Applied Energy Programs

Innovating, collaborating, and delivering on solutions for a secure energy future

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LANL delivers national security solutions

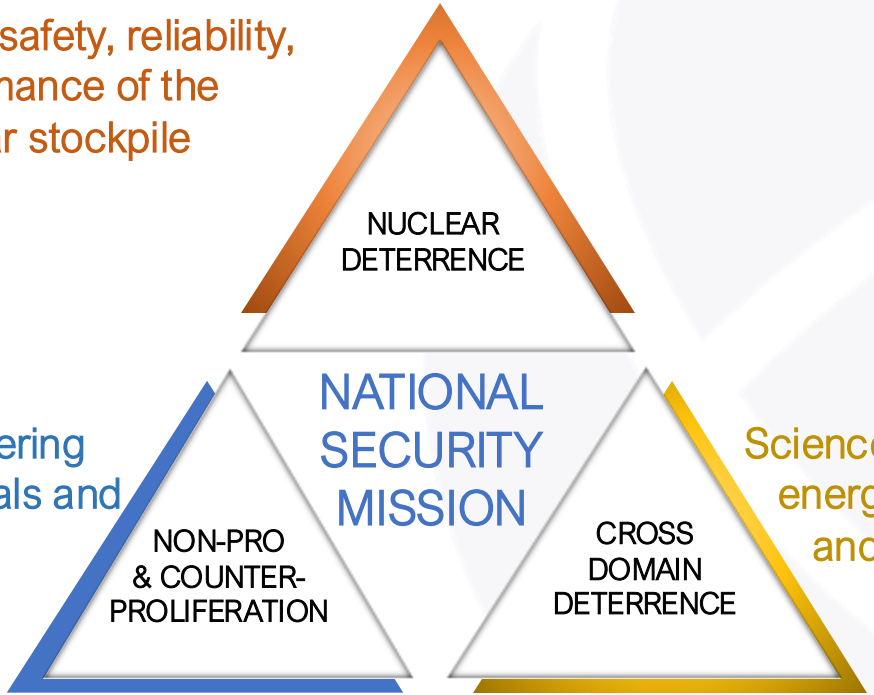
- In 1943, the Laboratory was founded with an urgent purpose: to build an atomic bomb
- **Today, LANL focuses on maintaining a strategic nuclear deterrent to protect the nation's security**
- **We address national security issues and the world's most difficult challenges**
  - by applying multidisciplinary STE capabilities;
  - in distinctive experimental, computational, and nuclear facilities;
  - with an agile, responsive, and innovative workforce; and
  - by partnering with peer institutions for mission success

LAB STATISTICS
40 square miles, ~50 technical areas
800+ bldgs., 8.4M sq ft.
13 nuclear facilities
17,500 workers
1,948 students, 502 postdocs
67% male, 33% female, 51% minorities
39% were born in New Mexico

