



Hawai'i Natural Energy Institute Research Highlights

International Support

Energy Regulatory and Technical Support for the Cook Islands

OBJECTIVE AND SIGNIFICANCE: Through funding from the Office of Naval Research (ONR), HNEI's Grid**START** provided technical, regulatory and policy support to Te Aponga Uira (TAU), the government-owned electric utility on Rarotonga, the capital of the Cook Islands nation in the South Pacific.

BACKGROUND: The Cook Islands Economic Development Strategy 2030 has a RPS target of 60% by 2030. TAU on Rarotonga has approximately 5,000 customers and is responsible for approximately 90% of the Cook Islands' electricity generation. The power grid on Rarotonga serves a peak demand of approximately 5.5 megawatts (MW), with most generation coming from diesel, and an increasing share supplied by customer-owned rooftop photovoltaics (PV) as well as utility-scale PV plus battery energy storage system (BESS) projects financed by international partners.



Figure 1. Te Mana o Te Ra PV + BESS Project (1 MW, 5.6 MWh) at Rarotonga International Airport.

Building on longstanding collaboration, Grid**START**'s support encompasses strategic planning, technical training, and advanced modeling assistance to strengthen TAU's ability to manage grid modernization, variable and intermittent energy integration, and regulatory development as the Cook Islands transitions toward higher shares of alternative energy.

PROJECT STATUS/RESULTS: By the end of 2024, HNEI completed training for TAU leadership in Honolulu and held technical and policy sessions in Rarotonga with the Prime Minister, TAU management, and the Board of the Cook Islands Investment Corporation (CIIC), laying foundations for advanced modeling and regulatory support activities in 2025.



Figure 2. TAU leadership with Prime Minister Brown.

In 2025, advanced technical support for TAU was provided through a series of analytical and modeling initiatives. Building on TAU's PowerFactory model, the team completed a stochastic hosting capacity study of Rarotonga's distribution feeders and refined key assumptions for daytime minimum loads, enabling more accurate assessment of distributed PV integration potential.

Concurrently, TAU management and engineers were invited to a three-day training workshop for the Scenario Analysis Interface for Energy Systems (SAInt) software to build the first production cost model of the TAU grid and performed scenario-based simulations linking generation, storage operation, and reserve management. Technical results demonstrated that coordinating BESS deployment could reduce curtailment and lower annual operating costs while supporting TAU's alternative energy targets.

Beyond these technical achievements, HNEI and TAU collaborated on coordinated planning exercises and policy framework review. The work reinforced TAU's capacity in strategic planning and grid operations, further aligning utility objectives with national energy targets.

While ONR funding support concluded in 2025, HNEI plans to maintain collaboration with TAU as resources permit under future funding opportunities.

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