BEFORE THE PUBLIC UTILITIES COMMISSION

OF THE STATE OF HAWAII

------ In the Matter of ------	)	
	)	
PUBLIC UTILITIES COMMISSION	)	DOCKET NO. 2018-0165
	)	
Instituting a Proceeding	)	
To Investigate Integrated	)	
Grid Planning.	)	
	)	

ORDER NO. 37730

DIRECTING HAWAIIAN ELECTRIC TO
FILE REVISED FORECASTS AND ASSUMPTIONS

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By this Order, the Public Utilities Commission ("Commission") directs HAWAIIAN ELECTRIC COMPANY, INC., HAWAII ELECTRIC LIGHT COMPANY, INC., and MAUI ELECTRIC COMPANY, LIMITED (collectively, "Hawaiian Electric")[1] to revise the Forecasts and Assumptions filed in its First Review Point[2] in the Integrated Grid Planning ("IGP") process.

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[1]The Parties to this proceeding are Hawaiian Electric, the DIVISION OF CONSUMER ADVOCACY ("Consumer Advocate"), an ex officio party, and the Intervenors: (1) LIFE OF THE LAND ("LOL"); (2) ENERGY ISLAND; (3) COUNTY OF HAWAII; (4) HAWAII PV COALITION ("HPVC"); (5) HAWAII SOLAR ENERGY ASSOCIATION ("HSEA"); (6) PROGRESSION HAWAII OFFSHORE WIND, LLC ("Progression"); (7) ULUPONO INITIATIVE, LLC ("Ulupono"); and (8) BLUE PLANET FOUNDATION ("Blue Planet").

[2]"Hawaiian Electric Companies Updated IGP Workplan & Review Point; and Certificate of Service," filed on January 19, 2021 ("First Review Point").

I.

BACKGROUND

On July 12, 2018, the Commission opened this docket to investigate the IGP process.[3] As IGP progressed, the Commission issued three orders providing guidance.[4] On January 19, 2021, Hawaiian Electric filed its First Review Point. The First Review Point contains: (1) an Updated IGP Workplan ("Updated Workplan"); (2) Draft IGP Inputs and Assumptions;[5] (3) review materials Hawaiian Electric provided to the Technical Advisory Panel ("TAP");[6] (4) the TAP's review of IGP forecasts;[7] (5) an Integrated Resilience Planning Approach;[8] and (6) Public Meeting and Virtual Open House Feedback.[9]

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[3]See Order No. 35569, "Instituting a Proceeding to Investigate Integrated Grid Planning," filed on July 12, 2018 ("Opening Order").

[4]See Order No. 36218, "Accepting the IGP Workplan and Providing Guidance," filed on March 14, 2019 ("First Guidance Order"); Order No. 36725, "Providing Guidance," filed on November 4, 2019 ("Second Guidance Order"); Order No. 37419, "Providing Guidance," filed on November 5, 2020 ("Third Guidance Order").

[5]First Review Point, Exhibit A1.

[6]First Review Point, Exhibit A2.

[7]First Review Point, Exhibit A3.

[8]First Review Point, Exhibit B.

[9]First Review Point, Exhibit C.

On February 4, 2021, the Commission issued Order No. 37604, establishing the procedural schedule to evaluate the First Review Point.[10]

On February 24, 2021, LOL filed comments on the First Review Point.[11] On February 25, 2021, (1) Progression filed comments;[12] (2) Blue Planet, HPVC, and HSEA (together, "Joint Parties") filed joint comments;[13] (3) Ulupono filed comments;[14] and (4) the Consumer Advocate filed comments.[15] On March 4, 2021, Hawaiian Electric filed reply comments.[16]

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[10]See Order No. 37604, "Establishing a Procedural Schedule for the First Review Point," filed on February 4, 2021 ("Order No. 37604").

[11]"Life of the Land's Comments RE IGP First Review Point; and Certificate of Service," filed on February 24, 2021 ("LOL Comments").

[12]"Progression Hawaii Offshore Wind, LLC's Comments on Hawaiian Electric Companies' First Review Point; and Certificate of Service," filed on February 25, 2021 ("Progression Comments").

[13]"The Joint Parties' Comments on the HECO Companies' First Review Point; and Certificate of Service," filed on February 25, 2021 ("Joint Comments").

[14]"Comments of Ulupono Initiative LLC on the Hawaiian Electric Companies Updated Integrated Planning Workplan - First Review Point; and Certificate of Service," filed on February 25, 2021 ("Ulupono Comments").

[15]"Division of Consumer Advocacy's Comments on the First Review Point; and Certificate of Service," filed on February 25, 2021 ("Consumer Advocate Comments").

[16]Letter From: K. Katsura To: Commission Re: "Docket No. 2018-0165, Instituting a Proceeding to Investigate

II.

POSITIONS OF THE PARTIES

A.

LOL

LOL focuses on shortcomings in Hawaiian Electric's stakeholder engagement. LOL states that the Draft Inputs and Assumptions embody Hawaiian Electric's vision while only giving "lip service to stakeholder input."[17] LOL believes that Hawaiian Electric "must engage in a meaningful, two-way communication, that results with something that most or all sides can live with."[18] LOL asserts that Stakeholder Council and Working Group members do not have access to the models Hawaiian Electric is using to develop solutions.[19]

B.

Progression

Progression focuses its comments on utility-scale offshore wind generation. Progression does not object to Hawaiian Electric's proposed inputs and assumptions, with respect

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Integrated Grid Planning, Hawaiian Electric's Reply Comments," filed March 4, 2021 ("Hawaiian Electric Reply Comments").

