



WORKING With Us





NREL ENGINEERS Mike Simpson, (left) and Tony Markel, run tests on Plug-In Hybrid Electric Vehicles (PHEV) at the Medium Voltage Outdoor Test Area (MVOTA) at the Energy Systems Integration Facility (ESIF) recording the net loads placed on a transformer from the single and aggregate charging of EV.

Photo by Dennis Schroeder, NREL 28217

NREL has **MORE THAN 800** ACTIVE PARTNERSHIP AGREEMENTS with **MORE THAN 500** UNIQUE, ACTIVE PARTNERS across large and small businesses, federal, state and local government, nonprofits, and academia.

Partnerships have been, and continue to be, key to National Renewable Energy Laboratory's (NREL) success and central to its mission. It's through partnerships, which originate from all over the globe, that NREL is able to deliver real-world impact in meaningful ways and create sustainable, transformational change. We are proud of our 60-plus R&D 100 awards, but realize real impact doesn't occur until our technology is deployed beyond the lab. That's why we work to develop and grow partnerships with companies that provide us with valuable insight into the energy market, inspire new research projects, and commercialize NREL technologies.

We work with partners large and small, from all over the world. To date, these collective efforts have produced incredible results, spawning entire industries, accelerating start-up technologies to market, empowering innovation at every level, advancing economic growth, supporting developing communities, and fueling American energy leadership.

NREL's highly-trained and experienced Technology Transfer Office is well-versed in the breadth of partnering options available to organizations looking for help to mature their technologies. An array of licensing options further expands the opportunities for engagement open to companies.



EXECUTIVES with the U.S. Department of Energy's (DOE) NREL, Oak Ridge National Laboratory (ORNL), and Dallas Fort Worth (DFW) International Airport tour the DFW facilities. They are looking at electrochromic windows that provide relief from hot sun for travelers in the airport. The group is working on a three-year research project to identify new transportation technologies that could dramatically improve energy use, convenience, and affordability. DOE's Vehicle Technologies Office (VTO) has awarded \$5 million to the Athena project, a first of its kind high-performance computing (HPC) transportation system simulation capable of accurately modeling the movement and energy flow of passengers and freight in airports and connected areas.

Photo by Dennis Schroeder, NREL 54586

TECHNOLOGY PARTNERSHIP AGREEMENTS

NREL offers a range of partnership agreement types that enable the lab to provide flexible and efficient ways to help partners meet their goals. Included in these are Cooperative Research and Development Agreements (CRADAs), meant to inspire side-by-side research and development; Technical Services Agreements (TSAs), used when NREL's services are not related to research and development; Interagency Agreements (IAG), used

when NREL performs work for a federal agency other than DOE; and Material Transfer Agreements (MTAs), which allow biological materials to be exchanged for evaluation. NREL's Technology Transfer Office can help connect DOE-funded R&D programs at NREL to industrial collaborators to form partnerships to catalyze energy technology commercialization.



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www.nrel.gov/workingwithus/

LABORATORY PARTNERING SERVICE

The Laboratory Partnering Service (LPS) is a suite of online applications enabling access to leading experts and innovations and patents from across the DOE and the national laboratories. It delivers a myriad of information to provide access to a portfolio

of investment opportunities. The LPS enables fast discovery of expertise and serves as a conduit between the investor and the innovator, providing multi-faceted search capabilities across numerous technology areas and the national laboratories.

NREL SENIOR SCIENTIST JOE BERRY helps give a quick tour of the Science and Technology Facility to attendees of NREL Partner Week 2017 at NREL to end the day of presentations and panel discussions. The theme of Partner Week 2017 was Energy Innovation Trends. Photo by Werner Slocum, NREL 47573



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CYBER SECURITY ANALYSTS JOSHUA RIVERA and BRIAN MILLER

work with Jennifer Cory of PowerSecure, Inc. to run a PEN test. NREL built a hardware replica of a real-world military microgrid control network and is performing cyber security testing to ensure all devices (real time automation controller, programmable logic controller, power circuit breaker relays, solar/storage inverters, SCADA server, and ethernet switches) can protect the supply of electrical power to the military mission.

Photo by Dennis Schroeder, NREL 52139



LICENSING

NREL provides businesses, large and small, with opportunities to commercialize NREL-developed innovations through industry-focused commercial license agreements. Our mission is to effectively transfer NREL technologies to the market so as to generate benefits for the public. Broadly, NREL offers licenses to both patent and software technologies, and we also make many 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 such a license is the best mechanism for maximizing a technology's

NREL has executed **MORE THAN 260**
LICENSES since 2000, currently has
approximately **800** PATENTED OR
PATENT-PENDING TECHNOLOGIES
and **MORE THAN 250** SOFTWARE
SOLUTIONS available for licensing.

commercial impact. Further, NREL offers flexible terms and conditions to meet the licensee's needs and business model, whether the licensee is a start-up company or a larger, established firm. NREL's Technology Transfer Office can help connect DOE-funded R&D programs at NREL to industrial collaborators to form partnerships to catalyze energy technology commercialization.

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, including international and developing countries, federal agencies, and U.S. state and local communities. Our 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.



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www.nrel.gov/research/index.html

NREL RESEARCHERS GREG MARTIN and MARIKO SHIRAZI work on the Consolidated Utility Base Energy (CUBE)

System in the PSIL at the Energy Systems Integration Facility (ESIF) at NREL. CUBE is an integrated power electronic platform for PV-battery-diesel hybrid power systems, developed for the U.S. Army to provide power to forward operating bases. Photo by Dennis Schroeder, NREL 45892



NREL SCIENTIST MATT REESE holds a substrate with the solar cells removed to minimize the weight of the solar cell. Working on a R&D contract with the Office of Naval Research, his research is on track to grow high-efficiency cells and then transfer them to lighter substrates, which could help the military reduce the burdens on its troops. On the left are cells that have been removed in the process.

Photo by Dennis Schroeder, NREL 40803



Funding Options: U.S. Department of Energy Grants and Contracts

Much of the work of DOE's Office of Science is supported through grants and contractual vehicles. This work is processed through the Office of Science Grants and Contracts Division. See the following links for more information.

- Grants and contracts: science.energy.gov/grants
- All federal grants: www.grants.gov
- Small Business Innovation Research Program: www.sbir.gov

**RAMANATH RAMAKRISHNAN,
EXECUTIVE VP & CTO, EATON,**

unpacks some new lab equipment in the ESIF. Eaton and NREL announced a new project partnership at the NREL in Golden, CO. Photo by

Dennis Schroeder, NREL 51043



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To learn more about partnering with NREL, visit www.nrel.gov/workingwithus



EATON STRATEGIC PARTNERS, left to right,
SEAN KETRING and **YI YANG** work on a hardware

prototype in their lab at the ESIF. Photo by Dennis Schroeder, NREL 38498



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NREL is a national laboratory of the U.S. Department of Energy
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