Hawai‘i Natural Energy Institute Research Highlights

Grid Integration & Renewable Power Generation

Energy Generation and Resilience Opportunities Assessment for MCBH

OBJECTIVE AND SIGNIFICANCE: HNEI is conducting an assessment of energy generation and resilience opportunities ("EG&R Assessment") for Marine Corps Base Hawai‘i (MCBH). This study seeks to identify and evaluate needs and opportunities for implementing cost-effective and commercially proven microgrid technologies (e.g., solar photovoltaics (PV), battery energy storage systems (BESS) and back-up diesel generation) on MCBH, while concurrently meeting MCBH's 14-day resiliency requirement.

Figure 1. Marine Corps Base Hawai‘i at Kāne‘ohe Bay. (Photo Credit: MCBH)

BACKGROUND: On May 30, 2018, the Office of the Assistant Secretary of Defense Energy, Installations, and Environment (OASD-EI&E) issued the memorandum "Installation Energy Plans – Energy Resilience and Cybersecurity Update and Expansion of the Requirement to All DoD Installations," mandating an Installation Energy and Security Plan (IESP) be prepared for MCBH. HNEI was initially assisting MCBH with the development and completion of MCBH's IESP and delivered a preliminary draft of the report in October 2020.

Earlier in 2020, the Marine Corps Installations Command (MCICOM) took over efforts to complete IESPs for all installations under its umbrella. As MCBH was still interested in HNEI's assistance to identify base energy security gaps and evaluate alternative energy resilience solutions, the scope of work of HNEI's analysis was updated and the EG&R Assessment was initiated.

PROJECT STATUS/RESULTS: Having completed a preliminary analysis of the existing MCBH electrical infrastructure and loads in 2020, HNEI recently completed a techno-economic analyses utilizing the commercial microgrid assessment software, XENDEE Microgrid Decision Support Platform ("XENDEE"), evaluating optimized long-term hybrid microgrid solutions incorporating both existing and new on-base PV generation, BESS resources and back-up diesel generation.

Alternative microgrid designs have been proposed, developed and assessed, including microgrid solutions that range from powering the entire base, to smaller footprint microgrids that maintain power to each of the several base primary substations. Additionally, HNEI has analyzed the feasibility of microgrids at a more granular distribution feeder level, including at the request of MCBH leadership, an assessment of the potential for microgrid development cost reduction opportunities by the use of existing rooftop PV systems and emergency generation assets already in place at critical load centers on the base.

Figure 2 illustrates a conceptual microgrid design that utilizes existing rooftop PV at MCBH and proposes additional generation and energy storage resources to power the entire base in the event of an extended utility service outage.

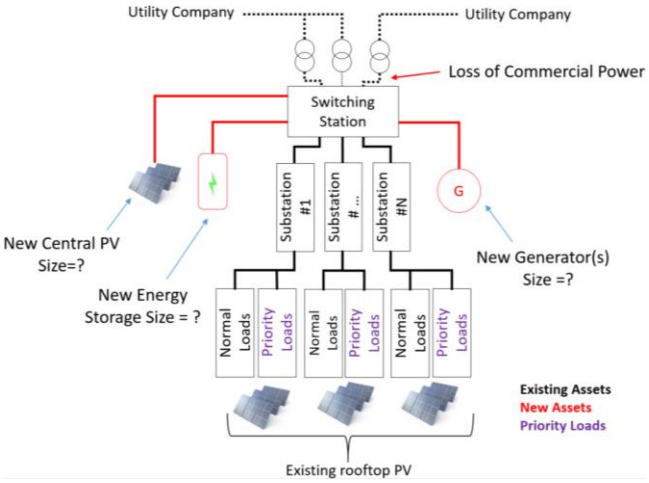

Figure 2. Conceptual design of a full-base microgrid.

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