



NREL at a Glance

NREL leads research, innovation, and strategic partnerships that advance and strengthen energy abundance, affordability, security, and reliability as well as power economic growth and global competitiveness.

Golden, Colorado, hosts the main NREL facility—the 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 NREL facilities include NREL’s Alaska Campus in Fairbanks and the Washington, D.C., office.

Physical Assets*

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

People Assets*

- 3,568 full-time equivalent employees
- 77 joint faculty
- 248 postdoctoral researchers
- 128 undergraduate students
- 169 graduate students
- 45 facility users.

*as of Sept. 20, 2024

Impact

NREL’s Fiscal Year 2024 business volume was **\$1.007B**, which was approximately 29% growth from FY 2023 (\$783.5M).



\$1.9B in the United States

NREL’s economic impacts on the nation totaled \$1.9 billion in FY 2023, with the laboratory directly employing or supporting more than 8,200 jobs across the country.



\$1.3B in Colorado

Colorado recorded the greatest economic benefits—\$1.3 billion in output, 5,700 jobs, and \$780 million in value added.



Innovation



Honored with
74 R&D100 awards
to date

655 Patents
to date

53,184 Publications
to date

Since 2000, NREL 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.

Record Year for Partnerships

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

NREL achieved a record-breaking year in partnerships, signing 365 new, high-impact agreements. The laboratory now has more than 1,160 active partnerships with 812 unique active partners across commercial, noncommercial, and government organizations in 49 U.S. states and 37 countries.

Capabilities for Systems Integration

- Advanced Research on Integrated Energy Systems (ARIES) research platform
- 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.

Foundational Knowledge

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



365
New partnership
agreements



812
Unique new
partnerships

Accomplishments



De-Risking Energy Technologies for Our Grid

NREL launched ARIES, Advanced Research on Integrated Energy Systems, 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. NREL 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.



AI for Applied Energy Systems

The three applied energy labs (Idaho National Laboratory, National Energy Technology Laboratory, NREL) 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

As the energy system grows more connected—and more vulnerable—NREL's Cybersecurity Research Center is confronting the nation's most urgent grid security threats. From simulating real-world cyberattacks to securing next-gen technologies and supply chains, NREL is shaping the standards, tools, and strategies needed to protect America's evolving energy infrastructure before adversaries exploit the gaps. NREL leads the Critical Energy Cybersecurity Accelerator, a collaborative technology accelerator program designed to achieve rapid innovations in cybersecurity for the energy sector. Participants have access to NREL's diverse cyber and physical assets to perform at-scale evaluations of their solutions in real operational environments.



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 NREL, the city deployed advanced technologies, including energy storage, hydropower controls, sensors, and smart metering. Real-time digital twin research at NREL supports these innovations, enhancing recovery, making Cordova a model for modern grid technology.



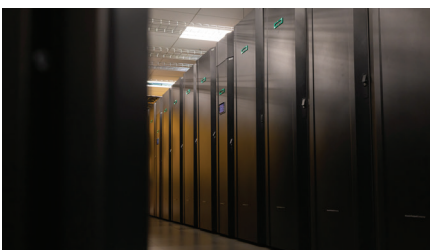
Energy Materials and Processing at Scale (EMAPS)

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.



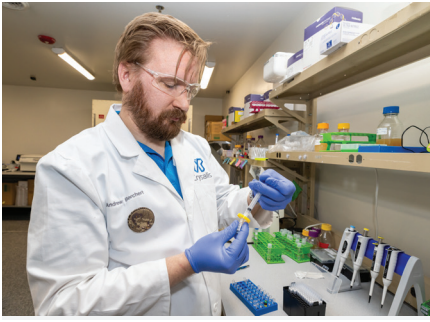
Advancing Geothermal

NREL expertise is advancing cutting-edge 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. NREL is partnering with the Department of Defense to evaluate deployment of geothermal technologies for several U.S. Army and U.S. Air Force bases. NREL 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.



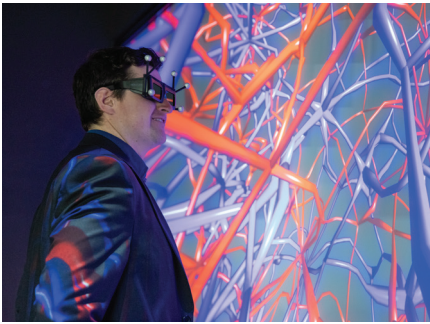
Grid Planning for Data Center Growth

Data center growth is creating load uncertainty and concerns about reliability and affordability—slowing development progress. NREL 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 Loudoun County, Virginia.



Turning Biomass Into Sources of Fuel, Rubber, and Battery Materials

NREL 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. Leveraging NREL's expertise in bioengineering and process optimization, 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.



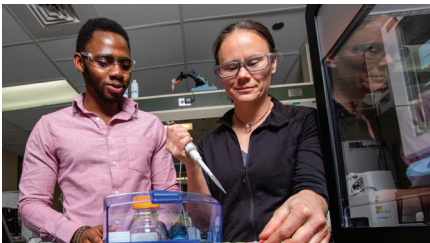
Chip-to-Grid

NREL's AI Data Center Initiative is addressing challenges of construction timelines, cooling, energy supply constraints, demand flexibility, and modularization. NREL'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, NREL provides a testbed for validating integrated technologies that enhance grid reliability, minimize permitting burdens, and unlock innovation across generation, distribution, and use. Collectively, this positions the United States to lead in the race to power next-generation AI infrastructure.



Lowering Energy Costs for Rural America

In partnership with the U.S. Department of Agriculture, the Rural Energy for America Program (REAP) brings advanced energy systems and energy efficiency improvement grants to agricultural producers and rural small business owners. NREL also facilitates microgrid development assistance for remote municipalities and Tribes.



Improving Commercial Packaging

The NREL-led consortium Bio-Optimized Technologies to keep Thermoplastics out of Landfills and the Environment (BOTTLE), comprising national labs and universities, is working with Amazon to advance chemical processes for breaking down plastic packaging, allowing for the synthesis of new and better materials.

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