NREL

WORKING **WITH US**

Director's Note

NREL's vision for an affordable and secure energy future rests on a foundation of individual partnerships that were built one relationship at a time. Each year, NREL signs hundreds of new research agreements with organizations across the United States and around the world to solve complex energy challenges and further our shared energy objectives.

We are focused on the long-term impact that strategic partnerships can have on energy research and development, grid security and resilience, the U.S. economy, and Americans' lives.

What does that impact look like? It bridges the gap between science, industry, and government entities, helping partners fast-track advanced energy solutions so consumers and businesses can benefit from them sooner. It leverages the laboratory's renowned scientific minds, technical capabilities, and world-class facilities, putting technology and knowledge into the hands of those that need it most.

Ultimately, NREL works with commercial and noncommercial entities, including national security and defense partners, national laboratories, and research institutions to advance foundational research and development—pushing the boundaries of scientific discovery and accelerating breakthroughs in energy innovation.

Whether through licensing NREL inventions, evaluating independently developed innovations at the lab, or pursuing research and development programs, these collaborations have helped address some of the world's most challenging energy issues. With NREL's expanding leadership on projects in this nation and beyond, the impact of our partnerships will only continue to grow.

Andrea Watson
Associate Laboratory Director for Innovation, Partnering, and Outreach

Accelerating Innovations to Market

NREL works closely with partners to accelerate the commercialization of startup technologies, drive innovation across the energy system, advance economic growth, and enhance U.S. global competitiveness. Collaboration is central to our shared vision for improved energy infrastructure that delivers secure, resilient, affordable, and reliable electricity to meet growing demand.

- Established in 1977, NREL has applied its deep technical expertise and unique breadth of capabilities to drive the successful integration of our nation's energy resources and systems for nearly 50 years.
- NREL has more than 1,100 active partnership agreements with more than 800 unique active partners.

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1977

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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 value. NREL's Strategic Partnerships team 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 impactful partnerships:

Comstock

Comstock Fuels is developing a new pathway for converting lignocellulosic biomass to synthetic aviation fuel (SAF). This new pathway will utilize licensed NREL technology for converting lignin to a high-quality aromatic SAF blendstock, enabling the production of a fully drop-in jet fuel from biomass. A three-year agreement between Comstock and NREL has been executed, enabling scale-up of the NREL lig-SAF process—originally developed in collaboration with Massachusetts Institute of Technology—from bench to pilot scale. These efforts will support Comstock's current plans for the commercial production of SAF from lignocellulosic biomass.

Florida Power & Light Company

As America's largest electric utility, Florida Power & Light (FPL) Company serves more customers and sells more power than any other utility, providing affordable and reliable electricity to approximately 5.8 million accounts, or more than 12 million people. NREL is conducting experimental assessments of photovoltaic and battery grid-forming inverters to gain insight and solutions that enhance power quality and reliability and improve energy systems integration.

Schneider Electric

Schneider Electric is a leading global company specializing in energy management and automation solutions, with operations in over 100 countries. Through a partnership agreement, NREL will assess and help quantify the impact of Schneider's Smart Electrical Panel within U.S. single-family residential homes, including their ability to reduce home energy consumption, optimize solar and storage systems, enable home modernization, and stabilize the electrical grid. This project will help industry de-risk the technology and increase its adoption throughout the United States.

NASA

NREL and NASA are working together to enhance community energy resilience by equipping airports with actionable plans for integrating advanced air mobility technologies like on-site power generation and electric aircraft charging infrastructure. The Airports as Energy Nodes (ÆNodes) activity leverages NREL's Advanced Research on Integrated Energy Systems (ARIES) platform to evaluate the interactions between advanced air mobility aircraft and airport energy systems. By analyzing energy generation, storage, and distribution, the project aims to model the energy demands and operational opportunities of next-generation aviation technologies.

U.S. Department of Defense

NREL's partnership with the U.S. Department of Defense (DOD) focuses on advancing resilient, energy-efficient technologies that enhance national security and operational effectiveness. Through collaborative projects, NREL supports DOD's mission to innovate in areas such as energy generation, energy storage, microgrids, and power system resilience. This partnership leverages NREL's expertise to address DOD's unique energy needs in remote, austere, and demanding environments. NREL is committed to meeting DOD's energy goals, bolstering defense capabilities through technological innovation and secure and resilient energy solutions.

ExxonMobil

In 2019, NREL and ExxonMobil signed a 10-year, up-to-$100 million agreement with NREL and other national laboratories focused on developing advanced energy solutions. An important aspect of this partnership is to identify options for biofuels that are scalable and minimize the drain on natural resources. One project is exploring pathways for bio-oil production using a pilot-scale system coupled with computational kinetic modeling and reactor simulations. This research seeks to accelerate the deployment of fuels by leveraging domestic biomass supplies, existing refinery infrastructure, and skilled workforces.

