



Hawai'i Natural Energy Institute Research Highlights

Energy Policy & Analysis

Support of Integrated Grid Planning

OBJECTIVE AND SIGNIFICANCE: In 2018, under guidance from the Hawai'i Public Utilities Commission (PUC), the Hawaiian Electric Company (HECO) initiated the Integrated Grid Planning (IGP) process to determine the types of resources and grid services the utility should invest in over the coming years to meet the goals of legislatively mandated Renewable Portfolio Standards. A Technical Advisory Panel (TAP) was established to provide a third-party, technical, and unbiased review of HECO's modeling and analysis efforts to ensure that best tools and methodologies are being used. The TAP consists of experts from around the country including members from National Laboratories, industry groups and other utilities. Based on direction from PUC Order No. 36725, *Providing Guidance on the IGP*, HNEI chaired the IGP's TAP from its inception in 2018 to October 2021.

KEY RESULTS: HNEI's involvement in the IGP and its leadership role in the TAP has helped ensure that HECO is moving forward in addressing grid issues related to increasing amounts of renewable energy, which includes both distributed behind-the-meter (BTM) generation, utility-scale generation, and utility-scale and BTM storage. The TAP provides HECO with independent and technical oversight from outside experts, helping ensure that the utility is using industry-accepted methods, inputs, and assumptions.

Key activities of the TAP have focused on assisting HECO in revising their approaches to analysis. These

have included advice in regard to the suite of tools and process for integration of those tools and methodologies. HNEI and its subcontractor Telos Energy developed a modeling framework (Figure 1) that was adopted as the IGP modeling framework by HECO. In addition, HNEI provided recommendations insight to using "bookends" to delineate the potential impacts of load uncertainty. During 2021, significant effort was expended by HNEI to quantify alternative methodologies and metrics from using energy reserve margins (ERM) in determining resource adequacy. These probabilistic tools are also being used in the analysis of grid reliability with the pending AES coal plant retirement.

BACKGROUND: By Order No. 35569, issued on July 12, 2018, the PUC opened the instant docket to investigate the IGP process. (Docket No. 2018-0165, Instituting a Proceeding Order No. 30725 To Investigate Integrated Grid Planning.) Pursuant to Order No. 35569, the Companies filed their IGP Workplan on December 14, 2018. The Workplan described the major steps of the Companies' proposed IGP process, timelines, and the methods the Companies intend to employ, including various Working Groups. On March 14, 2019, the PUC issued Order No. 36218, which accepted the Workplan and provided the Companies with guidance on its implementation.

Following an initial period in which the progress of the IGP did not fully meet expectations, HNEI was, in 2020, requested to assume an expanded role in supporting the IGP initiative. This increased support included re-constituting the TAP membership, working with HECO staff to revise their approach for

