



# Hawai'i Natural Energy Institute Research Highlights

## International Support

### Development of BESS Technical Standards for Thailand

**OBJECTIVE AND SIGNIFICANCE:** The objective of this project was to provide technical assistance to support Thailand's Office of Energy Regulatory Commission (OERC) in its ultimate adoption of codes and regulations for battery energy storage system (BESS) applications in Thailand. Under contract to Abt Associates Inc., lead implementer for the Clean Power Asia (CPA) program, and leveraged partial funding from the U.S. Office of Naval Research (ONR) under the APRESA grant, HNEI's Grid System Technologies Advanced Research Team (GridSTART) provided expert advice to OERC and Thai stakeholders, culminating in the delivery of a comprehensive guide and roadmap for developing BESS technical codes and standards for Thai regulatory action.



Figure 1. Bangkok, Thailand.

**BACKGROUND:** Propelled by the rapidly falling price for BESS around the globe, there are increasing applications of BESS by end-users, including utilities, industries, commercial businesses and homeowners. Despite the emergence of BESS applications in Thailand, there is still a lack of regulations to ensure the quality and safety of BESS installations and operations. The OERC expressed its interest to CPA to develop regulations that address the engineering, performance, and safety of the installation and operation of BESS, as well as relevant electrical grid connection codes. Toward that end, Abt Associates subcontracted HNEI GridSTART to develop and deliver BESS Technical Standards and provide recommendations on electrical grid connection codes to support OERC's mission to establish a regulatory foundation for the safe and reliable integration of BESS into the Thai power system.

**PROJECT STATUS/RESULTS:** Throughout 2020 and continuing through the first quarter of 2021,

GridSTART offered technical support to the Thai OERC via its (i) review of existing BESS-relevant regulations in Thailand; (ii) offerings of expert input in stakeholder engagements, advisory group consultations and technical report review; (iii) assessment of international industry best practices, standards and codes related to BESS regulations and relevant electrical grid connection codes; and (iv) delivery of a roadmap for development of BESS codes and standards that incorporated a comprehensive topical index to current global industry best practices and citations to relevant provisions found in the leading sources of international BESS-related codes and standards. The report serves as a practical and actionable "tool" to guide regulators and stakeholders in their development of BESS-enabling standards and codes for Thailand.

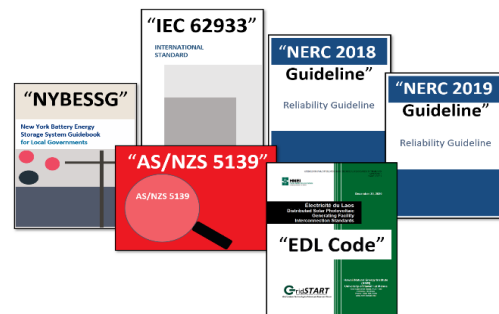


Figure 2. Selected samples of reviewed standards and codes.

Following a series of stakeholder and focus group engagements in 2020 on BESS application issues of interest in Thailand, a Final Stakeholder Consultation Workshop was held in Bangkok on February 18, 2021. GridSTART presented the final draft of the BESS technical standards report to OERC, with Thai electric utilities and numerous energy sector stakeholders in attendance. Stakeholder feedback was incorporated into the final deliverable "Guidelines for Developing BESS Technical Standards in Thailand," which was submitted to CPA on March 29, 2021, for delivery to OERC.

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