[17]LOL Comments at 14.

[18]LOL Comments at 18.

[19]See LOL Comments at 27.

to offshore wind generation, provided that Hawaiian Electric makes available "more robust data and information to ensure timely and viable long-term procurement processes."[20] Specifically, Progression is concerned by how Hawaiian Electric is modeling offshore wind resources because "the current approach, as reflected in the modeling and otherwise, favors delaying the necessary procurement of these resources[,]" until 2040, which would not allow sufficient time to build these resources, "given the ten to fifteen year development time period for offshore wind generation."[21] Progression argues "that this approach also fails to properly account for risks of delays in the development process, especially as competition increases over available project sites."[22] Progression concludes that Hawaiian Electric's "modeling is limited insofar as it lacks the appropriate inputs to produce accurate results."[23] Ultimately, Progression argues that the Commission should approve the long-term RFP concept in the IGP docket, and direct Hawaiian Electric to prepare and file this RFP

[20]Progression Comments at 2.

[21]Progression Comments at 6-7.

[22]Progression Comments at 7.

[23]Progression Comments at 7.

for Commission review and approval within the next one to two years.[24]

C.

Joint Parties

The Joint Parties state that "Hawaiian Electric's proposed forecasts and assumptions document misses the mark[,]" because it does not appropriately consider opportunities to create a more efficient grid that utilizes demand-side resources.[25] The Joint Parties argue insufficient granularity (e.g., rate classes, load type, time of use) cannot account for the evolution of load and distributed energy resources ("DERs"), and thus limits Hawaiian Electric's ability to analyze how different proposals could optimize the electrical grid.[26] According to the Joint Parties, Hawaiian Electric did not incorporate stakeholder feedback on addressing demand-side resources and disaggregating the load forecast, which makes analysis of how DERs (and other solutions) can defer future investments and address system needs difficult.[27]

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[24]See Progression Comments at 9.

[25]Joint Comments at 2.

[26]See Joint Comments at 4.

[27]See Joint Comments at 5-7.

The Joint Parties recommend that Hawaiian Electric model and analyze reasonable pricing options and programs to determine the actual need for procurements and whether DERs can potentially address multiple needs cost effectively.[28] The Joint Parties believe that Hawaiian Electric should model a proposed program to manage electric vehicle ("EV") charging, along with other anticipated rate design changes, to reveal the cost savings associated with managed charging.[29] The Joint Parties maintain that if ongoing Commission dockets such as DER tariff and grid programs, and community-based renewable energy ("CBRE") are not incorporated, then "this cycle of IGP fails to serve a rational purpose[,]" and leads to redundant procurements.[30]

Ultimately, the Joint Parties recommend that the Commission direct Hawaiian Electric to consider: (1) disaggregating all load profiles in RESOLVE and making these available to stakeholders; (2) disaggregating the energy efficiency load forecast within RESOLVE; (3) enhancing their load forecasting tools to enable utilization of disaggregated load profiles; (4) developing a locational avoided cost calculator for short- and long-term transmission and distribution costs and

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[28]See Joint Comments at 7.

[29]See Joint Comments at 8-9.

[30]Joint Comments at 10.

deferral value; (5) determining conventional generation unit life expectancy and developing retirement plans; (6) further analyzing impacts and planning alternatives from future heavy reliance on biomass/diesel to achieve renewable portfolio standards ("RPS") goals; (7) holding neighbor island reliability to the same standard as Oahu; (8) conducting RPS sensitivities with and without biofuels/biomass to identify opportunities for cost-effective acceleration of renewable integration; (9) evaluating alternative procurement methods, system resource operations, and customer participation pathways to address excess energy needs; (10) modeling iterations of different DER adoption levels, e.g., HPVC's "Smart Home" concept; and (11) modeling the impact of key proposed rate design changes on future load growth.[31]

The Joint Parties argue that because IGP needs significant and material changes to be of use, retrospective evaluation of IGP deliverables would not be an efficient use of time and resources.[32] Finally, the Joint Parties reject the premise that the TAP can provide independent review as its members were selected by Hawaiian Electric and provide an overtly-utility perspective.[33]

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[31]See Joint Comments at 11-13.

[32]See Joint Comments at 16.

[33]See Joint Comments at 16.

D.

Ulupono

Ulupono provides recommendations in several areas, including: (1) recommendations about Hawaiian Electric's baseline forecast values; (2) specific modeling recommendations; (3) suggestions on how to model future DER adoption; and (4) suggestions regarding the Stakeholder Council and the TAP.

Baseline Forecast. Ulupono believes that Hawaiian Electric should further explain its preference for using proprietary forecast data for both fuel and renewable resource costs, specifically wind, solar PV and storage.[34] Ulupono requests that the results from the new modeling run replace the existing base case for RESOLVE rather than be used as a sensitivity case.[35] Ulupono recommends that Hawaiian Electric modify base case assumptions for several of the proposed grid services (e.g., energy reserve margin, inertia, regulating reserves) to more accurately capture the true resource potential and to ensure that RESOLVE and PLEXOS are solving for the most optimal investments over the long term.[36]

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[34]See Ulupono Comments at 4.

[35]See Ulupono Comments at 5, Exhibit 2.

[36]See Ulupono Comments at 5.

