



U.S. DEPARTMENT OF
ENERGY

Nuclear Hydrogen Initiative

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2007 DOE Hydrogen Program Merit Review and Peer Evaluation Meeting

May 15, 2007





Outline

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



Goals and Objectives

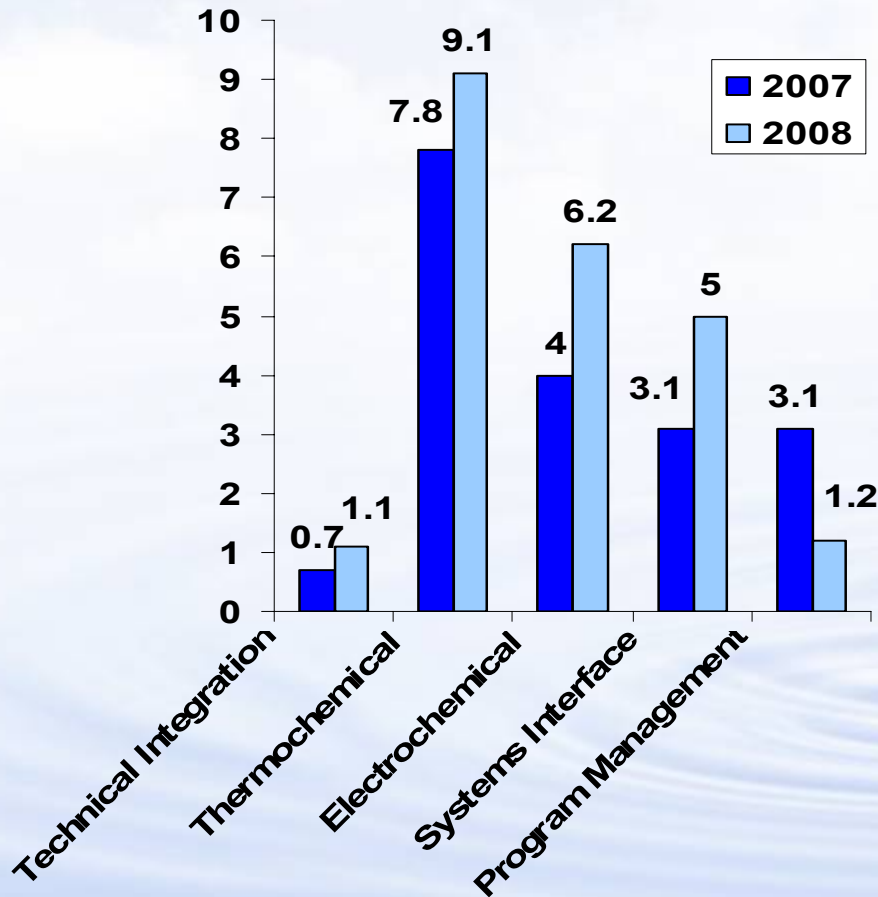
Nuclear Hydrogen Initiative: Develop hydrogen production technologies that are compatible with advanced nuclear energy systems and do not produce greenhouse gases.

- 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:**

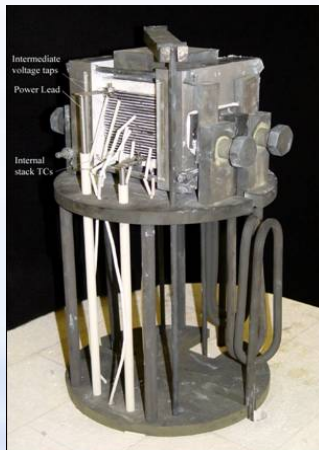
Fulfill current contracts	\$5.7M
R&D at National labs	\$16.2M
New starts	\$0.7M
Total	\$22.6M



