National Laboratory of the Rockies

Laboratory at a Glance

The National Laboratory of the Rockies (NLR) is the U.S. Department of Energy's primary national laboratory for critical minerals, energy innovation, and energy security. The laboratory bridges foundational research with practical applications to develop and bring to scale new energy materials and technologies that lower energy costs, drive economic growth, and deliver abundant and reliable energy.

> Golden, Colorado, hosts the main South Table Mountain Campus, and the U.S. Department of Energy (DOE) responsible site office, the Golden Field Office; the Flatirons Campus is located 25 miles north. Additional NLR facilities include the Alaska Campus in Fairbanks and the Washington, D.C., office.

Physical Assets*

- 483 acres, 93 buildings, and five trailers
- 1,313,644 gross square footage in buildings/trailers
- 199,852 gross square footage in leased facilities (seven buildings, whole or partial).

People Assets*

3,559 workforce, including:

- 2,829 regular/limited term
- 426 contingent workers
- 178 postdoctoral researchers
- 78 graduate student interns
- 48 undergraduate student interns.

*as of Jan. 1, 2026

Impact

The laboratory's Fiscal Year 2025 business volume was $1.1B.

Innovation

Honored with **76 R&D100 awards** to date

920 Patents or pending patents for our technologies to date

57,590 Publications to date

Since 2000, the laboratory has executed more than 320 royalty-bearing license and option agreements and has approximately 900 patented or patent-pending technologies—plus 250 software solutions available for licensing.

Partnerships

NLR's research and development capabilities empower partners to accelerate energy innovation and systems integration. The laboratory provides commercial and noncommercial partners with end-to-end expertise to de-risk and mature new energy technologies. Through licensing and industry partnerships, NLR fast-tracks DOE-funded research and innovation to market.

The laboratory now has more than 1,160 active partnerships with 812 unique active partners across commercial, noncommercial, and government organizations.

Fiscal Year 2025 Partnerships by the Numbers

365
New partnership agreements

812
Unique new partnerships

Research Capabilities

- Advanced manufacturing
- Advanced Research on Integrated Energy Systems (ARIES) research platform
- Artificial intelligence
- Critical minerals
- Data, analysis, and visualization
- Decision science and analysis
- Energy for buildings and mobility
- Energy security
- Modeling and simulation
- Grid modernization
- Large-scale user facilities
- Power generation and energy storage
- Power systems and electrical engineering
- Technical support for jurisdictions
- Quantum computing.

Foundational Knowledge

- Applied materials science and engineering
- Applied mathematics
- Biological systems science
- Chemical and molecular science.

Accomplishments

From Minerals to Marketplace

NLR is working to tackle key challenges facing the critical mineral supply chain, including water requirements, supply risk, economic infrastructure, secondary research recovery, and scaling to meet increased consumer needs. Researchers are looking at every step of the supply chain, researching the United States' ability to mine new materials, keep existing critical minerals out of landfills, and use AI-driven insights into supply chain recipes to cut energy demand and reduce manufacturing costs.

De-Risking Energy Technologies for Our Grid

ARIES, Advanced Research on Integrated Energy Systems, is the nation's most advanced research platform that brings together physical and virtual capabilities that can be configured to evaluate the whole energy system domain—from a few kWs to 20 MWs, from a single technology to thousands of devices, and across hundreds of grid integration configurations. The laboratory has modeled traffic flow at Dallas-Fort Worth International Airport by creating a "digital twin" of the airport with artificial intelligence tools to determine optimal designs and energy-saving decisions. This advanced modeling is helping other hubs consider how new technologies can be integrated into their own operations.

Adding Clarity to Critical Mineral Supply Chains

Modern supply chains are complex. A single product can require dozens of raw materials, energy sources, and processing steps, many of which aren't obvious from the finished product. NLR's Materials Flows through Industry (MFI) modeling tool helps tally hidden ingredients, helping manufacturers fully understand the benefits and consequences of technology deployment.

AI for Applied Energy Systems

The three applied energy laboratories (Idaho National Laboratory, National Energy Technology Laboratory, and NLR) formed a strategic collaboration to bring artificial intelligence (AI) solutions and technologies to applied energy systems for DOE's AI strategy in synergy with science and National Nuclear Security Administration labs. Key areas include grid planning and permitting; autonomous operation; accelerating delivery of new power plants; and energy material innovation, design, and discovery.