Ulupono is concerned that Hawaiian Electric continues to use proprietary forecasts for certain resource costs, including PV, Wind and Storage, instead of a widely used, public, benchmarked forecast such as the NREL Annual Technology Baseline ("NREL ATB").[37] Ulupono is also concerned that RESOLVE results overly favor thermal generation capacity.[38] Ulupono believes that Hawaiian Electric's current assumptions will likely bias RESOLVE to strongly favor large synchronous condensers and thermal generators.[39]

Specific Modeling Recommendations. Ulupono believes that Hawaiian Electric should adjust RESOLVE Day Weights, Daily Loads and Sample Days to incorporate the most difficult day to the 30-day sample with appropriate weights and re-run RESOLVE.[40] Ulupono also believes that Hawaiian Electric should: (1) adopt the NREL ATB for all resource cost forecasts or explain why they believe IHS Markit is more accurate; (2) use publicly available fuel forecasts for fuel prices; (3) provide a detailed response regarding why the FGE Forecast was chosen over the publicly available AEO Brent Forecast, and to the extent possible,

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[37]See Ulupono Comments at 7.

[38]See Ulupono Comments at 8.

[39]See Ulupono Comments at 9.

[40]See Ulupono Comments at 6.

provide specific reasons why the FGE Forecast is a more accurate forecast than the AEO Forecast.[41] Ulupono believes Hawaiian Electric should implement programs that purchase exports from distributed PV systems at a fair price (e.g., the avoided cost from other sources), allow for RESOLVE to model the uptake of distributed photovoltaics ("PV") on this basis, and model the technical potential of distributed PV, and not just the amount that Hawaiian Electric has determined is likely to be adopted under current tariffs.[42]

With respect to Hawaiian Electric's proposed grid services, Ulupono proposes modifications for energy, energy reserve margin ("ERM"), and inertia. For energy, Ulupono says that RESOLVE should be allowed to optimize the amount of storage needed for both stand-alone and paired with Solar PV sites.[43] For energy reserve margin, Ulupono states that Hawaiian Electric should adopt a reserve margin in later years that is tied to a reliability analysis, and should eliminate the ERM calculation and margin.[44] For inertia, Ulupono suggests that Hawaiian Electric modify its current assumptions for inertia and

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[41]See Ulupono Comments at 7-8.

[42]See Ulupono Comments at 8.

[43]See Ulupono Comments at 9.

[44]See Ulupono Comments at 9.

assume that batteries and curtailed renewables will be able to provide virtual inertia when needed.[45] For system balancing reserves, Ulupono recommends additional review and discussion with stakeholders before the Commission can approve Hawaiian Electric's proposed assumptions.[46]

Ulupono also recommends changes to modeling inputs for resource potential, independent power producer ("IPP") contract terms, and grid-connected storage. With respect to resource potential, Ulupono believes Hawaiian Electric should use the updated results from the NREL Solar and Wind Resource Potential study as the base case for RESOLVE, rather than a sensitivity case.[47] With respect to IPP contract terms, Ulupono states that, in order to get accurate costs in RESOLVE, Hawaiian Electric should either assume 30-year contracts as the life of the Solar PV system, or assume 20-25 with 5-10 year extensions (not rebuilds) that will be available at lower costs.[48] For grid-connected storage, Ulupono believes that Hawaiian Electric should: (1) account for the possibility of daytime EV charging to reduce required investments in grid-connected storage; and (2) develop feedback

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[45]See Ulupono Comments at 9.

[46]See Ulupono Comments at 10.

[47]See Ulupono Comments at 10.

[48]See Ulupono Comments at 11.

between the pricing, programs, and EV adoption, (i.e., if EVs can charge more cheaply at certain times, that should increase adoption of EVs).[49]

Estimating Programs and Tariff Values. Instead of Hawaiian Electric's proposal to wait until the next IGP cycle and use actual values, Ulupono recommends the best approach is for IGP modeling to include a best-estimate (i.e., not conservative, not status-quo) of the types of services that can be provided from pricing and programs and the cost of obtaining those services.[50] Ulupono suggests that Hawaiian Electric also run scenarios where new pricing and programs are omitted in order to estimate the value of pursuing specific or new programs.[51] Ulupono believes that, although it is hard to characterize the demand side in detail, it is possible to use a generic representation of the services that could be available rather than being limited to existing tariffs.[52]

Stakeholder Council and TAP. Ulupono recommends that the Commission provide a short list of completed IGP deliverables for the Stakeholder Council to prioritize for review

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[49]See Ulupono Comments at 11-12.

[50]See Ulupono Comments at 12.

[51]See Ulupono Comments at 12.

[52]See Ulupono Comments at 13.

and evaluation.[53] Ulupono believes the Commission should also ask the Stakeholder Council to provide a brief summary of the strategic issues that are currently or soon to be considered by the Stakeholder Council.[54] Ulupono also believes the Stakeholder Council should fully address: (1) the inputs and assumptions included in Ulupono's response; (2) the exhibits attached to its SOP; and (3) the new NREL resource plan.[55] Finally, Ulupono is concerned that the TAP is heavy on industry-affiliated members who may, to a large extent, share traditional views on how Hawaiian Electric should approach planning.[56] As such, Ulupono proposes individual experts for addition to the TAP, who can provide a different perspective.[57]

E.

Consumer Advocate

The Consumer Advocate generally supports Hawaiian Electric's proposal to use limited forecasts for this

[53]See Ulupono Comments at 13.

[54]See Ulupono Comments at 13.

[55]See Ulupono Comments at 13.

[56]See Ulupono Comments at 14.

[57]See Ulupono Comments at 14.

