



Hawai'i Natural Energy Institute Research Highlights

International Support

Asia Pacific Regional Energy System Assessment (APRESA)

OBJECTIVE AND SIGNIFICANCE: The objective of the Asia Pacific Regional Energy System Assessment (APRESA) program was to develop comprehensive energy system assessments in the Asia Pacific region regarding energy transition strategy, policy, regulation, technology options, demonstrations, implementation plans, and training based on the specific requirements or needs of the targeted jurisdictions and strategic alliances.

BACKGROUND: In August 2017, HNEI was awarded a grant from the Office of Naval Research (ONR) to support energy system transitions in select locations throughout the Asia Pacific region. During the nearly eight years of APRESA activities, HNEI established substantive strategic partnerships with national, regional, and local jurisdictions, as well as private and public stakeholders including numerous utilities, universities, and other research and international aid and development entities, such as the World Bank, Asian Development Bank, Australian Infrastructure Financing Facility for the Pacific, The Asia Foundation, The Maureen and Mike Mansfield Foundation, U.S. Agency for International Development (USAID), and U.S. Department of Defense (DOD) organizations in the areas of interest. Based on the programmatic success of these strategic partnerships, ONR extended the APRESA program past its initial five-year period.

PROJECT STATUS/RESULTS: The APRESA program ended in May 2025. HNEI's [final technical report](#) and [associated works](#) resulting from these efforts, including technical reports, peer-reviewed papers, and presentations, are available on our website.

Nations where engagement and support activities occurred through APRESA include Vietnam, Thailand, Laos, Indonesia, Philippines, Cambodia, the Republic of Palau, the Cook Islands, the Republic of the Marshall Islands, the Federated States of Micronesia, and the Republic of Fiji. The criteria for selection of jurisdictions included: 1) those with significant rates of projected demand growth requiring rapid energy system expansion and transformation; 2) strategic trade and geopolitical opportunities to the United States; 3) potential to integrate renewable energy technologies; and 4) a collaborative environment to conduct the work.

In addition to the deep local partnerships formed in these jurisdictions, this program led to a highly successful collaborative relationship with USAID and its implementation of prime contractors throughout the region. With significant experience providing technical expertise in the energy space, HNEI was uniquely positioned to partner with USAID and provide energy intelligence in identifying tailored solutions for jurisdictions in need. This collaborative approach, leveraging the capabilities, resources, and know-how of HNEI and USAID implementing contractors in the Asia Pacific region is consistent with the U.S.' whole-of-government strategy to grow sustainable and secure energy markets across the region.

HNEI's collaborations and interventions under this grant helped deliver technical expertise to policymakers in emerging economies that can aid in achieving lower-cost, cleaner energy solutions that catalyze competitive markets and reduce carbon emissions—ultimately enabling their populations to enjoy universal, reliable, and cleaner electricity services.

A brief summary of results by projects based in Hawai'i and then by region/country follows. Many of these are also described in further detail in separate project summaries in Appendix H.

Hawai'i

A number of projects based in Hawai'i were implemented with the intent to support secure energy development in the state and allow transition to the broader Asia Pacific region. These efforts included:

- Development and enhanced scaling of the Aloha+ Challenge dashboard website that tracks multiple global and statewide sustainability goals and targets, and buildout of a “template,” which led to dashboard launches in several Pacific Island Countries;
- Evaluation of indoor air quality through field measurement and computational fluid dynamics modeling to achieve indoor comfort and safety with reduced energy requirements;
- Anonymously measuring human-based activity with the intent of better understanding space utilization and energy management;
- Exploring a building assessment intended to provide a test platform for the built-environment

that could also support Navy ROTC on the UH Mānoa campus; and

- Providing in-kind and financial support for a global conference to identify potential plans for future hydrogen energy development in island communities.

Vietnam

HNEI established partnerships with several institutions in Vietnam to support their development of a sustainable and resilient energy system. Efforts in this region included:

- Supporting a community group to develop a workshop platform and present eight publicly accessible seminars covering a range of energy themes to raise awareness of renewable energy and energy efficiency (Appendix H2);
- Providing financial support and guidance to map the innovation opportunities associated with renewable energy sector development;
- Providing technical planning, capacity building, and scenario modeling in support of development for Vietnam's Eighth Power Development Plan's (PDP8)—the country's power sector strategy for 2021-2030 with an outlook to 2050; and
- Initiating an effort to support the development of the country's grid modeling capabilities.

