



Energy &  
Homeland Security

# SNL Hydrogen's Contributions to a Decarbonized Future

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*Sandia National Laboratories, September 15, 2021*



# SANDIA'S ENERGY PROGRAM INTEGRATES GENERATION AND APPLICATIONS



## Nuclear Energy & Fuel Cycle



Commercial Nuclear Power Generation,  
Nuclear Energy Safety & Security



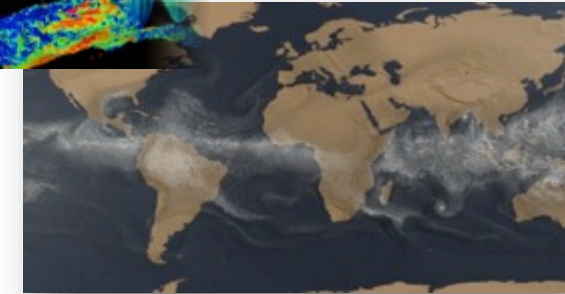
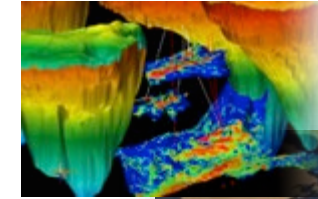
## Fundamental Energy Research

Chemical,  
Geological,  
Biological,  
Materials,  
Computational,  
and Nano  
Sciences



## Engineered Earth Systems

Energy & Water, Fossil Energy,  
DOE Managed Nuclear Waste



## Renewable Power & Energy Infrastructure

Renewable Energy, Energy Efficiency, and  
Grid Modernization



## Sustainable Transportation

Vehicle Technologies, Bioenergy, Hydrogen &  
Fuel Cell Technology







## Hydrogen Production



Water-splitting materials for large-scale hydrogen production

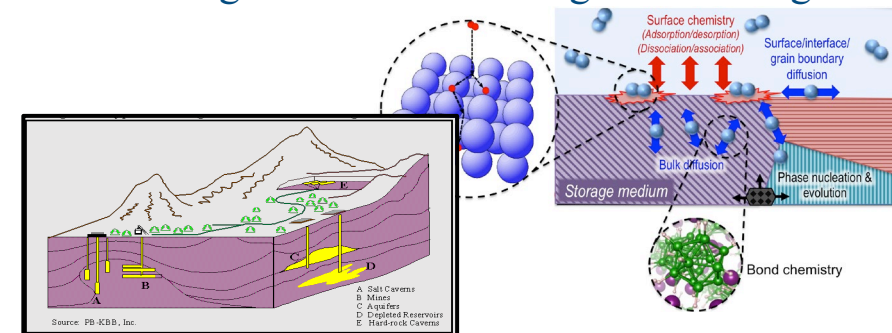
## Hydrogen Delivery

Materials compatibility for hydrogen in natural gas pipelines



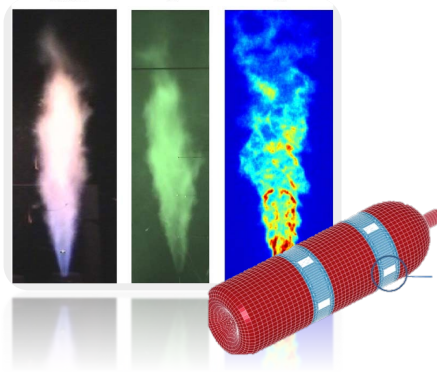
## Hydrogen Storage

Discovering the behavior of solid storage materials and advancing subsurface storage technologies



## Safety Codes and Standards

Structural material selection for production, storage and utilization



## Systems Engineering

Demonstrate innovative engineering solutions to harness clean energy technologies



## Fuel Cells

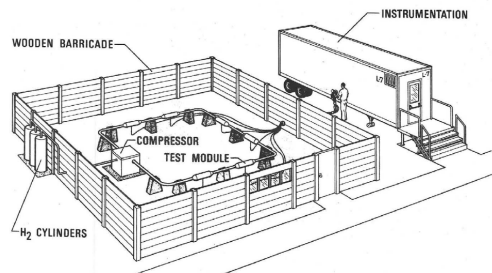
Develop synthesis toolbox and membrane chemistry for enhanced electrochemical performance



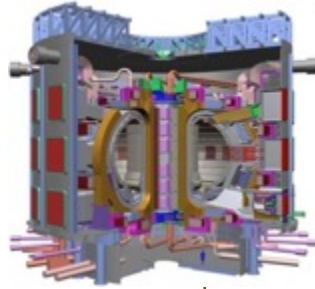
# PARTNERSHIPS AND CONSORTIA ARE CRITICAL TO SANDIA'S HYDROGEN PROGRAMS



Experimental Hydrogen Pipeline Facility



Fusion Energy Sciences



Conference Organization



Lift-Truck Lifecycle Requirements



Mobile Lighting



Solar Thermo-Chemical Hydrogen Reactor



1960

1970

1980

1990

2000

2005

2010

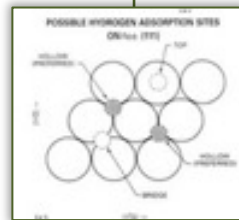
2015

2020

Metallurgy



Embedded Atom Method



RATLER



Automotive Storage



Mining Locomotive



Hydrogen Storage Technology Materials and Applications



Tritium Research