IGP cycle, acknowledging the iterative nature of this process.[58] The Consumer Advocate strongly encourages the Commission to view this plan as a general strategy or guide to planning processes, rather than a prescriptive document.[59]

The Consumer Advocate believes that data from the 2016 power supply improvement plans is "stale," and without more up-to-date information, "it will be challenging to conduct informed and relevant analyses to assist in the evaluation of future resource procurement alternatives."[60]

The Consumer Advocate recommends that Hawaiian Electric modify the assumptions related to the electrification of transportation ("EoT") by (1) including the "low" forecast of single light-duty EVs as a sensitivity within the IGP planning process; and (2) developing alternative scenarios for the vehicle miles travelled.[61] The Consumer Advocate believes unmanaged EV charging should be included as the baseline assumption, but that managed charging scenarios should be modeled as a sensitivity in comparison to the base case.[62] The Consumer Advocate also believes

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[58]See Consumer Advocate Comments at 3-4.

[59]See Consumer Advocate Comments at 4.

[60]See Consumer Advocate Comments at 6.

[61]See Consumer Advocate Comments at 8-9.

[62]See Consumer Advocate Comments at 9-10.

that energy efficiency's role could be expanded in Hawaiian Electric's modeling by using AEG's Market Potential Study.[63]

The Consumer Advocate argues that it is appropriate to wait until the next iteration of the IGP cycle to incorporate to-be-developed DER and EV tariffs.[64] Finally, the Consumer Advocate believes that Hawaiian Electric should confirm or elaborate on how it plans to approach future procurement processes, and believes that a "procurement first" approach is unreasonable because pricing options or programs could meet needs more cost- and time-efficiently.[65]

F.

Hawaiian Electric

Hawaiian Electric states that, with the help of stakeholders, it has incorporated substantial changes to its inputs and assumptions, and the Commission should approve them as a reasonable starting point for the first IGP cycle to move forward.[66]

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[63]See Consumer Advocate Comments at 11. The Consumer Advocate inadvertently refers to the "AEP" Market Potential Study.

[64]See Consumer Advocate Comments at 11-12.

[65]Consumer Advocate Comments at 13.

[66]See Hawaiian Electric Reply Comments at 2.

Hawaiian Electric details changes it has made or plans to make in response to certain comments and explains cases where it needs more clarity before it makes changes. For example, Hawaiian Electric pledges to provide a fossil generation retirement plan for Oahu for the modeling efforts.[67] Hawaiian Electric seeks specific proposals or modifications for "more granular forecasts" that can be considered, "rather than overly broad statements."[68] Hawaiian Electric believes the 8760-load profiles it provided with the First Review Point are sufficiently disaggregated.[69] Hawaiian Electric offers to better explain how the sample days are selected and weighted.[70]

Hawaiian Electric explains how specific analytical steps will take place in subsequent IGP steps. For example, Hawaiian Electric will examine managed charging during the grid needs assessment as a base assumption, will consider unmanaged charging and lower adoption of EV managed charging time of use ("TOU") rates through sensitivity analyses, and will evaluate a

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[67]See Hawaiian Electric Reply Comments at 8.

[68]Hawaiian Electric Reply Comments at 24-25.

[69]See Hawaiian Electric Reply Comments at 25.

[70]See Hawaiian Electric Reply Comments at 27.

managed charging sensitivity in the planning analysis after the forecast.[71]

Hawaiian Electric clarifies its integrated solution sourcing process, maintaining its commitment to source grid services through pricing, programs, and procurement opportunities, but strongly emphasizing affordability and cost-effective procurement.[72] Hawaiian Electric explains that "[p]ricing and programs are not excluded from the [grid needs assessment], and are an important part of the portfolio. For example, managed charging, future DER programs, the CBRE program, among others are included in the modeling inputs."[73] Hawaiian Electric justifies using proprietary IHS Markit resource cost data instead of publicly available data from NREL, stating that it is "much more granular."[74]

III.

DISCUSSION

The Commission has encouraged Hawaiian Electric to lead the IGP process. But it is clear that Hawaiian Electric is leading this process in the wrong direction, and the Commission needs to

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[71]See Hawaiian Electric Reply Comments at 29.

[72]See Hawaiian Electric Reply Comments at 31-32.

[73]Hawaiian Electric Reply Comments at 33.

[74]Hawaiian Electric Reply Comments at 35.

correct IGP's course. The Commission has serious concerns about the forecasts and assumptions presented in the First Review Point. IGP simply cannot proceed until Hawaiian Electric addresses these concerns since the forecasts and assumptions provide the fundamental underlying structure for any resulting plans. The Commission provides direction in the following areas: (1) Completeness; (2) Resource and Technology Cost Projections; (3) Fuel Price Forecasts; (4) DER and Load Forecasts; (5) Retirement Plans; (6) Sensitivities; (7) Grid Services and Planning Criteria; (8) Improving Data and Information Presentation; and (9) Energy Efficiency Modeling.

A.

Completeness

Hawaiian Electric provided the Inputs and Assumptions documents to the Parties on September 25, 2020,[75] and worked with Parties thereafter to incorporate feedback.[76] Hawaiian Electric provided an updated workbook of Inputs and Assumptions to stakeholders on February 18, 2021, and again on March 12, 2021,

[75]The inputs and assumptions documents are available at https://www.hawaiianelectric.com/clean-energy-hawaii/integrated-grid-planning/stakeholder-engagement/working-groups/forecast-assumptions-documents

[76]See Ulupono Comments at 3.

after submitting the First Review Point filing to the Commission. Hawaiian Electric further updated the full draft deliverable and appendices on March 30, 2021. This did not give stakeholders time to review the updated assumptions prior to filing comments.[77] The Commission has emphasized the need to provide adequate time for stakeholders to provide meaningful feedback.[78] Yet Hawaiian Electric did not provide a clear timeline for updating the Inputs and Assumptions document.