LANL's national security mission is broad and important

It motivates and is enabled by ST&E discoveries

Ensure the safety, reliability, and performance of the U.S. nuclear stockpile



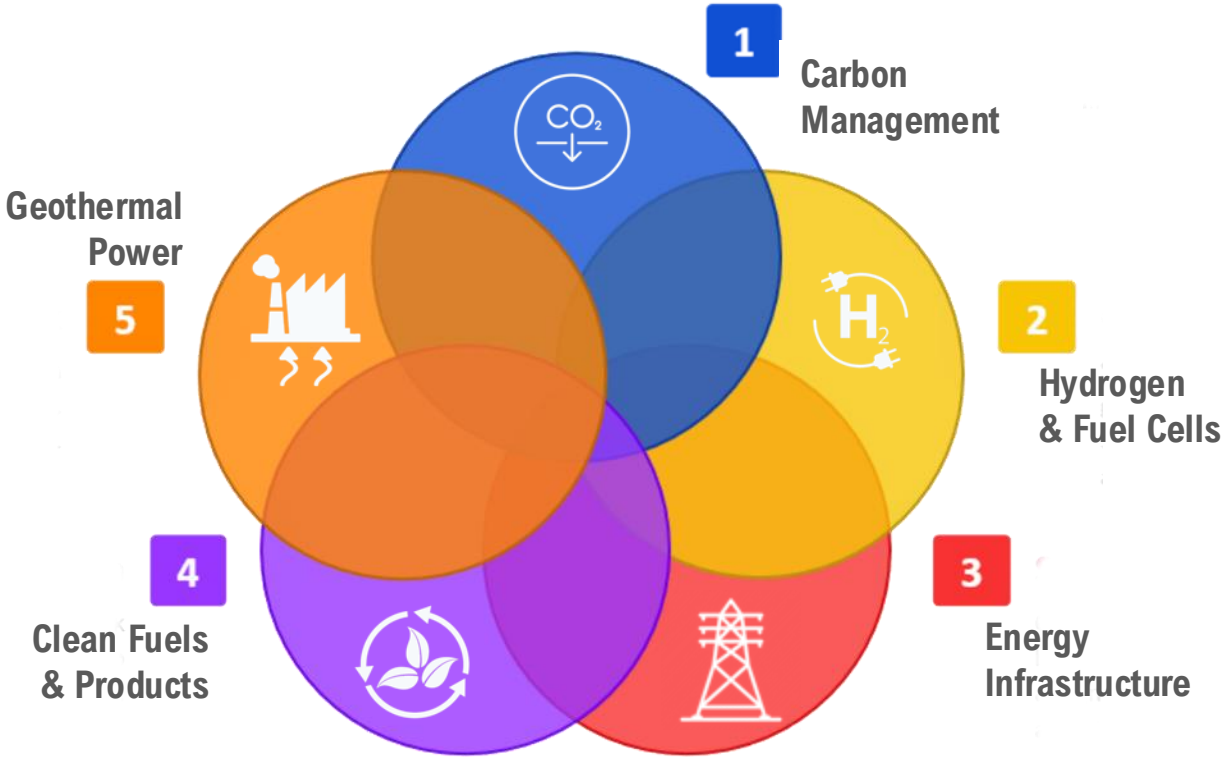
Preventing and countering proliferation of materials and expertise for nuclear weapons

Science & security for energy, climate, cyber, and counter WMD

Los Alamos applied energy focus areas reflect the diverse energy portfolio DOE is pursuing for the nation

"A portfolio approach that takes advantage of the full range of technology, planning, and operational solutions best ensures reliable, clean, secure, and affordable power"

DOE 2024 The Future of Resource Adequacy Report



Collaboration is central to how we innovate solutions to big energy problems

Capturing and storing carbon

- NRAP – National Risk Assessment Partnership
- SMART
- eXtremeMAT
- Argonne NATIONAL LABORATORY

Making fuel cells more affordable

- MILLION MILE FUEL CELL TRUCK – U.S. DEPARTMENT OF ENERGY
- ElectroCat – Electrocatalysis Consortium
- H2NEW
- CHTAC

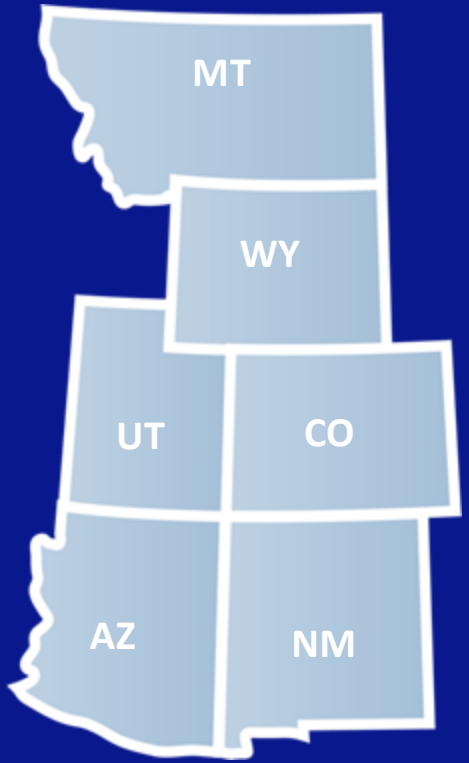
Modernizing and securing the electric grid