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

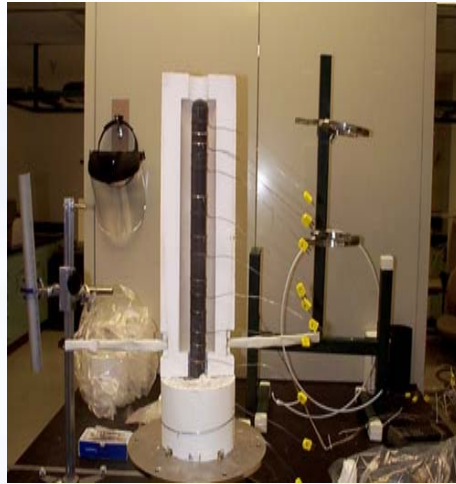




Progress

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)

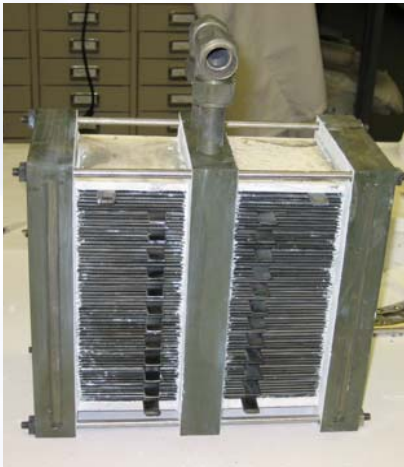


H_2SO_4 Decomposition
Skid for Sulfur-Iodine
Integrated Lab-Scale
Experiment
(SNL, GA, French CEA)

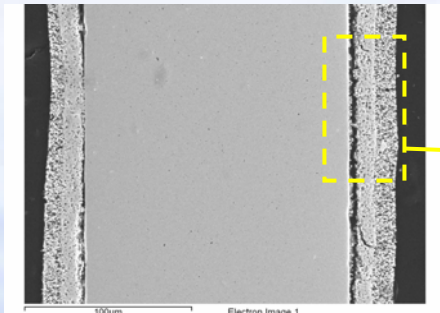


Progress

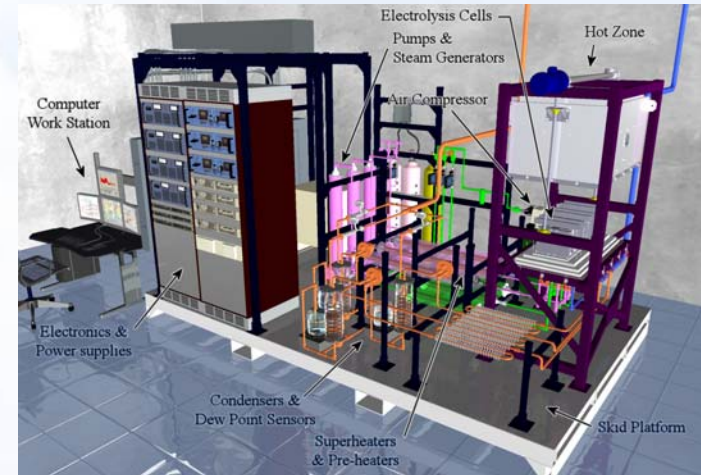
High Temperature Electrolysis



2,000-hr test of 120-cell “half-module”
September 2006 (INL / Ceramatec)



