



## Enabling High Penetration Renewables with Synchronous Condenser Conversion Technology

The Hawai'i State Energy Office (HSEO), in partnership with Kaua'i Island Utility Cooperative (KIUC), had proposed financial assistance from the Department of Energy for a project involving **Synchronous Condenser Conversion Technology (SCCT)**. The SCCT technology demonstration project would be funded under the Grid Resilience and Innovation Partnerships (GRIP) Grid Innovation Program of the Grid Deployment Office (GDO), Office of Clean Energy Demonstrations (OECD). The financial assistance will provide for a cost-shared project of \$3.35 million, with KIUC contributing at least 50% of the total project cost.

This project proposal involves an innovative technology application and activities to provide grid-forming capability of an existing generator to accommodate the operation of high penetration distributed renewable generation on the Kaua'i electric grid. The project will provide significant regional and community benefits, reducing the likelihood and consequence of disruptive events to the grid, and provide a reference case for duplication of the conversion technology by others. It provides a specific improvement in system operations via an innovative approach to address the most consequential system need and challenge of increasing the supply of geographically and technologically diverse location-constrained energy resources. This will enhance renewable resource adequacy, reduce outages, and enable grid reliability and resilience by assurance of continuity in the delivery of renewable energy and electrical service.

The SCCT project will be located at the Port Allen power station, developed through conversion of an existing, but essentially stand-by steam turbine generator. This conversion of an existing, but stand-by, generator to use as a synchronous condenser providing grid voltage regulation service will generate significant community benefit by furthering the capability of the system to accommodate 100% dispatch of renewable generation sources more economically and provide for a more reliable and resilient island grid. This novel approach to obtaining grid-forming capability is an innovative technology that will demonstrate a conversion that could be replicated for local, regional, and interregional grid enhancement, while advancing electric system decarbonization through improved interconnected operation with renewable power.

The Project will provide significant community benefits through enhanced utilization of existing renewable resources, the opportunity for additional renewables, reduced frequency and impact of power disruptions, and increased availability of clean electrical energy for beneficial uses.

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