



Hawai'i Natural Energy Institute Research Highlights

International Support

Feasibility Study on the National Load Dispatch Center Energy Storage Project

OBJECTIVE AND SIGNIFICANCE: Under this U.S. Trade and Development Agency (USTDA) project, HNEI was selected by prime contractor GE Energy Consulting, to conduct decision analysis and recommend to Vietnamese regulators grid scale Battery Energy Storage Systems (BESS) for consideration to advance policy and tariff formulation at the national level. HNEI's analysis review and policy recommendations during the project period of 2018-2020 incorporated specific use cases that apply to Vietnam Electricity National Load Dispatch Center's (EVN NLDC) transmission grid in Vietnam, taking into consideration grid related issues evaluated by the project team. The ensuing policy recommendations are intended to support BESS as a vital complement or addition to new power generation and power transmission infrastructure required to meet Vietnam's unique grid challenges.

BACKGROUND: HNEI evaluated analysis conducted by the prime contractor and BESS use cases in California and Hawai'i deemed illustrative for EVN NLDC based on general similarities of grid issues, generation issues, and load issues observed in the selected regions and Vietnam. Integrated in HNEI's evaluation are relevant analyses, regulatory, and policy works of the California Public Utilities Commission, the California Energy Commission, and the National Renewable Energy Laboratory on BESS and renewable generation. The intent of this evaluation is to identify specific BESS use cases to be adapted and recommended for EVN NLDC and Vietnam, based on similarities of grid issues, generation issues, and load issues observed in the

selected regions and Vietnam.

PROJECT STATUS/RESULTS: The following mechanisms were among those recommended by HNEI for urgent action given Vietnam's rapidly growing economy and energy demand:

- Direct investment in demonstrations;
- Mandatory targets and regulatory and agency analyses and roadmaps;
- Procurement rules and procedures; and
- Utility programs supporting energy storage.

Hawai'i and California case studies highlighted the importance of understanding the limitations of transmission and distribution systems when planning the addition of renewable energy resources. For BESS applications and potential value streams, arbitrage alone cannot pay for storage, and a battery providing transmission congestion relief may also provide value streams such as firm capacity, voltage regulation, frequency regulation, spinning reserves or arbitrage to some extent. Since providing one value stream can impact the ability to deliver another, trade-offs between value streams need to be assessed carefully. In other words, value stacking may be the only way to get cost-effective benefit from storage.

Funding Source: U.S. Trade and Development Agency via sub-award from GE Energy Consulting

Contact: Mark B. Glick, mbglick@hawaii.edu

Last Updated: December 2021

Policy Recommendations – Urgent Action	
KEY MESSAGES	
Apply Value Stacking to Achieve Cost-Effective Benefit from Storage	
Consider Appropriate Sizing & Location of BESS Near Solar Installations to Optimize Technical Benefits & Economics	
Top 5 BESS Demonstration Sites Offers Proof of Concept Prior to Scaling Up	
Grid Services via BESS (i.e., Provision of Operating Reserves Voltage Support, and Peak Shifting) Offers Additional Revenue	
REGULATORY POLICY	
Direct Investment in Demonstrations	
Mandatory Targets	
Guidance vis-à-vis Regulatory & Agency Analyses & Roadmaps	
Guidance vis-à-vis Procurement Rules & Procedures	
Utility Programs and Promotions in Support of Energy Storage	
FINANCIAL METHODOLOGY AND INCENTIVES	
Build-Own-Operate-Transfer (BOOT) Model May be Best Near-Term Financing Option	
Improve Market Certainty & Reduce Risk by Accelerating Market Reforms Plus Investment Tax Credits & RPS	