



2005 Annual DOE Hydrogen Program Review

Hydrogen Production Using Nuclear Energy

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Outline



- Barriers
- Nuclear Technologies
- Program Organization/Coordination
- 2004 Technical Accomplishments
- Future Plans



Barriers



➤ Long-Term – Cost

- Nuclear reactor & central hydrogen production facility
- Distribution from central production to point of use

➤ Near-Term

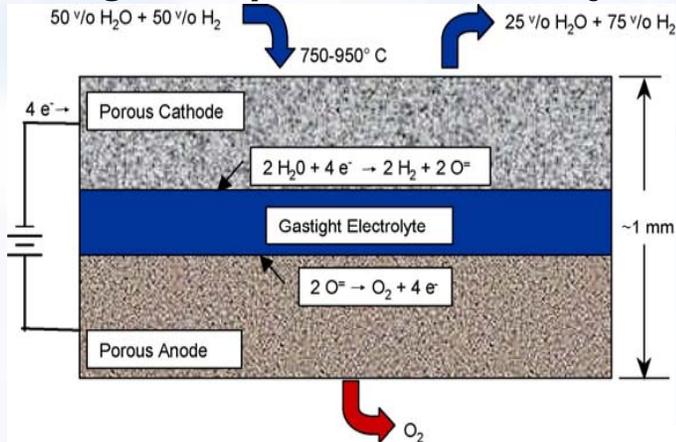
- Materials – high-temperature, corrosion resistant
- Catalysts – high-temperature, high-activity, stable
- Process realization – achieving reasonable performance of small-scale experiments



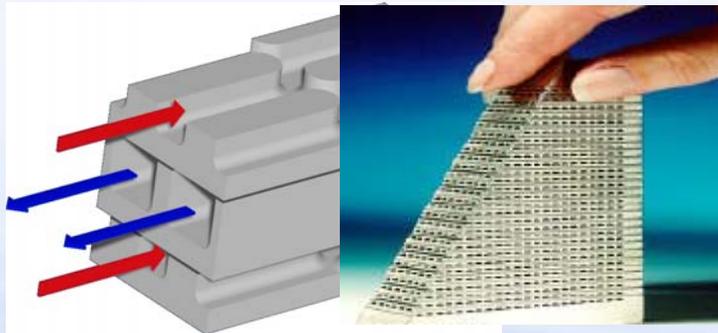
Nuclear Technologies



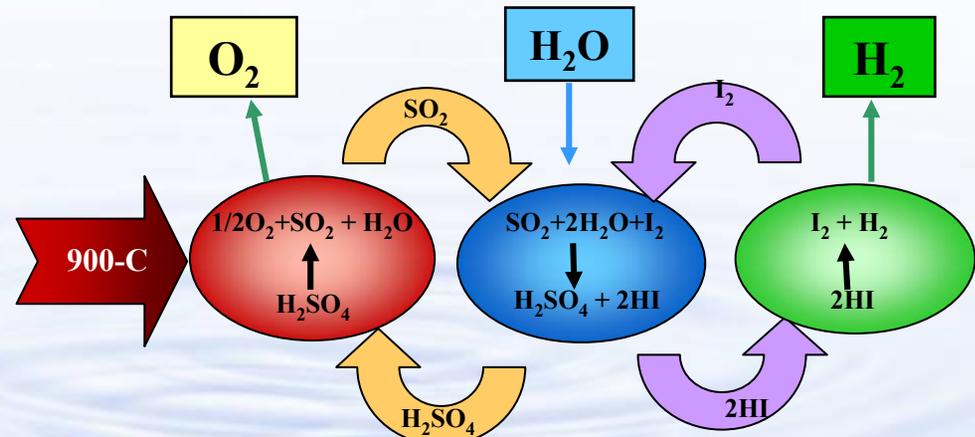
High Temperature Electrolysis



Interface Technologies (HX, Materials)