Sustained Relationships

NREL has been working with many of its strategic partners for more than a decade. Because of these long-term collaborations, partners are reaching their energy goals and making an impact around the world. For partners like Los Angeles Department of Water and Power and the city of Louisville, Kentucky, NREL is helping bring relevant technologies to local stakeholders. NREL also supports partners like Dallas-Fort Worth International Airport and Fortescue to understand and accelerate energy innovation and systems integration.

Technical Capabilities

NREL offers unmatched technical expertise and capabilities to help develop and deploy energy solutions worldwide. Collaboration with NREL supports the unique needs and goals of each partnership, helping to advance their own mission-driven priorities. Key NREL technical capabilities include:

Advanced Computational Science: AI, Machine Learning, and Digital Twins

Advanced Photovoltaics: Characterization, Performance, and Reliability

Aviation Ecosystem Innovation

Bioproducts and Fuels

Building Efficiency

Cybersecurity Research and Analysis

Data Center Efficiency and Security Solutions

Decision Support and Multicriteria Analysis

Energy System Resilience and Natural Disaster Recovery

Geothermal Technology Solutions

Grid Resilience, Security, and Modernization

Hydrogen Research and Scaling Solutions

Infrastructure Planning

Integrated Systems Planning and Control

Land Use Planning

Load Forecasting and Flexibility

Polymers for Energy Applications

Supply Chain Analysis

Techno-Economic Analysis

Transportation Planning and Analysis

Technology Partnership Agreements

NREL offers a range of flexible partnership agreement types to make it easier for partners to leverage NREL and Department of Energy expertise to meet energy objectives. Some examples include:

- 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 research and development capabilities, technologies, and programs at NREL with industrial collaborators to form partnerships and catalyze commercialization of energy technologies.

LEARN MORE
www.nrel.gov/workingwithus/technology-partnership-agreements

The Innovation and Entrepreneurship Center

NREL's Innovation and Entrepreneurship Center (IEC) works to bring economically viable energy 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 nationwide network of energy startups, investors, and industry partners.

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

IN2 portfolio companies have raised more than

$2.6

billion in external funding **since 2014**

GCxN cohort companies have raised more than

$942

million in external funding **since 2018**

More than

250

copyrighted software tools available for licensing

Wells Fargo Innovation Incubator (IN2) fosters innovation and accelerates the market adoption of energy technologies in the built environment and infrastructure sectors.

Shell Gamechanger Accelerator™ Powered by NREL (GCxN) provides startups with access to NREL's research and facilities, along with the incubation expertise of the Shell GameChanger program.

Industry Growth Forum has established itself as the premier event for technology collaboration and advancement, connecting innovators and investors since 1995.

Chevron Studio links entrepreneurs with national laboratories and universities to scale up early-stage technologies that have the potential to enable a lower-carbon future.

Energy I-Corps is an entrepreneurial training program for national lab research teams with technologies that may be ready for commercialization.

West Gate is a Lab-Embedded Entrepreneurship Program (LEEP) that supports promising innovators as they develop technology concepts into startups primed for growth.

NREL Technical Assistance Program connects startups with NREL's scientists, engineers, and facilities to answer specific technology questions and overcome technical barriers.

LEARN MORE
www.nrel.gov/innovate

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 or a larger, established firm. NREL can help connect research programs to industrial collaborators and form lasting partnerships.

More than

335

royalty-bearing option and license agreements executed since 2000

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.

LEARN MORE
www.labpartnering.org

Convening Power

To better facilitate engagement with a range of partners from industry, nongovernmental organizations, and city, state, local, and national governments, NREL hosts a variety of events throughout the year.

The annual **Industry Growth Forum (IGF)** is the premier advanced energy technology event that brings together entrepreneurs, investors, and industry experts to forge new partnerships. The IGF attracts more than 1,000 attendees and provides a platform to share cutting-edge technologies and emerging resources and to accelerate deal flow. Key features spanning the two-day conference include a pitch competition and facilitated one-on-one meetings between startups and investors. Focused on networking, the event allows startups to give investors and industry partners to share a deeper understanding of innovative technologies and investment opportunities.

The **Partner Forum** provides a unique opportunity for partners to connect with NREL and one another, learn about and explore current and future activities, and discuss new trends and innovations in advanced energy technologies. Past events have featured diverse voices from the U.S. military, industry, utilities, state and local governments, and federal agencies. NREL facilitates these discussions to set the stage for future collaborations.

Each year, NREL's partnerships team hosts dozens of organizations from all over the world at our South Table Mountain and Flatirons campuses in Colorado. These important visits allow guests to tour NREL facilities, learn more about capabilities, meet with researchers, and discuss potential high-impact projects and collaborations.

TO LEARN MORE, VISIT:
www.nrel.gov/workingwithus

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