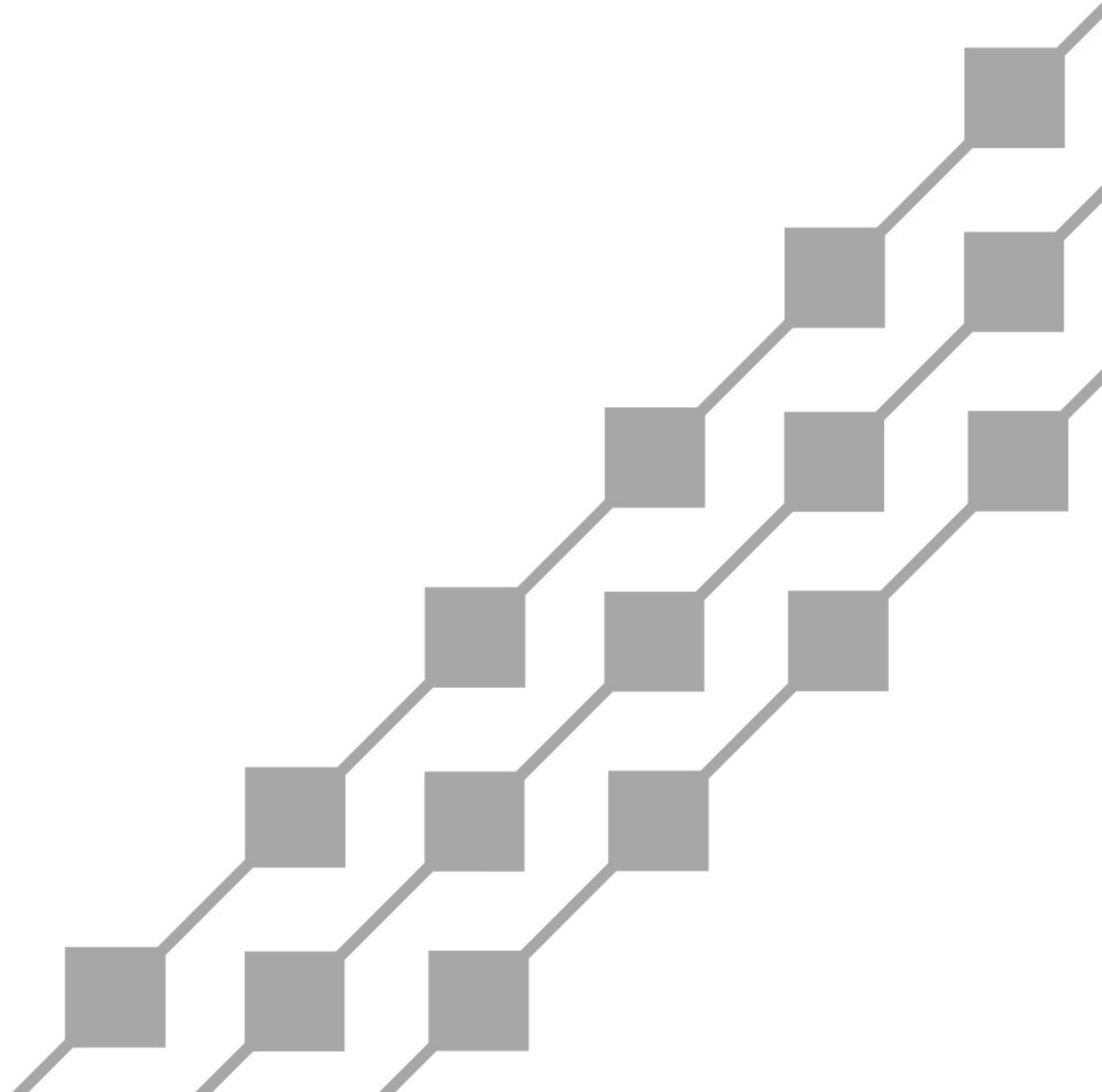




**Hawaiian
Electric**

IGP Technical Advisory Panel

July 7, 2022



Agenda

- ◆ Review IGP and Stage 3 RFP Orders



◆ Stage 3 RFP Order

- File a Near-term Grid Needs Assessment for O‘ahu and Maui within 30 days (July 29) and host a technical conference to discuss