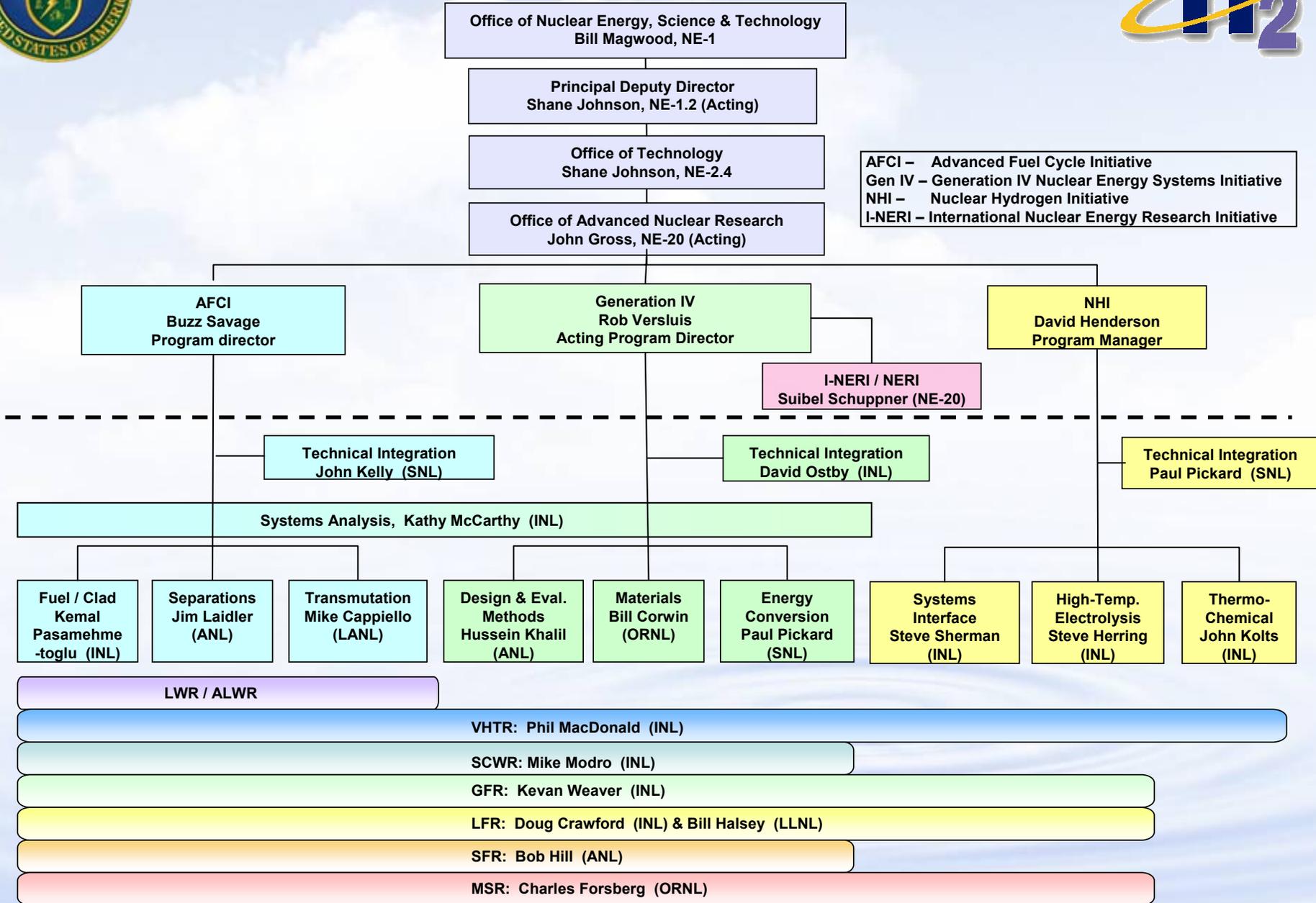
- Thermochemical Cycles (*Scaling, efficiency*)
- High Temperature Electrolysis (*modular scaling, efficiency*)
- System Interface (*High temp materials and HX design*)



Thermochemical Cycles



Program Organization/Coordination



AFCI – Advanced Fuel Cycle Initiative
 Gen IV – Generation IV Nuclear Energy Systems Initiative
 NHI – Nuclear Hydrogen Initiative
 I-NERI – International Nuclear Energy Research Initiative



Accomplishments & Plans



➤ 2004 Technical Accomplishments

- Completed designs for laboratory-scale experiment systems
- Completed button-cell experiments on candidate electrolyte materials for high-temperature electrolysis
- Enveloped infrastructure and balance-of-plant requirements for thermochemical and high-temperature electrolysis pilot-scale experiments
- Defined system interface technical requirements
- Initiated high-temperature materials & heat exchanger development work



Future Plans