Thailand

HNEI established collaborations with several Thai universities, utility providers, grid operators, and energy regulatory commission. Efforts in this region included:

- An assessment of small biomass systems as a firm power option in islanded settings including the design, development, and implementation of a bioreactor system to hybridize a community PV grid system and extend hours of electricity availability;
- Development of a capacity building program to provide hands-on training for utility engineers at a large Thai distribution grid operator (Appendix H3); and
- Providing technical collaborations and studies tailored to Thailand's needs, which enabled comprehensive advancements in grid planning, energy production forecasting, microgrid operations, and regulatory standards.

Laos

Our team supported technical capacity building, grid modernization, and policy advancement in the Lao People's Democratic Republic (LPDR). Efforts in this region included:

- Supporting the design and implementation of Laos' first market-based solar pilot auction to facilitate procurement of grid-connected solar PV projects from independent power producers; and
- Assisting in developing technical interconnection and performance requirements and grid codes for solar and wind projects in the Lao power grid, including conducting workshops and targeted capacity building.

Indonesia

HNEI worked with Indonesian energy partners to provide technical training, capacity building, and collaborative research supporting grid modernization and energy transition. Efforts in this region included:

- Capacity building sessions focused on strategies for sourcing alternative energy in grids with high levels of variable and intermittent energy resources;
- Collaborative DC microgrid research with the University of Indonesia advance technology on HNEI's Coconut Island microgrid project (Appendix C1); and
- Providing technical support and capacity building across a broad range of priority areas to Indonesia's Sustainable Energy for Indonesia's Advancing Resilience (SINAR) program.

Philippines

Collaborations established under APRESA assisted the Philippine power sector in their ongoing goal to modernize and build resilience. Efforts in this region included:

- Providing technical guidance for the development of a department circular aimed at strengthening the national net metering framework to encourage wider adoption of distributed solar generation; and
- Supporting the Energy Secure Philippines (ESP) program by delivering advanced regulatory frameworks, practical training, and targeted technical assistance, which directly enhanced

the expertise and operational capabilities (Appendix H4).

Pacific Island Countries (PICs)

HNEI expanded and established new partnerships in its collaborative work with multiple PICs, with specific efforts in the Republic of Palau, the Cook Islands (Rarotonga), the Republic of the Marshall Islands (Majuro), the Federated States of Micronesia (Yap), and the Republic of Fiji. Efforts in this region included:

- Providing technical and regulatory support to Palau in three areas: 1) the development of energy regulatory frameworks, 2) conducting modeling and analysis of the national electric system, and 3) creating requirements and improved processes for connecting new sources to the grid (Appendix H5);
- Providing technical and regulatory support to a state-owned power company in the Cook Islands in three areas: 1) building and refining the utility's regulatory and planning frameworks, 2) conducting modeling and analysis of the Rarotonga grid, and 3) establishing methodologies for evaluating how much additional distributed generation could be accommodated by the system (Appendix H6);
- Providing training to the national utility in the Republic of Fiji on integrating variable generation and shared lessons learned from Hawai'i's island grids (Appendix H7);
- Providing technical assistance and capacity building to support the Republic of Marshall Islands' agencies as they seek to update their energy law and prepare for future changes to the power system (Appendix H8); and
- Providing on-island training state-owned utility staff in Yap State of the Federated States of Micronesia covering topics, such as system planning approaches from Hawai'i's island grids, management of high levels of variable generation, updated interconnection standards, BESS applications, EV integration, energy resilience considerations, and strategies for competitive resource procurement.

Southeast Asia and Indo-Pacific Region

Funding from this award played a key role in establishing and strengthening collaborative technical engagement throughout Southeast Asia and the Indo-Pacific region. Efforts in these regions included:

- Making sustained contributions to the Association of Southeast Asian Nations (ASEAN)'s Interconnection Masterplan Study (AIMS) III process by providing direction on study scope, data collection, modeling assumptions, and technical review;
- Supporting the Southeast Asia Smart Power Program in several of their core activities and also providing country-specific technical support and training to national authorities and utilities in Laos and Cambodia;
- Contributing to key Asia-Pacific Economic Cooperation (APEC) Working Group meetings, workshops, and capacity building events aimed at advancing energy system integration, policy development, and technology deployment throughout the Asia Pacific region;
- Hosting the 50th meeting of the APEC Expert Group on New and Renewable Energy Technologies (EGNRET) in Honolulu;
- Participating in many forums and capacity building events with the Asian Development Bank (ADB) and the U.S. Department of State's Asia Enhancing Development and Growth through Energy (EDGE);
- Participating in sustainable aviation fuels (SAF) workshops held in Thailand Indonesia; and
- Conducting a literature review and analysis of a tropical oilseed tree to evaluate its potential as a sustainable bioenergy resource.

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