



U.S. DEPARTMENT OF
ENERGY

Nuclear Hydrogen Initiative

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2007 DOE Hydrogen Program Merit Review and Peer Evaluation Meeting

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Outline

- Goal and Objectives
- Budget
- Challenges
- Progress
 - Accomplishments/Status
- Future Plans



Goals and Objectives

Nuclear Hydrogen Initiative: Develop hydrogen production technologies that are compatible with advanced nuclear energy systems and do not produce greenhouse gases.

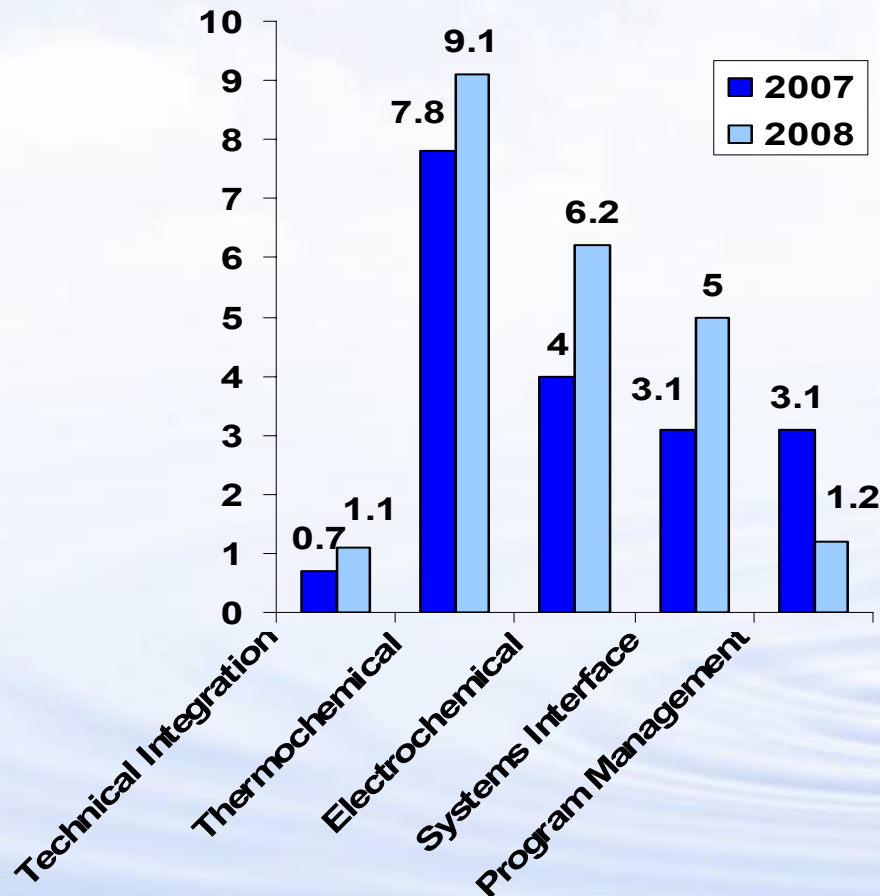
- Operate laboratory-scale and pilot-scale experiments of thermochemical and high temperature electrolysis production technologies to demonstrate feasibility and scale-up
- Select hydrogen production technology to be coupled with the Next Generation Nuclear Plant (EPACT requirement)
- By 2019, demonstrate commercial-scale hydrogen production system for use with advanced nuclear reactors



Budget

FY2007 Appropriation = \$18.7M

FY2008 Budget Request = \$22.6M



- **Emphasis:** Research and development of high-temperature hydrogen production technologies for use with nuclear energy – Thermochemical Cycles and High-Temperature Electrolysis.

- **Budget Obligations:**

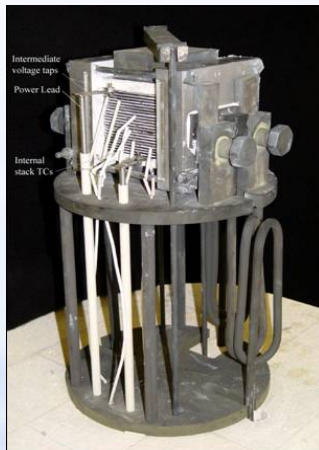
Fulfill current contracts	\$5.7M
R&D at National labs	\$16.2M
New starts	\$0.7M
Total	\$22.6M



Challenges



- Need for high temperature resistant, corrosion resistant materials
- Need for advanced catalysts and membrane materials
- Water management
- Durable electrode materials and seals for electrolysis cells
- Selection of intermediate loop heat transport fluid





