



NREL + HECO

Hawaiian Electric Companies' (HECO) customers are among the nation's fastest-adopters of solar PV systems. For HECO, the increased daytime PV generation raises feeder voltage profiles. Emerging technologies such as advanced PV inverters, battery storage, electric vehicles, and controllable loads also have an impact on voltage profiles. From the utility's perspective, it is yet unclear how to effectively manage these customer-sited resources. NREL is helping HECO understand its options by validating several voltage regulation strategies, making specific use of advanced inverters with voltage support functions, and their integration with other controllable sources.

R&D STRATEGY

The research strategy for this partnership is broken down into two projects: simulating the impact of customers' resource-use on voltage regulation strategies, and controlling PV systems to validate those strategies.

1. Simulation

Based on [prior efforts](#) with HECO, the performance of advanced inverters with voltage support functions is understood. Their use by customers poses a new question, however; what are the best operating strategies to manage those inverters considering both utility and customer impacts? NREL scientists are simulating HECO's feeders under various deployment scenarios of customer sited resources such as PV, battery storage and demand response, and under various strategies of using advanced inverters to regulate voltage at the customer meter.

2. Field Demonstration

NREL researchers are remotely monitoring and analyzing a fleet of PV inverters to evaluate different voltage regulation strategies and collect use data in collaboration with two inverter manufacturers. That data will be used to validate voltage regulation models, and ultimately, used to inform the use of more grid-supportive inverters.

IMPACT

The impact of this work fits into a broader, nationwide conversation about distributed energy resources' performance on the grid; other utilities such as California's San Diego Gas and Electric are referencing NREL's work to activate grid-supportive inverters. Results from the project will also feed into the stakeholder process for updating HECO's Rule 14H interconnection standard, which now requires system-wide activation of inverter settings [recommended by this project team](#).



NREL is helping HECO keep pace with customer adoption of renewables by validating voltage-regulation strategies.

Photo courtesy of Hawaiian Electric Companies

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/esif/work-with-us.html

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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/esif.

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