Moreover, Hawaiian Electric states that it is "currently incorporating stakeholder feedback received on the Draft IGP Inputs and Assumptions document and will issue a finalized Inputs and Assumptions document in Q1 2021 incorporating [C]ommission review point feedback."[79] Hawaiian Electric also states that "certain items still need to be fully developed or completed before the Grid Needs Assessment," including development of scenarios and sensitivities and strategic discussion of the Inputs and Assumptions by the Stakeholder Council.[80] Essentially, Hawaiian Electric is asking the Commission to review the First Review Point, even though it is incomplete.

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[77]See Ulupono Comments at 3.

[78]See Third Guidance Order at 10.

[79]First Review Point, Exhibit A, at A-1.

[80]See Hawaiian Electric Reply Comments at 2, n.6.

The Commission cannot approve the Draft IGP Inputs and Assumptions given the outstanding changes that Hawaiian Electric already plans to add, as well as the potential for additional changes following more thorough stakeholder review. The Commission is also alarmed by Parties' concerns that their feedback has not been included or addressed.[81] Therefore, the Commission directs Hawaiian Electric to re-file the Draft IGP Inputs and Assumptions only after: (1) implementing its own planned changes; (2) incorporating the directives in this Order; (3) the TAP has thoroughly reviewed the changes; (4) stakeholders have had ample opportunity to provide corrective feedback; and (5) any necessary corrective stakeholder feedback has been integrated into the Draft IGP Input and Assumptions. The Commission also directs Hawaiian Electric to provide an updated timeline and stakeholder engagement plan for completing these steps, including a projected date for filing revised Draft IGP Inputs and Assumptions, provided that the date for filing revised Draft IGP Inputs and Assumptions shall be no later than August 3, 2021. Hawaiian Electric shall be prepared to discuss its progress on implementing each of these steps at the June 4, 2021 technical conference, discussed below.

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[81]See LOL Comments at 14; Joint Comments at 7; and Ulupono Comments at 5.

The Commission understands that the IGP process is iterative and that it is important to continue forward progress by submission of work for review at reasonable points. But clear timelines and Hawaiian Electric providing work products for review that are as close to final as possible are necessary to allow the IGP process to function.

B.

Resource and Technology Cost Projections

After Hawaiian Electric filed its Reply Comments on March 4, 2021, it uploaded an updated the Draft Inputs and Assumptions document to its website, on March 30, 2021.[82] It appears that Hawaiian Electric continues to use data from HIS Markit to project costs for grid-scale and distributed PV, grid-scale and distributed storage, and onshore wind in its updated workbooks. The Commission acknowledges Hawaiian Electric's preference to use the IHS Markit Forecast due to data granularity but, like Ulupono, is concerned that IHS Markit Forecasts are proprietary and may be inaccurate for certain resources.[83]

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[82]See Hawaiian Electric 2020 Integrated Grid Planning Inputs and Assumptions Draft March 2021, available at: https://www.hawaiianelectric.com/documents/clean_energy_hawaii/integrated_grid_planning/stakeholder_engagement/working_groups/forecast_assumptions/20210330_wg_fa_deliverable_draft.pdf

[83]See Ulupono Comments at 6-7.

Ulupono recommends that Hawaiian Electric use the NREL ATB for all resource cost forecasts.[84]

Hawaiian Electric explains the discrepancies between its September 2020 Draft Inputs and Assumptions and the February 2021 I&A Workbook.[85] However, Hawaiian Electric does not directly respond to Ulupono's concerns regarding the proprietary nature of IHS or its recommendation to use NREL ATB, but instead states that the Draft Inputs and Assumptions report will be "updated to reflect

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[84]See Ulupono Comments at 7 (stating, "the use of IHS Markit Forecasts may compromise the accuracy of the overall resource cost forecasts. For example, the IHS Markit forecasts for the cost of utility-scale solar and offshore wind are about 40% lower than the NREL ATB forecast, while the IHS Markit forecasts for residential solar is about 60% higher than the NREL ATB (after 2030). We understand the desire to use forecasts with a more detailed allocation between solar modules and balance-of-system. However, this feature will have no value if those forecasts introduce large errors in the total resource cost . . . Ulupono recommends Hawaiian Electric adopt the NREL ATB for all resource cost forecasts or explain why they believe IHS Markit is more accurate. If Hawaiian Electric continues to use the IHS Markit forecasts, we also request that they explain why their forecasts differ between the September 25[,] 2020 I&A Resource Costs report and the February 18[,] 2021 I&A workbooks." See also Ulupono Comments, Exhibit - I&A Discussion Spreadsheet at G20.

[85]See Hawaiian Electric Reply Comments at 35-36 (stating, "[t]he difference is the September 2020 used IHS' 2019 forecast and February 2021 I&A Workbook used IHS' 2020/2021 forecast. IHS rebuilt their forecasting models from the bottom up, updated their learning curves to accelerate near term price declines and incorporated the latest financial data from Sunrun, SolarCity, and other developers to account for increases in customer acquisition costs. The I&A Report will be updated to reflect the latest information")

the latest information [from IHS]."[86] The Commission is not convinced that the purported benefits of the IHS Markit forecasts outweigh the drawbacks of it being proprietary. Therefore, the Commission directs Hawaiian Electric to include a sensitivity with the NREL ATB for all resource cost forecasts and to clearly explain, narratively and quantitatively, the differences between the NREL ATB and IHS Markit forecasts.