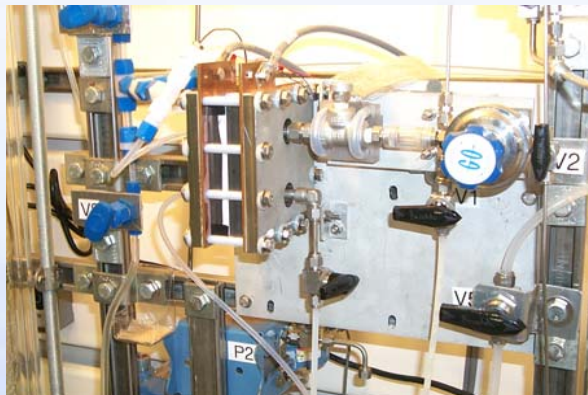
Progress

Thermochemical Cycles

Bayonet Design, Si-C,
 H_2SO_4 Decomposer for
Sulfur-Iodine Cycle,
FY 2006 (SNL)



SO_2 -depolarized
Electrolyzer for Hybrid
Sulfur Cycle; 100-hr test
scheduled for June 2007
(SRNL)

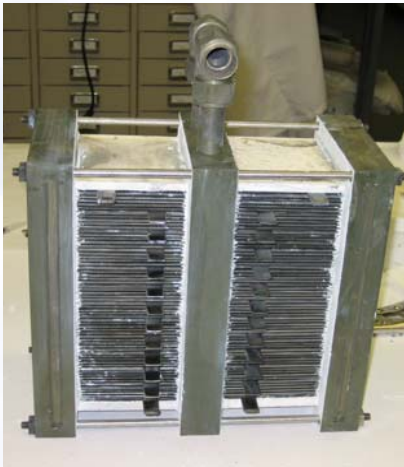


H_2SO_4 Decomposition
Skid for Sulfur-Iodine
Integrated Lab-Scale
Experiment
(SNL, GA, French CEA)

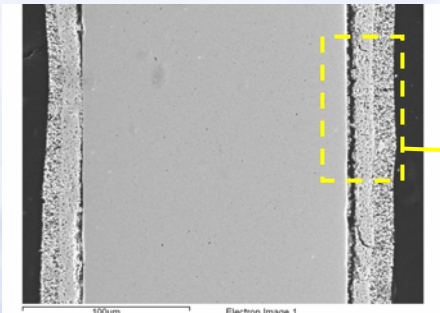


Progress

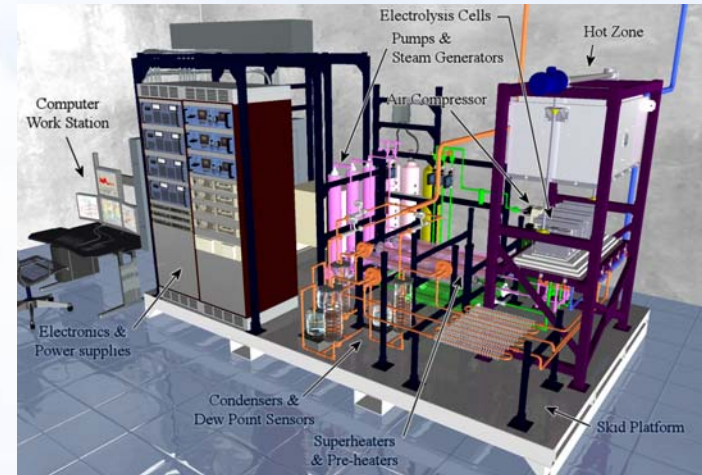
High Temperature Electrolysis



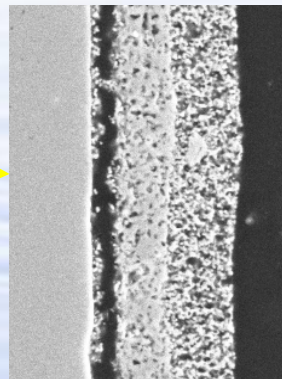
2,000-hr test of 120-cell "half-module"
September 2006 (INL / Ceramtec)



Post-test evaluation of electrodes (ANL)

