Press Release Examples

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General Electric (GE) Research

GE Researchers Developing Advanced PV Inverter Technology to Support More Reliable, Resilient Solar Grid Integration

- *Developing new grid-forming inverter controls to handle higher amounts of solar power while improving grid stability*
- *Plans to deploy and test new controls with GE Renewable Energy's commercial PV LV5 inverter platform*
- *Inverter improvements will support nation's increasingly distributed, renewable-intensive grid network*

February 6, 2020, NISKAYUNA, NY – GE Research, the central technology development arm for the General Electric Company (NYSE: GE), has been awarded $4.2 million in funding from the U.S. Department of Energy Solar Energy Technologies Office (SETO) to help develop and deploy advanced grid-forming photovoltaic (PV) inverter control technologies that can reliably support higher amounts of solar power on the grid. This work keeps pace with the nation's changing electric grid system, which is getting more energy from distributed and renewable sources.

Today, wind and solar inverters connected to the grid depend upon existing voltage and frequency levels to deliver power. This is different from traditional generators, like gas and steam turbines, which dictate, or form, the voltage and frequency levels at which the grid operates.

The development of "grid-forming" controls will allow wind and solar inverters to form voltage and frequency levels like traditional generators, creating an opportunity for greater and more resilient integration of these resources into the grid.

"When it comes to solar and other renewable resources, all roads lead through the inverter," said Maozhong Gong, Senior Engineer, Electric Power Technologies, GE Research. "As the nation's grid sees more electricity from the sun and wind, it will require advanced inverters to maintain reliability."

Gong added, “As part of this project, we will develop and field-test advanced grid-forming controls that enable many distributed resources to deliver reliable and resilient power like traditional generators do. We will test and validate these new technologies utilizing GE Renewable Energy’s commercial PV LV5 inverter platform. The goal is to have a solution ready to commercially deploy and implement to support the nation’s increasing solar power portfolio.”

Gong explained that while grid-forming inverter control technology is not new, the big challenge is enabling so many distributed grid-forming inverter resources to act together like traditional generators without causing stability issues. The team will address this with a holistic solution that includes advanced grid-forming controls, system modeling and analysis, and extensive tests and validation.

According to the most recent data from the U.S. Energy Information Administration, U.S. renewable electricity generation doubled from 382 million megawatt-hours (MWh) in 2008 to 742 million MWh in 2018. Solar generation has increased nearly 50 times over that same period, from 2 million MWh to 96 million MWh.

This year, the EIA says solar and wind will account for 76% of all planned capacity additions. This growth is giving rise to inverter-dominated grids that will require more advanced technologies to ensure grid stability.

GE Research was selected as a part of the Solar Energy Technologies Office Fiscal Year 2019 funding program. For its project, Gong will lead a multi-disciplinary team of electric power and electrical controls experts to develop advanced control technologies for PV inverters that can support increasing solar power loads on the grid. The team will develop controls for individual and clusters of grid-forming PV inverters to improve grid stability under various conditions and field-test them in GE’s commercial PV inverter.

As part of its $4.2 million cooperative award from SETO, GE and its partners will contribute a cost share of $1.4 million, bringing the total funding for the project to $5.6 million.

About the Solar Energy Technologies Office

The U.S. Department of Energy Solar Energy Technologies Office supports early-stage research and development to improve the affordability, performance, and value of solar technologies on the grid. Learn more at energy.gov/solar-office.

About GE Research

GE Research is GE’s innovation powerhouse where research meets reality. We are a world-class team of scientific, engineering and marketing minds working at the intersection of physics and markets, physical and digital technologies, and across a broad set of industries to deliver world-changing innovations and capabilities for our customers. To learn more, visit our website at https://www.ge.com/research/.

University of Utah

Enhancing power supply resilience to first responders

University of Utah engineer receives $4.4 million grant to develop management system for power distribution systems

Apr 2, 2019 - If a city experiences a major power outage due to a natural disaster or a cyberattack, it is vital to bring back power as soon as possible for first responders and critical infrastructure.

University of Utah electrical and computer engineering assistant professor Masood Parvania and his team at his Utah Smart Energy Laboratory (U-Smart) have received a three-year, $4.4 million research award from the U.S. Department of Energy Solar Energy Technologies Office (SETO) to advance solar energy's role in strengthening the resilience of the U.S. electricity grid. This project will develop an automated resilience management system (ARMS) to enhance the city's power grid in case of a power outage.