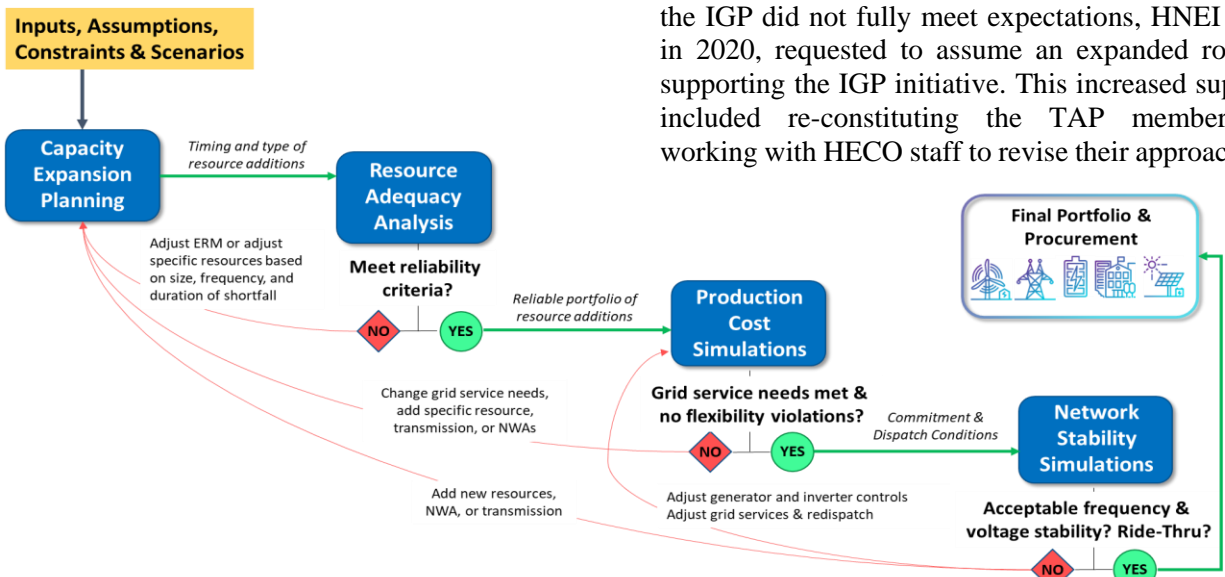


Figure 1. HNEI Modeling Framework Adopted by the IGP.

TAP meetings, and assistance in the review of presentation materials to ensure that meetings are as effective as possible. In addition, due to issues that have arisen in Working Groups and with the Stakeholder Council, HNEI took an expanded role in participating in all of these activities.

This approach was confirmed by the PUC request to HECO for the TAP to play a more substantive role in advising HECO as it moves forward with its integrated grid planning activities and confirmed in a May 2020 letter from HECO to the PUC.

Through its November 2020 IGP Commission Guidance, the PUC noted that, “[f]or the stakeholder process outlined in the Workplan to effectively serve as a replacement for independent evaluation, the Technical Advisory Panel would have to take an active role in analyzing, evaluating, and providing public feedback on Working Group activities and Review Point filings.” The PUC continued by stating its expectation that the Companies “use the Technical Advisory Panel to provide independent review of each Review Point filing that the Companies will file.” While noting this more substantive approach, the TAP is an independent advisory group and is not a decision-making body, but provides input and advice on the methods and processes that the Companies use to perform such work. HNEI’s chairmanship of the TAP operated under these new principles through October 2021 when a new Chair was selected. HNEI continues to play a very active role in all aspects of the IGP process and TAP.

PROJECT STATUS/RESULTS: HNEI’s role as the TAP Chair was an ongoing process that included regular discussions with the HECO planning team, meetings with the TAP members, and active engagement in HECO’s technical working groups. HNEI continued to be involved in assisting HECO in properly formulating questions and agendas for TAP meetings in order to make these meetings productive and effective.

As part of this process, HNEI also helped to create consolidated reporting to better share IGP results with TAP members who may not be aware of Hawai‘i-specific events, trends, or challenges. Despite no longer chairing TAP, HNEI and their contractor Telos Energy continue to be actively engaged in other parts

of the IGP stakeholder process, including active involvement in the Stakeholder Committee, the Stakeholder Technical Working Group, and other relevant Technical Working Groups.

In order to assist HECO in providing more clarity in their internal analyses, HNEI proposed that HECO develop “bookend” scenarios. That is, rather than run a large number of scenarios with variable forecasts and assumptions, it was recommended that HECO use a limited set of scenarios to analyze the impact of extreme or “bookend” values for the forecast loads. The intent was to reduce modeling and analysis time spent developing detailed layers of forecasted energy usage where it was difficult to discern the impact of changing various variables where the intent was to use modeling outputs to better understand critical factors that impacted the future grid, that have a better focus on specific information. In this manner, one could determine the impact of aggregated impacts on grid operations to ensure reliable grid operations over the wide range of forecasts.

HNEI and its contractor, Telos Energy, frequently raised concerns about the excessive use of the capacity expansion model, RESOLVE, in evaluating impacts and implications related to its use in characterizing reliability and grid service needs. HNEI has demonstrated that these types of analyses should be done in tandem with probabilistic analyses that can be used to measure grid reliability from the use of RESOLVE. Grid planning should include both a simplified ERM deterministic metric and more detailed probabilistic metrics for resulting portfolios.

The HNEI team will continue to provide technical and unbiased review and recommendations for HECO’s long-term planning and procurement process to ensure that the State can achieve its ambitious renewable energy policy in an efficient and reliable manner.

Funding Source: Energy Systems Development Special Fund and Office of Naval Research

Contact: Richard Rocheleau, rochelea@hawaii.edu

Last Updated: November 2021