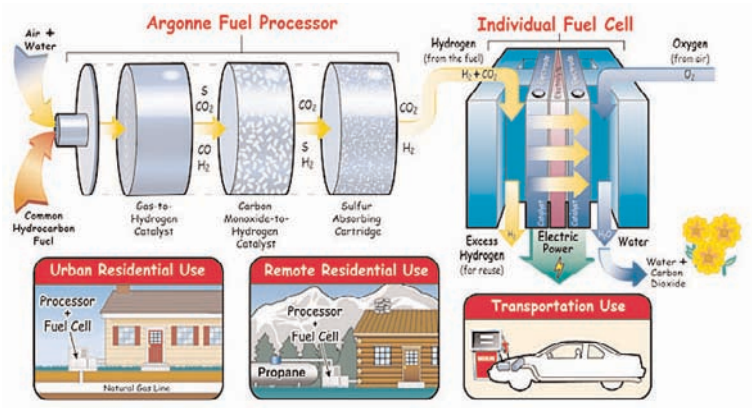
How to license Argonne technologies:
http://www.techtransfer.anl.gov/working/index.html

Examples of successful partnerships:
http://www.techtransfer.anl.gov/partners/index.html

Argonne's Chemical Engineering Division:
http://www.cmt.anl.gov/science-technology/fuelcells/default.shtml

Fuel Reforming: Argonne National Laboratory's cost-effective, compact fuel reforming technology for stationary and transportation applications quickly and efficiently extracts hydrogen from common hydrocarbon fuels, such as gasoline, propane, and natural gas. Based on a new partial oxidation catalyst, the system operates at temperatures several hundred degrees lower than noncatalyzed processes, shows excellent tolerance to sulfur (an impurity found in hydrocarbon fuels), and follows changing loads with ease. The fuel processor operates using a process similar to that in today's automotive catalytic converters. The unique first-stage, partial oxidation catalyst is based on a novel combination of selected metals and an oxygen-conducting ceramic material.

Solid Oxide Fuel Cells: Argonne has developed solid oxide fuel cell technologies that can operate at lower temperatures than conventional solid oxide fuel cells. The lower operating temperature (500-800ºC) results in increased energy conversion efficiencies, improved mechanical robustness, and offers cost savings by eliminating the need to use expensive ceramic-based materials. Current efforts focus on developing advanced, low-temperature cathodes (for use below 800ºC), sulfur-tolerant anodes (for operation on sulfur-containing fuels), and metallic interconnects (in almost any desired shape).



Fuel Cell Modeling: Argonne's unique software for designing, analyzing, and comparing fuel cell systems and other power-plant configurations, such as automotive, space-based, and stationary systems, lets designers test different system configurations without the expense and delay of actually building numerous prototypes. The General Computational Toolkit (GCTool) software provides a convenient, flexible framework for integrating various component models into simple or complex system configurations. A library of models for subcomponents and property tables common to many different systems and powertrains is available, and users can add their own models as needed.

Fuel Cell Testing: Argonne offers an independent testing facility for fuel cell developers, government agencies, and automakers to evaluate and validate fuel cell technologies. The facility is designed for testing and evaluating fuel cell stacks and systems up to 50 kW. Employing standardized tests and conditions, Argonne provides comparative data on the performance, operational characteristics, and durability of fuel cells to help developers and sponsors evaluate technical progress.

Successful Partnerships

Developing Advanced Fuel Reforming Technologies with Argonne

Argonne is working with multiple industrial partners to design and operate a low-cost hydrogen generator based on Argonne inventions that range from novel sulfur-tolerant catalysts to an onboard fuel reformer. Partners such as Sud Chemie, H2fuel, and Unitel Technologies have joined Argonne, resulting in licensed rights and a more commercial focus. Advanced designs are available for licensing. According to Serge Randhava, President of H2fuel, "Our goal is to supply the smallest, most efficient, and least expensive fuel processor to the fuel cell industry." Three other companies and three DOE labs are working with Argonne to pool selected component technologies in order to make an improved reformer.

Your organization can be successful working with Argonne!

Argonne National Laboratory has successfully partnered with hundreds of companies (from very large corporations to start-ups) using a variety of flexible cooperative research and development arrangements. Our licensing program enables companies to acquire rights to Argonne inventions and copyrights. Licenses may be exclusive or nonexclusive.

General Contact

For general information and inquiries, contact: Argonne's Office of Technology Transfer, 1-800-627-2596, or e-mail us (*partners@anl.gov*).

Media Contact *(not for publication)*

For technical and background information only, contact Jim Gleeson at 630-252-6055, (*gleeson@anl.gov*).

Argonne's advanced fuel cell technologies can help you make a significant impact in the marketplace

For Argonne research partners and/or licensees, there exist significant marketing opportunities with Argonne's advanced fuel cell technologies. As the U.S. moves more rapidly toward developing a hydrogen economy, reliable fuel cells and hydrogen-related technologies will find wider use in a great variety of applications, including

- Stationary power for homes and commercial buildings
- Stationary power for remote locations (buildings and equipment)
- Transportation, including auxiliary power units and hybrid vehicles

Technology/Application	Technology Potential	Current Usage
Fuel reforming for fuel cells	$8.5 billion over 20 years for stationary applications*	Field-testing in progress
	$28.1 billion over 20 years for transportation applications**	Fast Start Reformer unit in development

*Based on a published study estimating a market of $340 billion over 20 years to meet future U.S. power demand increases as projected by DOE × 0.10 (estimated percent demand met by stationary fuel cells) × 0.25 (estimated percent fuel cells using fuel reforming).

**Based on a published study estimating a market of $1.124 trillion over 20 years to meet future U.S. automotive power plant demand increases × 0.10 (estimated percent demand met by fuel cell vehicles) × 0.25 (estimated percent fuel cell vehicles using onboard fuel reforming).

Argonne to coordinate DOE's fuel reformer program

The U.S. Department of Energy has named Argonne National Laboratory to coordinate efforts with other DOE labs and industrial partners for the DOE's "Fast Start Reformer" program. The program's goal is to develop a working fuel reformer and fuel cell system that can operate at full power after one minute of vehicle operation.