

Utility poised to double solar rooftop capacity based on tests of inverter reliability

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Inverter load rejection overvoltage (LRO) tests completed by the Energy Department's National Renewable Energy Laboratory as part of a cooperative research agreement with SolarCity have proven so successful that a testing partner, Hawaiian Electric Companies (HECO), has proposed to double its hosting capacity for solar energy.

The inverter testing at NREL's Energy Systems Integration Facility (ESIF) examined ways to quantify transient LRO, which is one of the main technical barriers to allowing more distributed [energy](#), such as solar and wind, onto the grid. Results of the testing are discussed in the report, "Inverter Load Rejection Over-Voltage Testing: SolarCity CRADA Task 1a Final Report."

Based on the results of these tests, HECO announced in a Jan. 20 filing with the Hawaii Public Utilities Commission its intention to increase its penetration limits for rooftop solar - from the current limit of 120 percent of minimum daytime load (MDL) to 250 percent of MDL. If those increases are implemented, they will represent the highest threshold for solar penetration on distribution circuits in United States.

LRO conditions can occur when a local feeder or breaker opens and the power output from a distributed energy resource exceeds the local load. These LRO issues have been driving HECO's current limitations on high penetration of distributed generation on the utility's feeders. Results from NREL testing helped to mitigate some of HECO's LRO challenges generated from advanced photovoltaic inverters.

"ESIF enables NREL and DOE to leverage strong partnerships with manufacturers and utilities to help integrate renewable energy into a smarter, more resilient energy system," NREL's Associate Laboratory Director for Energy Systems Integration Bryan Hannegan said. "NREL and its partners use state-of-the-art capabilities to develop advanced PV inverter technology and successfully integrate that with plug-in electric vehicles, hybrid power systems, hydrogen fuel cells, microgrid controls and several other advanced energy technologies".

NREL's ESIF is a 182,500-square-foot user facility that is helping transform how the nation generates, delivers and uses energy by modernizing the interplay among energy sources, infrastructure, and data. ESIF offers partners access to some of the most advanced testing, research, and development capabilities in the country and was named 2014 Lab of the Year by R&D Magazine.

The collaboration among NREL, HECO and SolarCity continues, with testing on the ability of advanced inverters to mitigate ground fault overvoltage issues. Later this year, tests at ESIF will examine the capability of advanced inverters to support distribution voltage regulation, address challenges related to bi-directional power flow, and measure the effectiveness of multiple inverter islanding during faults.

More information: "Inverter Load Rejection Over-Voltage Testing: SolarCity CRADA Task 1a Final Report":

www.nrel.gov/docs/fy15osti/63510.pdf

DOE's SunShot Initiative: energy.gov/eere/sunshot/sunshot-initiative

Provided by National Renewable Energy Laboratory

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