Securing the Grid of the Future

NLR's cybersecurity research portfolio offers unique capabilities and expertise to help partners prepare for an increasingly intelligent, interconnected, and complex power grid. The energy sector is undergoing rapid change. Advanced technologies and controls, digitally connected devices, and a mix of generation sources offer increased energy reliability and security, reduced energy costs, and enhanced grid operations. But they can also carry physical and cybersecurity risks that are not yet fully understood. NLR's Cybersecurity Research Center is examining the cybersecurity implications of evolving systems and developing cutting-edge tools, novel approaches, and innovative research capabilities to address sector-wide challenges.

Major Microgrid Enhancements for Alaskan City

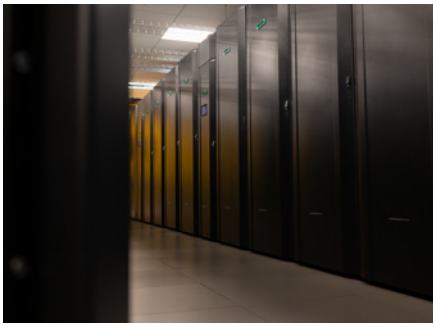
Cordova, Alaska, upgraded its microgrid to withstand extreme weather and disasters, ensuring reliable power for 2,700 residents and robust fishing and tourism industries. In collaboration with the National Laboratory of the Rockies, the city deployed advanced technologies, including energy storage, hydropower controls, sensors, and smart metering. Real-time digital-twin research supports these innovations, enhancing recovery, making Cordova a model for modern grid technology.

Energy Materials and Processing at Scale (EMAPS)

Slated for completion in 2027, EMAPS will enable collaboration with industry partners, universities, and other DOE labs to accelerate lab-scale innovations and industry adoption of advanced energy materials. This 129,000-square-foot facility, being built through a streamlined construction approach, will help create stronger domestic supply chains and bolster American manufacturing capabilities.

Advancing Geothermal

The laboratory is advancing geothermal technologies and methods that can open up tens of gigawatts of domestic resources for reliable baseload power, heating, and cooling, contributing to energy security and independence as well as job creation. NLR is partnering with the Department of Defense to evaluate deployment of geothermal technologies for several U.S. Army and U.S. Air Force bases. NLR has also partnered with CPS Energy in Texas and Con Edison in New York to study the feasibility of using geothermal energy for heating and electricity generation.



Grid Planning for Data Center Growth

Data center growth is creating load uncertainty and concerns about reliability and affordability—slowing development progress. NLR provides analysis and expertise working with local stakeholders that de-risks and accelerates infrastructure development to meet rapidly emerging data center demands. Examples include projects in Utah and Louden County, Virginia.

Turning Biomass Into Sources of Rubber and Battery Materials

The laboratory is partnering with Crysalis Biosciences to advance domestic biomanufacturing technologies. This collaboration aims to scale up enzymes and microbe-based systems to produce biobased materials, reducing dependence on imported raw materials and benefiting the manufacturing sector. The partnership focuses on developing technologies that can be integrated into existing manufacturing infrastructure. By refining production processes and increasing efficiency, they seek to foster broader adoption of biobased solutions across industries. The initiative supports national efforts to unlock opportunities for economic growth and workforce development and foster innovation.

Chip-to-Grid

The laboratory's AI Data Center Initiative is addressing challenges of construction timelines, cooling, energy supply constraints, demand flexibility, and modularization. NLR's solution blends liquid cooling, demand flexibility, and an "all-of-the-above" energy strategy to accelerate deployment timelines and reduce strain on utilities. The initiative explores the integration of geothermal cooling and thermal energy storage to reduce cooling-related power needs, manage peak loads, and improve off-grid viability. Through ARIES, NLR provides a testbed for validating integrated technologies that enhance grid reliability, minimize permitting burdens, and unlock innovation across generation, distribution, and use.

Photo Credits: *Page 1: Josh Bauer, National Laboratory of the Rockies (NLR) 059022. Page 2: Josh Bauer, NLR 103985; and Taylor Mankle, NLR 105201. Page 3: Getty Images 583639930; Getty Images 943065368; Gregory Cooper, NLR 098082; Forest Service Alaska Region USDA; and rendering courtesy of SmithGroup. Page 4: Dennis Schroeder, NLR 048302; Joe DelNero, NLR 101334; Gregory Cooper, NLR 097555; and Agata Bogucka, NLR 098044.*

National Laboratory of the Rockies

15013 Denver West Parkway
Golden, CO 80401
303-275-3000 • nlr.gov

The National Laboratory of the Rockies prints on paper that contains recycled content.

The National Laboratory of the Rockies is a national laboratory of the U.S. Department of Energy, Office of Critical Minerals and Energy Innovation, operated under Contract No. DE-AC36-08GO28308.

NLR/FS-6A42-100169 • July 2026