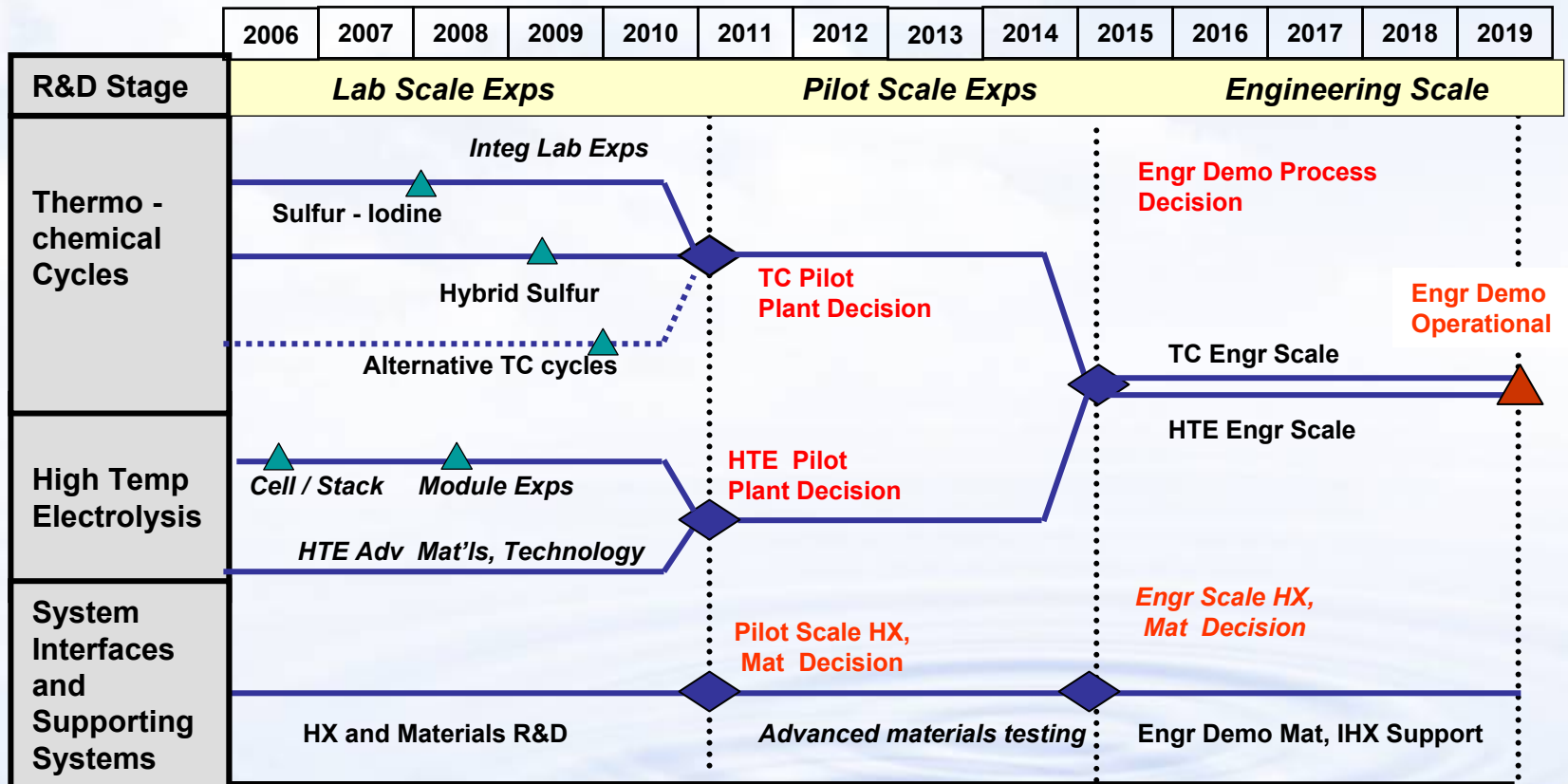


Integrated Laboratory-Scale Experiment
to start operation September 2007 (INL)





Future Plans





For More Information

Nuclear Hydrogen Initiative

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The screenshot shows the homepage of the U.S. Department of Energy's Hydrogen Program website. The header includes the DOE logo and the text "hydrogen.energy.gov". A navigation bar contains links: Home, About, DOE Participants, International, Library, and News/Events. A search bar is on the right. The main content area is divided into several sections:

- Left Sidebar:** A list of topics under "Hydrogen Production":
 - > Hydrogen Production
 - > Hydrogen Delivery
 - > Hydrogen Storage
 - > Hydrogen Manufacturing
 - > Conversion / Fuel Cells
 - > Applications / Technology Validation
 - > Safety
 - > Codes & Standards
 - > Education
 - > Basic Research
 - > Systems Analysis
 - > Systems Integration
- Center:**
 - INCREASE YOUR H₂IQ**
 - Announcement:** Peer Evaluation Report Focuses on Merit of DOE Hydrogen and Fuel Cell Projects
 - News:** Independent Review Panels Assess Progress Towards Technical Targets. Two new reports describe review panel findings related to cost targets for hydrogen production and fuel cells. October 5, 2006 [More >](#)
 - DOE Announces Hydrogen Funding Opportunity for Small Businesses:** Small Business Innovation Research funding is available for evaluating hydrogen production and delivery technologies. September 27, 2006 [More >](#)
 - DOE Loan Guarantee Program Promotes Innovative Technologies:** The DOE Loan Guarantee Program is available to promote the commercial use of innovative technologies. August 23, 2006 [More >](#)
- Right Sidebar:**
 - DOE Hydrogen Program** (with H₂ logo)
 - Features:**
 - President's Hydrogen Fuel Initiative (with photo of President Bush)
 - ADVANCED ENERGY INITIATIVE**
 - Hydrogen.gov**
 - FreedomCAR & Fuel Partnership**
 - Information on:**
 - Financial Opportunities

Look under "Hydrogen Production" at:

www.hydrogen.energy.gov

