



# UNIVERSITY of HAWAII<sup>™</sup> at MĀNOA<sup>™</sup>

# MECHANICAL ENGINEERING

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Sakami Hall C301

## Using Battery Energy Storage Systems to Address the Needs of Different Types of Grid Participants

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### Abstract

This work presents the application of a software tool that was developed to assesses the value of Battery Energy Storage (BES) systems to different types of electrical grid participants. BES systems help support increasing the amount of electricity demand served by intermittently available clean renewable energy resources because they provide a range of grid support services that deliver significant value to grid participants. The rate that BES systems are incorporated into the electrical grid depends on the perceived value of the services delivered to the entity using the BES system. In this talk I will discuss the application of the tool to two use cases. The first identifies potential areas for enhancing grid reliability with BES by characterizing the variability in net energy flows on the interties between balancing authorities (BAs) directly interconnected with the California Independent System Operator (CAISO). The second estimates the optimal size of BES system for IPPs participating in the CAISO wholesale energy market. The tool's analytics support grid operators' long-term grid planning efforts and operational reliability models and IPPs and utility customers economically size their systems.

### About the Speaker



**Michael S. Angelo** is the Executive Director of the Hawai'i Division of Consumer Advocacy (DCA).<sup>1</sup> Mr. Angelo previously held positions as a Technology Consultant with the Hawaiian Electric Company, Inc., Sr. Application Engineer for Kevala, Inc., and Research Faculty with the Hawai'i Natural Energy Institute (HNEI) at the University of Hawai'i at Mānoa.

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<sup>1</sup> The work presented here is independent of any of the work of the DCA and should not be taken to reflect the opinions, recommendations, and/or any analysis of the DCA.