C.

Fuel Price Forecasts

Hawaiian Electric presents a single fuel price forecast for each service territory based on a forecast provided by Facts Global Energy ("FGE Forecast") rather than the Brent North Sea Crude Oil Benchmark ("AEO Brent Forecast").[87] The Commission shares Ulupono's concern about the accuracy of the FGE Forecast.[88]

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[86]Hawaiian Electric Reply Comments at 35-36.

[87]See First Review Point, Exhibit A1, at 31-32.

[88]See Ulupono Comments at 7-8 (citation omitted) (stating "Hawaiian Electric should provide a detailed response regarding why the FGE Forecast was chosen over the publicly available AEO Brent Forecast [], and to the extent possible, provide specific reasons why the FGE Forecast is a more accurate forecast than the AEO Forecast. Ulupono stresses the need for a response on this topic, as the FGE Forecast begins 21% below the AEO Forecast in 2021, and ends 40% below the AEO Forecast by 2040. Ulupono remains concerned that if the FGE Forecast is less accurate than the AEO Forecast, its lower prices will bias the RESOLVE results to overly favor thermal generation capacity. It also appears that Hawaiian Electric has had to arbitrarily extend the FGE Forecast

Hawaiian Electric does not adequately respond to Ulupono's question about why it chose the FGE Forecast over the publicly available AEO Brent Forecast, or why the FGE Forecast is a more accurate forecast.

Hawaiian Electric's chosen proprietary forecasts offer oil prices that are significantly lower than publicly available prices. The Commission is concerned that this will bias IGP models to select thermal generation and put customers at significant risk of paying unnecessarily high prices. This outcome is easily avoidable. Therefore, the Commission directs Hawaiian Electric to include a scenario using the AEO Brent Forecast and to clearly explain what drives the differences between the FGE Forecast and the AEO Brent Forecast. Hawaiian Electric must also perform a sensitivity analysis to explore how different commodity costs would impact resource selection, retail rates,

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beyond 2040, while the AEO Forecast extends to 2050. Hawaiian Electric has reported that they prefer the FGE forecast because it is better suited to forecast the final cost of fuels delivered to Hawaii. However, this explanation seems to conflate two issues. For the IGP, Hawaiian Electric needs to (1) estimate how fuel costs in Hawaii vary in response to Brent Crude, based on contract terms and historical data, and (2) apply those adjustments to a forecast of future Brent Crude prices. Using the EIA forecast instead of FGE for part (2) of this process will not affect part (1). So we recommend that Hawaiian Electric adopt the widely used AEO Forecast of Brent Crude prices, or else explain why they think the FGE forecast of Brent Crude prices will be more accurate."

electricity demand, etc. For example, many utilities develop "low," "medium," and "high" fuel forecasts.[89]

D.

DER and Load Forecasts

Hawaiian Electric's plan to essentially ignore the value of DER for the first IGP cycle belies its statement that it recognizes "the inherent value of prioritizing customer demand side resources in the development of the resulting solution portfolio."[90] However Hawaiian Electric truly views the value of DER, the Commission will require Hawaiian Electric to prioritize customer demand side resources in the first IGP cycle, as follows.

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[89]See e.g., Puget Sound Energy Resource Planning, available at: https://pse-irp.participate.online/2021-irp/reports, see also Australian Energy Market Operator ("AEMO") Integrated System Plan, available at: https://aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp

[90]Updated Workplan at 9. Hawaiian Electric further explains that "[t]here is a discontinuous dimension to this sourcing, because the regulatory process for determining new tariffs and programs (including Hawaii Energy's energy efficiency programs) is conducted in separate dockets on different timelines that do not align with this initial IGP schedule. The Companies recognize the inherent value of prioritizing customer demand side resources in the development of the resulting solution portfolio. However, due to the timing mismatch it is necessary to incorporate the pending results of the current dockets regarding tariffs and programs for DER, [energy efficiency ("EE")], and EoT into the next IGP cycle. It is not appropriate or practical to incorporate a range of hypothetical tariffs and programs into this IGP cycle for the purpose of identifying incremental needs." Id.

Hawaiian Electric shall explain how it uses the LoadSEER and Synergi models to develop and/or inform DER and EV forecasts, and include qualitative summaries and quantitative results of its LoadSEER and Synergi findings as part of its revised Draft IGP Inputs and Assumptions. Hawaiian Electric shall also revise the Inputs and Assumptions to include best estimates of tariffs and programs to inform the "adjusting layers" of the load forecast. The Commission appreciates that Hawaiian Electric provided the baseload forecast's adjusting layers on a granular level by presenting the data as hourly, (i.e., 8760) load forecasts. To improve the value of this data, Hawaiian Electric shall collaborate with the Parties and the TAP to further disaggregate this data by location and rate class. Hawaiian Electric must include such disaggregated data in its revised Draft IGP Inputs and Assumptions. Finally, Hawaiian Electric must also clearly explain which EV charging assumption it is using in the base case.

1.

