



# WORKING WITH US





# Accelerating Innovations to Market

## **The National Renewable Energy Laboratory (NREL)**

works closely with partners from all over the world to spawn new industries, accelerate startup technologies to market, empower innovation at every level, advance economic growth, and support developing communities. Collaborating with partners is central to NREL's vision for a clean energy future for the world.

As the nation's only national laboratory focused on clean energy, partnerships also provide valuable insight into the energy market, inspire new research projects, and increase the impact of NREL technologies.

With a 45-year track record of innovation and more than 70 R&D 100 Awards, NREL helps partners deliver real-world impact in meaningful ways that create and accelerate sustainable, transformational change.

NREL has more than

**1,000**  
active partnership  
agreements

with more than

**700**  
unique active  
partners



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# Partnerships Deliver Real-World Impact

Since the late 2000s, NREL has generated partnership projects totaling more than \$1 billion in research and development contract value. NREL's strategic partnerships team secures and grows partnerships with industry, government, research organizations, and nonprofits to accelerate the transition of technologies to the marketplace. The team has the technical and market expertise to identify NREL capabilities that address and achieve partners' energy goals. Here are some examples of NREL's long-term partnerships:



## EATON

In 2018, NREL forged new ground in its partnership with Eaton Corporation, by co-locating employees at NREL's Energy Systems Integration Facility as part of a partnership agreement with the multinational power management company. The embedded workforce is the latest chapter in a long history between NREL and Eaton. More than a decade of collaboration created a portfolio that includes projects to develop a predictive battery system for hybrid electric vehicles; and optimize energy systems for microgrids, buildings, and communities.

More recently, Eaton and NREL added Ballard Fuel Cell Systems on a project to develop fuel cell technologies for heavy-duty trucks. The project leans on Eaton's Twin Vortices Series supercharger technology.

## DALLAS-FORT WORTH INTERNATIONAL AIRPORT

NREL, in partnership with Dallas-Fort Worth International Airport (DFW), is using electrification, connectivity, and automation to improve energy-efficient transportation. Through the help of data-driven statistical modeling and artificial intelligence, the “Athena” project helps transportation hubs integrate and adapt to transformative technologies.

Athena researchers developed sophisticated models of current and future mobility requirements, including a “digital twin” model of the airport to simulate the impacts of scenarios for future capacity expansion. Athena insights will help inform realistic recommendations for long-term investments at DFW and other transportation hubs during the next 20 years.

## SOUTHERN CALIFORNIA GAS COMPANY

Southern California Gas Company partnered with NREL to research, develop, test, and launch a carbon-free, power-to-gas system for the first time ever in the United States. The technology converts excess energy to hydrogen, which can be used, stored, or combined with carbon dioxide and fed to a bioreactor to produce renewable natural gas. This innovative technology could provide a large-scale, cost-effective solution for storing excess energy produced from renewable sources. The pilot project will be used to determine the



commercial viability of the power-to-gas approach and provide insights into designs for megawatt-scale systems. By combining insights with renewable energy resource data, the research team will identify optimal locations in California and the western half of the United States where grid-scale energy storage would be economical.

## HEWLETT PACKARD ENTERPRISE

NREL and Hewlett Packard Enterprise (HPE) enjoy a long-running and fruitful partnership, leading technology that spans a broad range of topics, including energy system edge computing, data-centric computing, fault-tolerant computing, optimization and integration of grid-edge controls and architecture, cybersecurity, and energy system security and resilience.

The NREL-HPE partnership combines existing research efforts with collaborative, innovative solutions to make major industry impacts such as conducting high-performance computing operations in one of the most energy-efficient data centers in the world.

# Technology Partnership Agreements

**NREL** offers a range of partnership agreement types that enable the laboratory to provide flexible and efficient ways to help partners meet their goals. Some examples among these:

- Cooperative research and development agreements inspire side-by-side research and development.
- Technical services agreements are used when NREL provides services using existing capabilities.
- Interagency agreements are used when NREL performs work for a federal agency other than the U.S. Department of Energy.
- Funds-in agreements come into play when a nonfederal entity pays NREL to conduct a research-oriented project.

