



NREL + SOLARCITY AND THE HAWAIIAN ELECTRIC COMPANIES

NREL is collaborating with solar energy company SolarCity at the ESIF to address the safety, reliability, and stability challenges of interconnecting high penetrations of distributed photovoltaics (PV) with the electric power system. The work includes collaboration with the Hawaiian Electric Companies to analyze high-penetration solar scenarios using advanced modeling and inverter testing at the ESIF.

R&D STRATEGY

The ESIF's unique megawatt-scale power hardware-in-the-loop capability allows researchers to analyze the behavior of distributed electricity generation and distribution devices while connected to a testing system that dynamically emulates the characteristics of a power system. Testing with SolarCity and Hawaiian Electric at the ESIF is covering dynamics between inverter-based assets on the electric grid, such as transient overvoltage from PV inverters, multi-inverter unintentional islanding, and voltage regulation. NREL will also evaluate SolarCity's PV generation curtailment hardware and software based on the potential need for PV power curtailment, or the use of less solar power than is available at a specific time, through a remote signal. Hawaiian Electric is partnering with NREL and SolarCity throughout the process, providing technical input on testing and setup, as well feedback on results.

IMPACT

SolarCity ultimately aims to increase the penetration of renewable energy technologies on the electric grid by addressing the system-level challenges of interconnecting high-penetration distributed PV. For Hawaiian Electric, this testing will allow the company to approve PV deployments for customers who have been waiting for interconnection on these high-penetration solar circuits.



SolarCity's work with NREL at the ESIF to optimize PV inverter technology will ultimately enable greater deployment of solar PV on homes and buildings across the country. *Photo from SolarCity*

Partner with NREL at the ESIF

User facility access to the ESIF is awarded through the review and approval of user proposals, depending on the scientific merit, suitability of the user facilities, and the appropriateness of the work to DOE objectives, and includes a signed user agreement for the facility.

For more information, please visit:

www.nrel.gov/esi/working_with.html

or contact:

Dr. Martha Symko-Davies
Martha.Symko.Davies@nrel.gov
(303) 898-4834

The Energy Systems Integration Facility (ESIF) at the National Renewable Energy Laboratory (NREL) provides the R&D capabilities needed for private industry, academia, government, and public entities to collaborate on utility-scale solutions for integrating renewable energy and other efficiency technologies into our energy systems.

To learn more about the ESIF, visit: www.nrel.gov/esi.

National Renewable Energy Laboratory

15013 Denver West Parkway • Golden, CO 80401 • 303-275-3000 • www.nrel.gov

NREL/FS-5C00-63435 • February 2015

NREL prints on paper that contains recycled content.