- NAERM
- GRID MODERNIZATION INITIATIVE – U.S. Department of Energy
- Advanced Grid Modeling

Developing biofuels and bioproducts

- Agile BioFoundry
- fcic – FEEDSTOCK-CONVERSION INTERFACE CONSORTIUM – U.S. DEPARTMENT OF ENERGY
- ChemCatBio
- Waste to Jet (W2J

I-WEST



www.iwest.org

Connecting energy technologies, projects, and communities

- Place-based approaches focus on the unique geographical, environmental, and demographic attributes of the region
- Technology-neutral approach leverages opportunities across numerous symbiotic energy economies
- Integrated approaches to assessing technology readiness in tandem with societal readiness for a just and equitable energy transition
- Community engaged research and coalition building to encourage regional partnerships

Four Corners Rapid Response Team

Addressing immediate needs of energy communities facing challenges associated with power plant and mine closures

- Gather stakeholder input and give regional voices a platform
- Interface with 12 federal agencies in the IWG on regional priorities

High-level Tasks

- Identify and coordinate use of IWG member agency resources
- Establish working relationships with community leaders and members
- Provide dedicated assistance to address immediate needs and longer-term economic transition strategies
- Assist in ensuring programs from IWG member agencies work for communities' efforts to transform and grow their economies

Interagency Working Group on Coal & Power Plant Communities & Economic Revitalization

www.energycommunities.gov

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Regional partners are critical to many of our R&D projects

A few highlights…

Carbon Management

- CarbonSAFE
- Four Corners Power Plant Integrated Carbon Capture and Storage
- CUSP: Four Corners Regional Initiative

- Undocumented Orphan Well R&D Program

Hydrogen & Fuel Cells

- Fuel cell manufacturing and workforce development

- Expanding to include SJC

- M2FCT consortium industry partner

- Hydrogen production initiatives

Energy Infrastructure

- Microgrid transmission and distribution modeling
- GHG emissions reduction analysis and calculations

- Case study on feasibility of transmission corridor across tribal lands

Looking ahead, national energy drivers will continue to motivate and inspire our applied energy programs

DOE Energy earthshots

Targeting the remaining solution points of the most challenging technical problems across the energy economy.

- Hydrogen
- Industrial Heat
- Long Duration Storage
- Affordable Home
- Carbon Negative
- Clean Fuels and Products
- Enhanced Geothermal
- Offshore Wind

DOE Commercial Liftoff Reports

Creating a common fact base and tool to accelerate clean energy technologies accelerate clean energy technologies from the lab to market.

- Advanced Nuclear
- Carbon Management
- Clean Hydrogen
- Industrial Decarbonization
- Innovative Grid
- Long Duration Energy Storage
- Next-generation Geothermal Power
- Offshore Wind
- Virtual Power Plants