NREL's Technology Transfer Office helps connect DOE-funded R&D capabilities, technologies, and programs at NREL with industrial collaborators to form partnerships and catalyze commercialization of energy technologies.





IN<sup>2</sup> portfolio companies  
have raised more than  
**\$1.4 billion**  
in external funding  
since 2014

GCxN cohort companies  
have raised more than  
**\$52 million**  
since 2018

## The Innovation and Entrepreneurship Center – Connecting People and Ideas

**NREL's Innovation and Entrepreneurship Center (IEC)** works to bring economically viable cleantech innovations to market. Serving public and private-sector funding partners, the IEC leverages the capabilities of NREL and other national laboratories, activating and connecting a network of cleantech startups, investors, foundations, and industry partners.

IEC programs and events cover every development stage on the pathway to commercialization. From company formation to market readiness, IEC and its partners share the goals of solving environmental challenges, de-risking technology, and bolstering innovation.

### Entrepreneurial Mentorship

- Canadian Technology Accelerator Program
- Energy I-Corps, a Program of the Office of Technology Transitions, U.S. Department of Energy
- NREL Small Business Program
- West Gate

### Incubation & Acceleration

- Chevron Studio
- Clean Energy Cybersecurity Accelerator™
- NREL Commercialization Assistance Program
- Shell Gamechanger Accelerator™ Powered by NREL (GCxN)
- Wells Fargo Innovation Incubator (IN<sup>2</sup>)

### Convening the Ecosystem

- Industry Growth Forum
- Innovation Showcase
- Investor Advisory Board



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## Licensing Opportunities

**NREL** provides businesses with opportunities to commercialize laboratory-developed innovations through industry-focused commercial license agreements. NREL offers licenses to both patented and copyrighted software technologies and makes software tools available publicly under open-source software licenses.

The majority of NREL's patent and closed-source software licenses are royalty-bearing, nonexclusive, and contain annual performance milestones. However, NREL may grant an exclusive license when it is the best mechanism for maximizing a technology's commercial impact. NREL offers flexible terms and conditions to meet the licensee's needs and business model, whether they are a startup company or a larger, established firm. NREL can help connect research programs to industrial collaborators and form partnerships to catalyze the commercialization of energy technologies.

## Laboratory Partnering Service

**The Laboratory Partnering Service** is a suite of online applications enabling access to leading experts and innovations from across DOE and the national laboratories. It enables fast discovery of expertise and serves as a conduit between the investor and the innovator.

NREL has executed more than

# 275

royalty-bearing  
option and license  
agreements  
since 2000

More than

# 850

patents  
or pending patents for NREL  
technologies to date

More than

# 200

copyrighted  
software tools  
available for licensing



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[labpartnering.org](http://labpartnering.org)



# Strategic Public-Private Partnerships

**Strategic Public-Private Partnerships** develop high-impact, multiyear collaborations that drive transformation of domestic and global energy landscapes.

The partnerships bring together governments, communities, utilities, industry leaders, manufacturers, distributors, federal agencies—including the U.S. Department of Energy—and more.

## ACTIVE STRATEGIC PUBLIC-PRIVATE PARTNERSHIPS

- Accelerating Clean Energy at Scale supports a vision for rapid, widespread transition to clean, affordable, equitable, secure, and resilient energy systems.
- Autonomous Energy Systems helps conduct fundamental research work to design intelligent and robust solutions for operating highly electrified, heterogeneous energy systems.
- The Global Power System Transformation Consortium supports power system operators by ensuring they receive the technical and engineering knowledge required to support the global energy transition.
- Sustainable Aviation pursues research, development, demonstration, and deployment strategies that identify pathways to decarbonized aviation.





# Deployment and Project Assistance

**NREL** uses its expertise and facilities to provide technical assistance in applying renewable energy and energy efficiency technologies to a variety of public and private organizations. This includes international and developing countries; federal agencies; and U.S. state, local, and tribal communities.

NREL analysis informs policy and investment decisions that lead to more resilient, reliable, and efficient energy systems. With objective, technology-neutral analysis, NREL aims to increase understanding of energy policies, markets, resources, technologies, and infrastructure to address U.S. economic, security, and environmental priorities.

## Funding Options

Much of the U.S. Department of Energy's work is supported through grants and contractual vehicles. For more information, visit:



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