"It is critical to ensure resilience of power supply to emergency services and first responses, such as hospitals, after a major power outage caused by widespread events like natural disasters," Parvania, says. "The ARMS solution will use distributed solar photovoltaics, distributed energy resources, fault detection sensors, and distribution monitoring and switching equipment to improve the resilience of critical infrastructure and emergency centers."

The project partners include PacifiCorp, Utah Governor's Office of Energy Development, Idaho National Laboratory and Washington State University.

"In a rapidly evolving energy landscape, we are proud to see Utah's collaborative partnerships demonstrate national leadership in energy research and planning to advance grid resilience," said Laura Nelson, the Utah Governor's energy advisor and executive director of the Utah Governor's Office of Energy Development. "In Utah, our renewable portfolio is expanding, and we rank fifth nationally for installed solar capacity. This grant enables us to analyze opportunities presented through greater integration of new, intermittent resources and maintain resilience, security and affordability."

Rocky Mountain Power, a division of PacifiCorp, which services more than one million customers in Utah, Wyoming and Idaho, will work with the Utah Smart Energy Laboratory to test and validate the technology at multiple locations in Utah.

"Implementation of the ARMS solution will provide the framework to substantially improve real-time information exchange with field devices and reduce the time spent to locate, isolate and restore power to emergency services and critical infrastructure," said Rohit Nair, grid solutions manager at Rocky Mountain Power.

The University of Utah was selected to receive this award as a part of the Energy Department's effort to invest in new projects that enable grid operators to rapidly detect physical and cyber-based abnormalities in the power system and utilize solar generation to recover quickly from power outages.

BlueDot Photonics

Making the next leap in solar power manufacturing

BlueDot Photonics aims to lower the production cost of solar panels by 50% using a new high-throughput manufacturing process

November 18, 2019, [Seattle, WA] – BlueDot Photonics, a company focused on commercializing next-generation solar panels, announces being selected to receive a $1,000,000 award from the U.S. Department of Energy Solar Energy Technologies Office (SETO) to advance innovations in solar manufacturing. This project will accelerate the development of a new manufacturing process to produce high efficiency solar panels at a fraction of today's costs.

Most commercial solar panels today are about 20% efficient at converting sunlight into electricity. Although more efficient technology exists, the costs of these alternatives have been too high for broad deployment. A new class of materials, known as perovskites, have great potential to solve this problem. But a cost-effective, scalable, and reproducible manufacturing process for perovskite materials has not been identified. The team at BlueDot have invented such a process.

"Cost is king in solar. And for the market to grow at its current rates, solar costs must continue to fall rapidly. The industry needs simple, scalable, and efficient approaches to produce panels. This project develops the technology to meet this need," said Jared Silvia, CEO and Co-Founder of BlueDot.

Most of the focus on perovskite solar device production has been on what's known as solution-processing. Perovskite inks are printed to make a working solar cell. Although theoretically capable of high production rates, solution processing is limited by materials compatibility, reproducibility at high rates, and the safe handling of often toxic solvents. BlueDot's manufacturing process simplifies the process. Solvents are eliminated. BlueDot's process takes perovskite powders, vaporizes them, and redeposits the material as high-quality thin films. The flexibility of the process means the design and performance of the solar device can be tuned for a specific customer need. And it should achieve high throughput, like the rates used to make food packaging and high-performance glass.

BlueDot Photonics was selected as a part of the Solar Energy Technologies Office Fiscal Year 2019 funding program, an effort to invest in new projects that will lower solar electricity costs, while working to boost solar manufacturing, reduce red tape, and make solar systems more resilient to cyberattack. BlueDot Photonics is one of several manufacturing innovation projects with early-stage product ideas that can lower solar costs and rapidly achieve commercialization, with an emphasis on projects that contribute to a strong U.S. solar manufacturing sector.

A spinoff of the University of Washington, BlueDot's core technology was originally developed in the research lab of Prof. Daniel Gamelin. CoMotion, the University of Washington's collaborative innovation hub supported BlueDot Photonics with intellectual property management and initial funding from the CoMotion Innovation Gap Fund and the Commercialization Fellows Program.