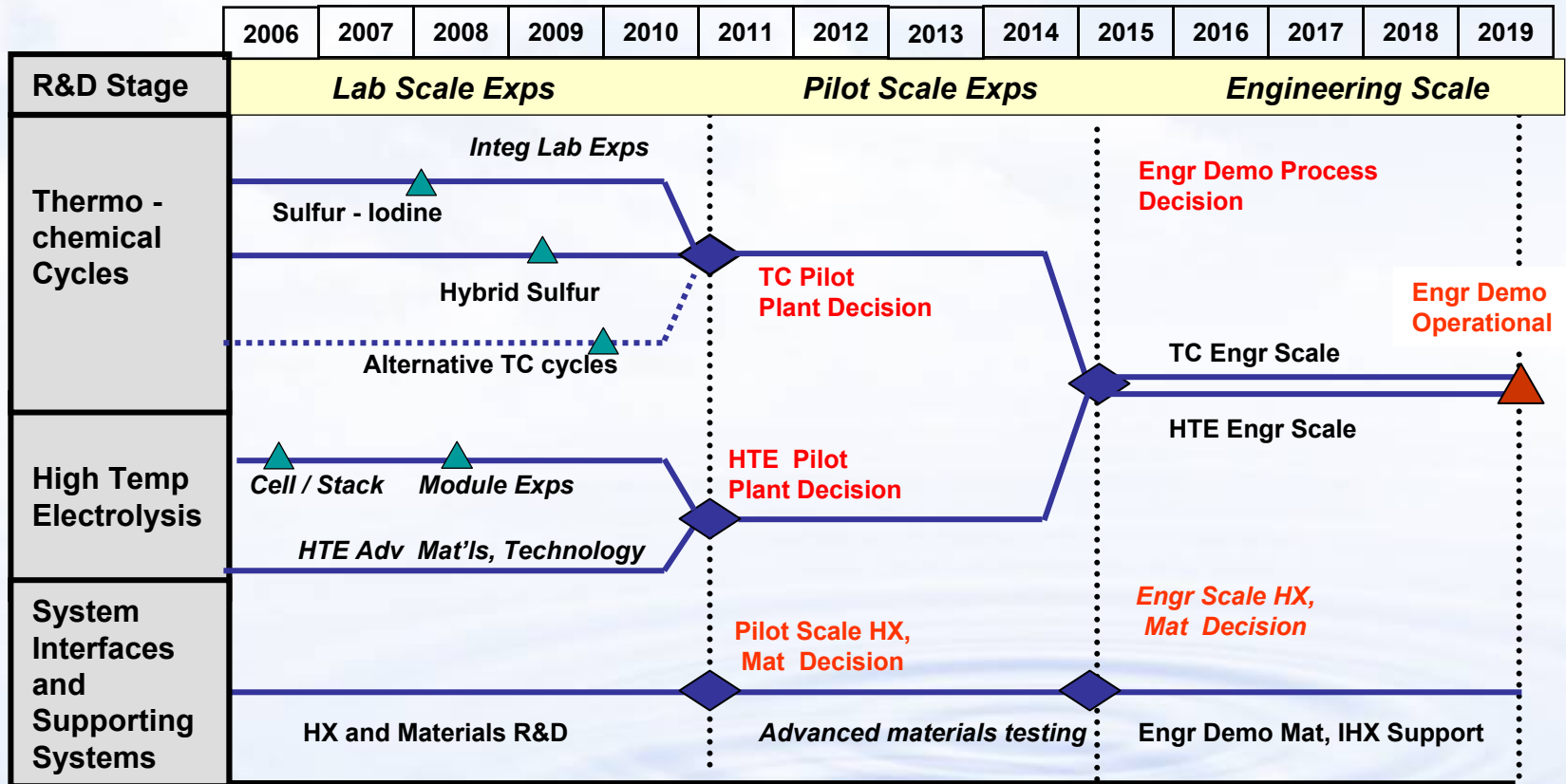
Post-test evaluation of electrodes (ANL)



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 menu lists: Home, About, DOE Participants, International, Library, and News/Events. A search bar is located in the top right. The main content area is divided into several sections:

- Left Sidebar:** A list of categories with expandable arrows: Hydrogen Production, Hydrogen Delivery, Hydrogen Storage, Hydrogen Manufacturing, Conversion/Fuel Cells, Applications/Technology Validation, Safety, Codes & Standards, Education, Basic Research, Systems Analysis, and Systems Integration.
- Top Center:** "INCREASE YOUR H₂IQ" and "Announcement Peer Evaluation Report Focuses on Merit of DOE Hydrogen and Fuel Cell Projects".
- Right Side:** "DOE Hydrogen Program" logo, "Features" section, "President's Hydrogen Fuel Initiative" with a photo of a man, "ADVANCED ENERGY INITIATIVE" logo, "Hydrogen.gov" logo, and "FreedomCAR Fuel Partnership" logo.
- Bottom Center:** "DOE Announces Hydrogen Funding Opportunity for Small Businesses" (dated September 27, 2006) and "DOE Loan Guarantee Program Promotes Innovative Technologies" (dated August 23, 2006).

Look under "Hydrogen Production" at:

www.hydrogen.energy.gov