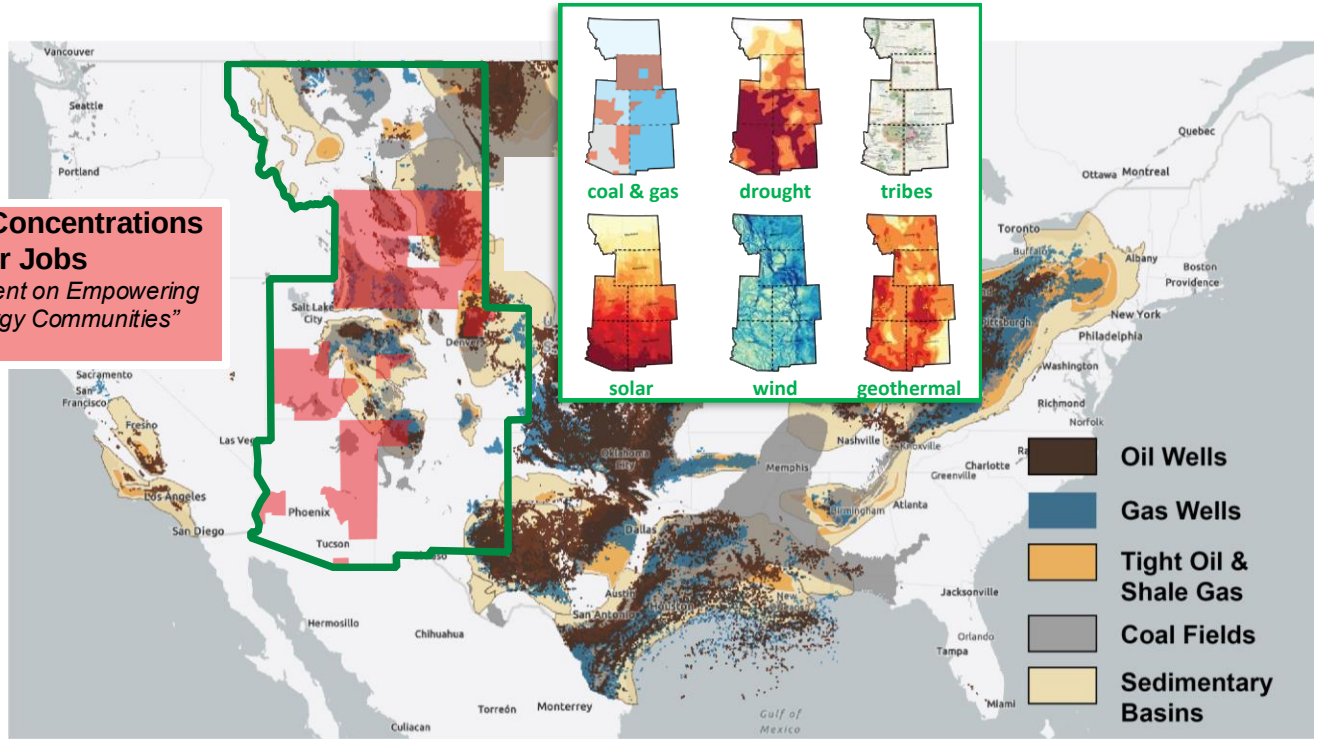
Backup

Why these states?

The Intermountain West encompasses numerous communities currently dependent on fossil-based economies—and many positioned to emerge as leaders in new energy economies

I-WEST Counties with High Concentrations of Direct Coal-Sector Jobs

From the "Initial Report to the President on Empowering Workers Through Revitalizing Energy Communities"



Base map: U.S. Fossil Fuel Resources (atlas.eia.gov)