◆ IGP Order

- Approves the November 2021 Grid Needs Assessment Methodology Filing with modifications to the energy reserve margin and capacity accreditation with additional clarification, guidance on other issues
- Approves ERM and exceedance-based HDC for this round of IGP only. Use of ERM/HDC outside of IGP requires PUC approval, and not for use in any other docket or filing (i.e., AOS, KPP transition plans).
- Agrees with approach to add probabilistic analysis IGP process, including 250 draws and calculation of LOLP, LOLE, LOLH, and EUE. Future iterations should integrate climate change into its weather modeling.
- Instructs Hawaiian Electric to develop an ELCC-based resource adequacy criteria for use in future rounds of IGP and develop a workplan in consultation with the TAP and Parties. The workplan must explain:
 - How Hawaiian Electric intends to solicit and incorporate stakeholder feedback
 - How long Hawaiian Electric expects the process to take
 - How and in what dockets and other efforts Hawaiian Electric uses ERM and HDC as resource adequacy criteria
 - How Hawaiian Electric could begin transitioning from using ERM and HDC to ELCC in IGP and elsewhere
 - How long it would take to compute ELCC for all resource types evaluated in PLEXOS as part of Hawaiian Electric’s stochastic reliability modeling in the current round of IGP
 - File this workplan by August 31, 2022
- Directs Hawaiian Electric to communicate to the Commission and stakeholders when the TAP’s recommendations for future IGP processes will be implemented, file future written recommendations and advice from the TAP, as they are received, in this docket.



IGP Order: Impact of System Security Analysis on Resource Plans

- ◆ Hawaiian Electric's practical approach to adjusting the resource plan for transmission planning criteria violations remains unclear.
- ◆ The Commission shares Ulupono's concerns regarding the proper use of the optimization models in the grid needs assessment process. More explanation is needed for the magnitude of violations that would trigger an iteration in the prior modeling steps and how an addition or adjustment to the resource plan or production simulation would be sized appropriately to meet the violation.
- ◆ Commission directs Hawaiian Electric to clarify the magnitude and number of violations that would trigger a model iteration for another step in the GNA process. Must also clarify how it will use the modeling tools to continue to optimize the resource plan after an iteration. Provide written explanation in the Final GNA methodology.
- ◆ Directs Hawaiian Electric to promptly communicate with the Commission and stakeholders when modeling iterations occur as a result of not meeting certain criteria from any modeling step. At a minimum, this communication must include an IGP working group meeting open to all stakeholders, such as the STWG, and be filed in writing in this docket and posted on the IGP website.
- ◆ The Commission directs Hawaiian Electric to prepare methods to reincorporate virtual inertia and fast frequency response in the optimization tool used to develop resource plans in future iterations of IGP.



IGP Order: Regulating Reserve Criteria

- ◆ Commission is satisfied with the clarity regarding the methods used to determine regulating reserve requirements. However, Hawaiian Electric must better justify the standard deviation approach it will use to determine the regulating reserves for each island.
- ◆ Hawaiian Electric has not yet responded to stakeholder feedback regarding the decision to use three standard deviations.
- ◆ The Commission further directs Hawaiian Electric to conduct the additional analysis of the regulating reserve requirements recommended by Ulupono to arrive at the desired percentile for calculating regulating reserves instead of the 3-sigma calculation and use this result to implement "the best combination of high reliability and low reserve requirements" in the next round of IGP.
- ◆ Directs Hawaiian Electric to continue its review of this framework with stakeholders and the TAP to determine if there is a need to cap regulating reserve requirements in future rounds of IGP.



- ◆ Commission is concerned about the accuracy of these costs and implications on the model outcomes. To address these concerns, the Commission directs Hawaiian Electric to test the sensitivity of the transmission costs inputs in RESOLVE resulting from the REZ study.
- ◆ Further improvements that Hawaiian Electric must make to future iterations of the REZ study include: (1) following the TAP's recommendations to incorporate behind-the-meter DERs; (2) creating stepwise supply curves for each group; (3) incorporating non-Transmission alternatives; and (4) conducting additional transmission studies.
- ◆ Commission also directs Hawaiian Electric to consider the TAP's recommendation to use a chronological modeling tool, such as PLEXOS, to perform the dispatch analysis necessary to evaluate real-life scenarios and estimate transmission-related costs more accurately in future iterations of the REZ study.
- ◆ Hawaiian Electric must propose a community engagement plan for REZ development. This plan should clearly define how results from community engagement will inform REZ constraints and how these constraints will modify the results of the study. This plan will require Hawaiian Electric to clearly present technical information in a way that all stakeholders can easily comprehend, as discussed throughout this order. The Commission will monitor this process as it progresses before approving the results.



- ◆ ERM/HDC vs. PRM/ELCC in capacity expansion; probabilistic in PLEXOS
 - Given the thorough probabilistic analysis conducted, will the change to PRM/ELCC significantly impact results?
 - Calibrating ERM did not impact resource mix or lead to less build of hybrid solar; however, the firm generation amount did vary
 - Appropriate type analysis for adequacy of supply or other reliability assessments?
- ◆ System Security
 - How to quantify shortfalls?
 - How best to integrate FFR and inertia constraints in a capacity expansion model given grid forming inverters?
 - What is the threshold for RESOLVE iterations e.g. above a certain quantity of firm or synchronous condensers that need to be added? Is it more meaningful to iterate on the PLEXOS production simulation instead of all the way back to RESOLVE?