LoadSEER

The inherently location-specific nature of DERs requires DER forecasts to use granular circuitlevel data and be used to inform transmission and distribution in addition to resource planning. LoadSEER is a modern spatial load forecasting tool - which Hawaiian Electric already uses - that can help develop

the location-specific data needed for IGP. LoadSEER allows planners to toggle between regression based, econometric, and spatial load forecasting (and a combination of all three) to achieve accurate load forecasts that address geographic, economic, DER, and weather diversity across a service territory, and produce sub-circuit level results. Hawaiian Electric states that LoadSEER is "used to create circuit- and transformer-level forecasts"[91] in its distribution planning, and that "LoadSEER is able to produce circuit-level new load, DER, EE, and EV forecasts."[92] Despite these capabilities, it is not clear whether or how LoadSEER informed Hawaiian Electric's development of underlying DER or EV forecasts. Although Hawaiian Electric described the LoadSEER model during a March 5, 2020 Distribution Planning Working Group meeting[93] and in its June 2020 "Distribution Planning Methodology" document, it has not yet shared results.

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[91]"Distribution Planning Methodology," June 2020 ("Distribution Planning Methodology"), at 7, available at: https://www.hawaiianelectric.com/documents/clean energy hawaii/integrated grid planning/stakeholder engagement/working groups/distribution planning/20200602 dpwg distribution planning methodology.pdf.

[92]See Distribution Planning Methodology at 8. See also Hawaiian Electric Reply Comments at 29, 51.

[93] "Hawaiian Electric LoadSEER 2020 Forecast and Data Review," March 5, 2020, available at: https://www.hawaiianelectric.com/documents/clean energy hawaii/integrated grid planning/stakeholder engagement/working groups/distribution planning/20200305 dpwg meeting presentation materials.pdf.

To clarify this situation, Hawaiian Electric shall provide qualitative and quantitative summaries of its LoadSEER findings as part of its revised Draft IGP Inputs and Assumptions. Hawaiian Electric shall also provide the results of the probabilistic DER hosting capacity analysis from the Synergi circuit models and its work with Electric Power Research Institute.[94] The revised Draft IGP Inputs and Assumptions must show how Hawaiian Electric used LoadSEER to disaggregate load forecasts further (e.g., by rate class or location). Hawaiian Electric must also demonstrate how the probabilistic forecasts developed with LoadSEER will inform the different reference case load forecast scenarios to be established using the "bookends" approach.[95]

2.

Using Best Estimates

As discussed above, Hawaiian Electric's plan to ignore the value of DER in the first IGP cycle is unacceptable. As the Joint Parties correctly observe:

> Hawaiian Electric's failure to consider customer-based solutions to grid needs is untenable and subverts the Commission's express guidance that Hawaiian Electric 'integrat[e] the Companies'

[94]See Distribution Planning Methodology at 12-13.

[95]See Hawaiian Electric Reply Comments at 6-8.

> efforts across multiple dockets' to 'maximize potential synergies and avoid contradictions or unnecessary duplication,' and 'reap the cross-cutting benefits that come with close coordination.' Divorcing IGP from ongoing docket proceedings - with proposals and concepts that have been under discussion for years - likely means this cycle of IGP fails to serve a rational purpose. By the time material decisions are made on, among other things, revised rate design, future DER tariff and grid programs, and CBRE, this cycle of IGP will be obsolete."[96]

Ulupono offers a solution to this "chicken-and-egg problem with modeling pricing and programs in IGP before they have been defined in other dockets" which is "to include a best-estimate - not conservative, not status-quo - of the types of services that can be provided from pricing and programs and the cost of obtaining those services."[97] Ulupono correctly states that "[t]his approach will ensure that the rest of the portfolio is designed correctly around the resources likely to be available and will help to identify the programs worth developing."[98] Therefore, the Commission rejects Hawaiian Electric's proposal to exclude in the current cycle of IGP any considerations of ongoing dockets regarding tariffs and programs for DER, EE and EoT in its baseline

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[96]Joint Parties' Comments at 9-10 (quoting Order No. 36725 at 14-15, and Order No. 37419 at 4).

[97]Ulupono Comments at 12.

[98]Ulupono Comments at 12.

load forecast.[99] Instead, Hawaiian Electric shall, with its stakeholders, devise best estimates for tariff and program values for DER, EE and EoT, and include those estimates in the revised Draft IGP Inputs and Assumptions, to inform the underlying layers (i.e., DER, EE, and EOT layers) "adjusting layers" of the baseline load forecast.

3.

EV Charging Assumption

Confusion lingers over which EV charging assumption Hawaiian Electric will use in its baseline load forecasts and bookend sensitivities. First, Hawaiian Electric states: "[i]n the context of IGP, the unmanaged electric vehicle charging assumption is incorporated into the baseline forecast. The outcomes from managed charging will then modify this forecast based on specific program provisions. Essentially, managed charging then becomes a programmatic or pricing-based approach to adjust the base forecast."[100] Hawaiian Electric later includes managed EV charging

[99]Although baseline load forecasts must include best estimates for DER, EE, and EOT tariff and program values, Hawaiian Electric must continue to model previously developed scenarios and sensitivities, such as the "DER Freeze" and "managed EV charging" sensitivities, to assess the value of alternative resource options.

[100]Updated Workplan at 5.

TOU rates as an assumption in its base case for proposed bookend sensitivities.[101] Hawaiian Electric explains that "[m]anaged charging will be examined during the Grid Needs Assessment as a base assumption. Unmanaged charging and lower adoption of EV managed charging TOU rates can be considered through sensitivity analyses."[102]

It is unclear which EV charging assumption Hawaiian Electric will include in the base case. Therefore, Hawaiian Electric shall clearly identify which assumption, i.e., managed charging or unmanaged charging, it will include in the base case and other scenarios. In addition, Hawaiian Electric shall further develop its charging assumptions to consider hourly load profiles for managed charging, and transparently explain every assumption driving these hourly load profiles.