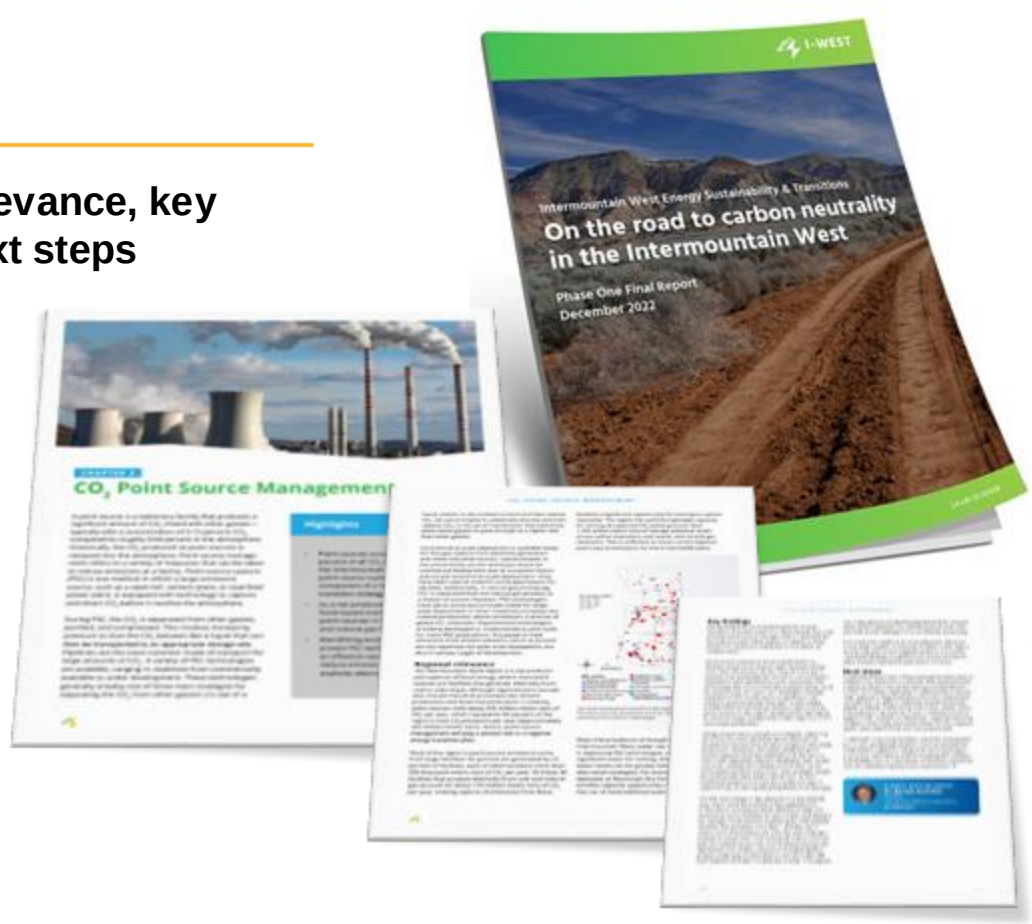
Phase-I Final Report

Online at www.iwest.org

Public report summarizing regional relevance, key findings, and recommendations for next steps

- Regional Overview
- CO2 Point Source Management
- Direct Air Capture
- CO2 Storage and Utilization
- Certification
- Hydrogen Supply
- Hydrogen Demand
- Bioenergy
- Low-carbon Electricity
- Environmental, Energy, and Social Justice
- Policy
- Economic Impacts
- Workforce Impacts

Supplemented by 600+ pages of detailed reporting written for subject matter experts, available upon request.



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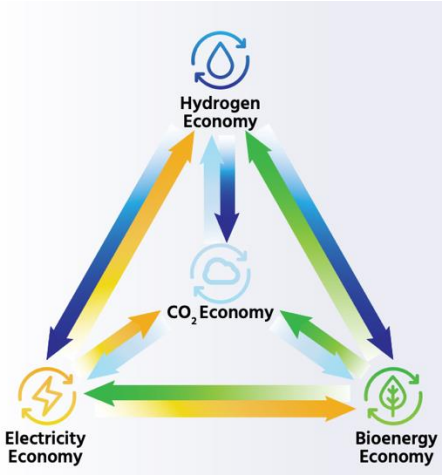
I-WEST strategy to accelerate energy transition *and* prioritize energy and environmental justice

Explore symbiotic economies



- Achieving carbon neutrality will require multiple pathways
- Pathways must reduce greenhouse gas emissions *and* be sustainable
- Symbiotic energy economies can be exploited to decarbonize critical energy sectors and create supply-and-demand scenarios for new energy industries

Build regional coalitions

- Successful energy transition strategies depend on effective planning and implementation at local levels
- A place-based approach engages regional stakeholders to assess societal readiness in tandem with technology readiness
- Regional coalitions are critical to roadmap implementation and technology deployment

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