BlueDot Photonics is driven to realize terawatt scale deployment of solar power in the next decade and is grateful for the support and backing of the Department of Energy in its mission.

About BlueDot Photonics

BlueDot Photonics is accelerating the deployment of next-generation solar technology by developing simple, cost-effective solutions to improve solar panel performance and durability. BlueDot is based in Washington State and is a spin-out of the University of Washington. Learn more at bluedotphotonics.com

About the Solar Energy Technologies Office

The U.S. Department of Energy Solar Energy Technologies Office supports early-stage research and development to improve the affordability, reliability, and performance of solar technologies on the grid. Learn more at energy.gov/solar-office.

Southwest Research Institute (SwRI) and General Electric (GE)

SwRI AND GE DESIGN AND OPERATE THE HIGHEST TEMPERATURE SCO2 TURBINE IN THE WORLD

April 8, 2019 — A team of Southwest Research Institute and General Electric (GE) engineers have designed, built and tested the highest temperature supercritical carbon dioxide (sCO2) turbine in the world. The turbine was developed with $6.8 million of funding from the U.S. Department of Energy (DOE) Solar Energy Technologies Office (SETO), in addition to $3 million from commercial partners GE Research, Thar Energy, Electric Power Research Institute, Aramco Services Company and Navy Nuclear Laboratory. Additionally, the DOE's Advanced Research Projects Agency – Energy (ARPA-E) Full-

Spectrum Optimized Conversion and Utilization of Sunlight (FOCUS) program provided financial support and extended the test program to validate advanced thermal seals.

"The full 10 megawatt turbine is the size of a desk and yields the highest power density of any industrial turbine, rivaled only by the turbopumps used on the space shuttle engines," said Dr. Jeffrey Moore, a mechanical engineer at SwRI and the principal investigator of the project. "This will not only improve concentrated solar power plant efficiency but also improve the efficiency of fossil and nuclear power plants, as well as lower the cost of waste heat recovery and energy storage." This small but powerful turbine can withstand the tough operating conditions of concentrated solar power (CSP) plants and is highly scalable, to as much as 450 MW. This technology could result in a two to four percent efficiency increase for fossil plants, reducing CO2 emissions equivalent to 14 million cars.

CSP plants use mirrors to concentrate solar energy to drive turbines, which generate electricity using a working fluid, typically steam, at high pressures and temperatures. Achieving the conditions needed for sCO2-based systems required the SwRI team to overcome a number of significant engineering challenges.

Over the past five years, the SwRI team worked with SETO and their collaborators to create a multi-stage axial flow sCO2 hot gas turbo-expander. Collaborator GE Research contributed significantly to the turbine's design, especially in the creation of the turbine's rotor.

The axial turbine expands high-pressure sCO2 gas to produce enough power to drive the compressor and generator that create electricity in CSP plants. These turbo-expanders must operate at temperatures greater than 1,300°F and pressures over 3,600 psi under a wide range of load conditions. They must also maintain high efficiency, a fast start-up time and the ability to handle rapid swings in transient heat input. Tested in custom-built high-pressure sCO2 test loop, the turbine met all mechanical and performance objectives, including full temperature, pressure and speed.

"Most conventional CSP systems operate at a thermal efficiency of 35 to 40 percent. The newly designed turbine with the sCO2 power cycle can approach a 50 percent efficiency," Moore said. "In addition to more efficient and cost-effective power, the new turbine will also allow CSP plants to be more economically competitive with fossil fuel power plants."

A variation of the turbine will be incorporated into the Supercritical Transformational Electric Power (STEP) 10 megawatt demonstration plant, a $119 million sCO2 pilot plant currently under construction at SwRI's headquarters in San Antonio. Developed through a collaborative partnership between Gas Technology Institute (GTI),SwRI and GE and funded by DOE's National Energy Technology Laboratory, STEP will demonstrate a fully integrated sCO2 power plant that generates power at higher efficiency and lower costs with a smaller carbon footprint than conventional plants.

"We're hoping to prove that we can operate at scale with good safety and control systems," said Engineer Douglas Hofer, who guided the turbine development at GE Research headquarters in Niskayuna, New York.