



# SANDIA NATIONAL LABORATORIES

## CAPABILITIES FOR REGIONAL CLEAN HYDROGEN HUBS

Sandia National Laboratories offers expertise with respect to Regional Clean Hydrogen Hubs in two capacities:

-  Cross-cutting support to reduce risk for technology integration into the market
-  Partnerships where unique regional resources are aligned with Sandia capabilities

### Cross-cutting support for risk reduction that builds on Sandia capabilities

- **Structural materials engineering:** material selection for high-pressure hydrogen service; material performance qualification methods
- **Safety and risk management:** safety and consequence analysis using tools that tie risk to the scientific basis of hazards and controls
- **Codes and standards:** hydrogen safety and component performance education for designers and permitting officials; scientific basis for new codes and standards
- **Transmission and distribution pipelines:** materials compatibility, aging and lifetimes
- **Innovative hydrogen storage solutions:** materials and engineering for solid-state storage approaches at all scales; high-pressure and liquid storage solutions
- **Water resource planning and water treatment technologies**
- **Resilient infrastructure metrics and analysis**

- **Grid integration:** microgrid design and controls; hydrogen for long-duration energy storage
- **End-use** (e.g., air, marine, rail) technical application feasibility and performance assessments
- **End-use applications involving hydrogen combustion:** combustion process characterization to maximize efficiency and minimize emissions; gas turbines and internal combustion engines; industrial processing heating; residential combined heat and power

### Capabilities specific to unique resources in a geographic region

- **Solar thermochemical hydrogen production:** water-splitting materials, chemical reactor design, and concentrating solar thermal engineering
- **Thermochemical hydrogen production using nuclear reactor process heat:** water-splitting materials and chemical reactor design
- **Large-scale, sub-surface hydrogen storage:** geomechanics and techno-economic analysis

*Sandia is a federally funded research and development center (FFRDC). FFRDCs are intended to “provide federal agencies with R&D capabilities that cannot be effectively met by the federal government or the private sector alone.”<sup>1</sup> Our collaborations must align with our federal agency missions and our ability to maintain long-term scientific and technical expertise to execute on those missions.*

**Please visit our hydrogen program website for more information:**  
[hydrogen.sandia.gov](https://hydrogen.sandia.gov)

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<sup>1</sup> Congressional Research Service. "Federally Funded Research and Development Centers (FFRDCs): Background and Issues for Congress" <https://crsreports.congress.gov/product/details?prodcode=R44629>