



Hawai'i Natural Energy Institute Research Highlights

International Support

Provincial Electricity Authority of Thailand (PEA) Collaboration

OBJECTIVE AND SIGNIFICANCE: HNEI's Grid System Technologies Advanced Research Team (GridSTART) delivered capacity building and direct technical support to the Provincial Electricity Authority of Thailand (PEA). These efforts have strengthened PEA's capacity to adopt, manage, and scale distributed energy technologies across Thailand's evolving power sector.

BACKGROUND: PEA, the main electric distribution utility serving 74 of 77 provinces, is integrating and maximizing the value of locally available energy resources through various initiatives, including the development of resilient microgrids. With support from the Office of Naval Research (ONR) through the Asia Pacific Regional Energy Systems Assessment (APRESA) grant, HNEI has designed and led technical training programs, field-based demonstrations and hands-on workshops for PEA engineers, supporting grid modernization, microgrid development and the advancement of electric vehicle (EV) charging solutions.

PROJECT STATUS/RESULTS: Since Spring 2020, GridSTART has provided training programs for selected PEA engineering interns in Hawai'i, with each cohort receiving tailored lectures and hands-on mini-projects focused on distributed energy resources and smart grid technologies. The lectures address topics such as distributed energy resource integration and advanced smart grid applications, while the mini-projects include activities such as developing controls for EV chargers, analyzing PV hosting capacities, studying virtual power plant (VPP) energy management and optimizing microgrid design and operation.

Early 2025 saw the expansion of the collaboration, where HNEI conducted a ten-day hands-on course in Bangkok for thirty PEA engineers. This intensive workshop covered microgrid fundamentals, control strategies, regulatory standards, and technoeconomic optimization, utilizing scenarios from the Mae Hong Son microgrid and simulation and control platforms such as XENDEE, Re-Opt, and ETAP.

In May 2025, four PEA engineers completed an immersive internship at HNEI in Hawai'i, gaining expertise in ETAP software fundamentals, system modeling, load flow, and transient analysis for the

Mae Hong Son field site, supported by software-in-the-loop (SIL) and hardware-in-the-loop (HIL) testing. These activities culminated in technical presentations and feedback sessions.



Figure 1. Training from the ten-day hands-on course.



Figure 2. Final presentations from the 2025 PEA internship.

In addition to these training initiatives, the team's support has extended to technical assistance during equipment commissioning for PEA's microgrid development on Koh Phaluai island in the Gulf of Thailand.

The combined efforts have equipped PEA with enhanced expertise in advanced grid operation, distributed energy system management and practical microgrid deployment. APRESA concluded in May 2025, however, HNEI intends to maintain its partnership with PEA, providing technical exchange to support Thailand's grid modernization goals.

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