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 and continued to stay engaged in the TAP throughout 2022 and 2023.

KEY RESULTS: HNEI's involvement in the IGP and its previous leadership role in the TAP 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 to identify "bookends" to delineate the potential impacts of load uncertainty. During 2021, significant effort was expended by HNEI to quantify alternative probabilistic methodologies and metrics other than energy reserve margins (ERM), with the potential for enhanced insights, in determining resource adequacy. These probabilistic tools were 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 #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,

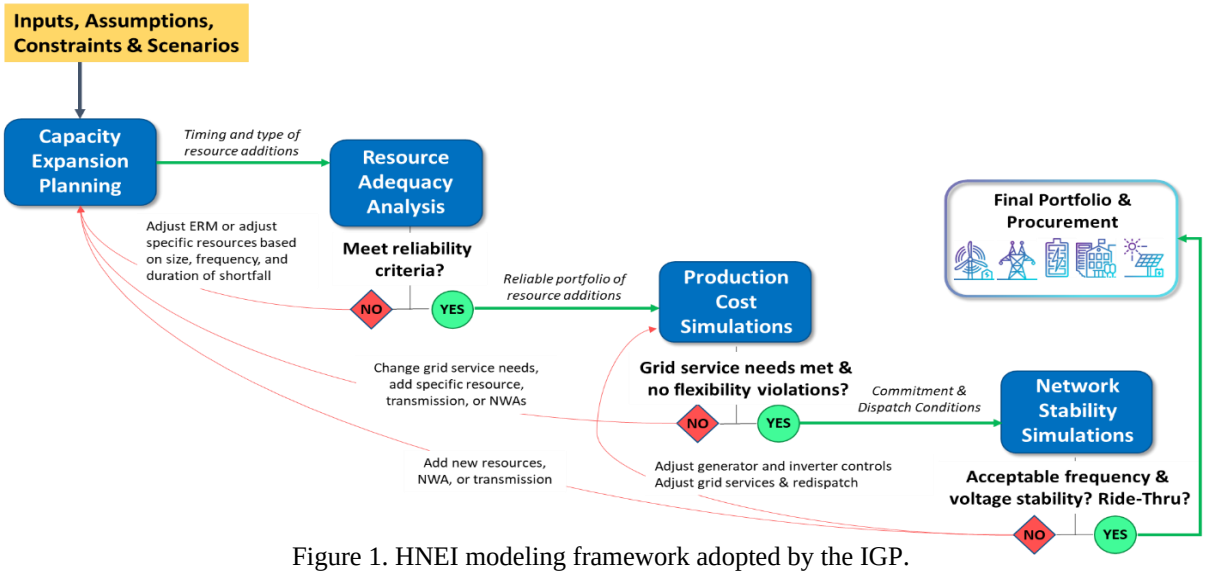

Figure 1. HNEI modeling framework adopted by the IGP.

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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 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 ended in early 2022. Despite no longer chairing TAP, HNEI and their contractor Telos Energy continue to be actively engaged as a member in the TAP as well as other parts of the IGP stakeholder process, including active involvement in the Stakeholder Committee, the Stakeholder Technical Working Group, and relevant TAP subgroups.

In 2022, HNEI and its contractor, Telos Energy, raised numerous concerns and corrective recommendations 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.

As a result of these recommendations, HECO adopted HNEI's probabilistic analysis framework at the end of 2022 and throughout 2023. Now included in all of the IGP filings as well as HECO's RFP is a probabilistic framework that quantifies the loss of load probability across different future resource mix years and procurement cycles. It considers the impact of forced outages, load variability, and weather impacts on solar and wind resources.

Throughout 2023, HNEI and Telos Energy actively engaged in the TAP's Transmission sub-committee, and the Resource Adequacy sub-committee. Considerable attention was paid to the Energy Reserve Margin, HECO's novel approach to resolving challenges associated with the planning reserve margin (PRM) commonly used across the power industry. Based on written feedback and recommendations the Commission ordered HECO to conduct a third-party led study to evaluate different options for PRM and ERM methodologies in Hawai‘i. In 2023, HECO engaged with their consultant (E3) and conducted the ordered study. Throughout this process, HNEI and Telos Energy provided numerous recommendations, written comments, and several discussions with the HECO and E3 team to provide recommendations.

The IGP culminated in 2023 and ended a multi-year process to lay out HECO's long-term plan to reaching 100% renewable energy by 2045 as well as intermediate goals. The final IGP was filed with the Commission on May 12, 2023 and HNEI and the TAP filed 111 public comments during the review process. The IGP is currently under review by the Commission.

In parallel to the Commission review, HECO is continuing its competitive solicitation process via the Stage 3 RFP. HNEI and Telos Energy have provided both the Commission and HECO feedback on this

RFP and are awaiting notification of the selected projects. At that time, the HNEI-Telos team will review proposed projects and may conduct independent reviews of modeling and analysis if requested.

As the IGP continues into its next phase, 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.

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