E.

Retirement Plans and RPS Modeling

Hawaiian Electric must continue developing its proposed unit retirement plan for use in the base case and analyze how this affects the optimization of new renewable resources.

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[101]See Hawaiian Electric's Reply Comments at 10.

[102]Hawaiian Electric Reply Comments at 29.

Hawaiian Electric must also analyze the factors driving resource selection during and near the end of the RPS compliance schedule.

In its RESOLVE modeling, Hawaiian Electric assumes "[a]n annual renewable energy constraint that reflects the State of Hawaii's Renewable Portfolio Standards policy."[103] In the DER docket, the DER Parties have had access to RESOLVE and are concerned that Hawaiian Electric's RESOLVE base case for Oahu does not optimize to build new renewable generation or storage until absolutely required for incremental RPS compliance, where on Maui and Hawaii Island, the RESOLVE model selects new renewable and storage resources earlier than incremental RPS compliance requires.[104]

The Joint Parties recommend that to adjust Hawaiian Electric's Draft IGP Inputs and Assumptions, it should: "[d]etermine conventional generation unit life expectancy and develop retirement plans[,] [f]urther analyze impacts and planning alternatives from future heavy reliance on Biomass and Biodiesel to achieve state RPS goals[,]" and "Conduct RPS sensitivities with

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[103]First Review Point, Exhibit A1, at 8.

[104]See "DER Parties' Response to the February 10, 2021 Letter from the Commission Requesting Information from the DER Parties," filed in Docket No. 2019-0323, on February 24, 2021, at 6.

and without Biofuels/Biomass to identify opportunities for cost effective acceleration of renewables integration."[105]

In response, Hawaiian Electric agrees "that retirement plans for existing generation is required as part of the IGP process[,]" and promises to "propose a unit retirement plan to be used in the base case based on age in the next update of the I&A Report."[106] Hawaiian Electric clarifies that "[t]he initial RESOLVE and PLEXOS modeling that will inform the solution sourcing step is a proxy meant to solely identify the needs, and allow the market to determine the technology and price that best fits those needs . . . That does not imply that there's a preference for biomass or the Companies would specifically seek a biomass unit in a procurement . . . The selection of a biomass unit by the model during the grid needs assessment helps to determine the grid needs and contributes to the avoided cost or valuation of the grid service."[107]

The Commission believes that the proposal of a unit retirement plan for use in the base case is appropriate and directs Hawaiian Electric to continue this development and file it as a part of its revised Draft IGP Inputs and Assumptions. As part of

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[105]Joint Comments at 12.

[106]Hawaiian Electric Reply Comments at 38.

[107]Hawaiian Electric Reply Comments at 38.

this analysis, Hawaiian Electric must analyze how using a unit retirement plan in the base case changes the optimization of new renewable and storage resources outside of incremental RPS compliance needs for Oahu. Hawaiian Electric may also employ a "no retirement" sensitivity for comparison, if desired.

The Commission appreciates the clarification regarding including biomass and biofuels as a resource for RESOLVE's optimization. However, the Commission seeks to better understand why the model selects these resources in such large amounts towards the end of the RPS compliance schedule rather than other renewable resources in earlier years. This could indicate a serious problem with the modeling constraints or the optimization process. Therefore, the Commission directs Hawaiian Electric to thoroughly analyze and clearly explain why the model selects such large amounts of biomass and biofuel resources, including what cost assumptions (e.g., fuel prices) in the modeling contribute to this selection.

F.

Sensitivities

Hawaiian Electric must provide a clear explanation of the assumptions and calculations it uses to develop its sensitivities. Hawaiian Electric states that "[t]he TAP recommended that scenario and sensitivity analysis

(i.e., "bookend") is an important modeling and analysis approach to better test the sensitivity of the models and resulting resource portfolios against a wide range of load forecasts."[108] Hawaiian Electric provides a high-level proposal for a "Bookends Sensitivity."[109] While applying these sensitivities to the reference forecast layers is a step in the right direction, Hawaiian Electric must clearly explain the assumptions and calculations it uses to develop these sensitivities. All calculations must be shared in Excel workbooks with all assumptions clearly stated and formulas intact.

To date, Hawaiian Electric has only developed the Market DER or "DER Freeze" sensitivity identified in Appendix E of the June 2020 Draft Grid Needs Assessment.[110] This DER Freeze sensitivity helps demonstrate some of the value of forecasted DER adoption in contrast to serving that load with new utility procurements. Hawaiian Electric must apply the remaining

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[108]Hawaiian Electric Reply Comments at 4.

[109]Hawaiian Electric Reply Comments, Table 1.

[110]See "Grid Needs Assessment & Solution Evaluation Methodology Draft 2020," ("Draft Grid Needs Assessment"), Appendix E, available at: https://www.hawaiianelectric.com/documents/clean_energy_hawaii/integrated_grid_planning/stakeholder_engagement/working_groups/solution_evaluation_and_optimization/20200602_wg_seo_deliverable_draft_v1.pdf.

nine sensitivities identified in the Draft Grid Needs Assessment to the reference forecast.

As it creates new scenarios and sensitivities, Hawaiian Electric must provide a clear narrative that describes how the scenarios or sensitivities adjust data in inputs and assumptions workbooks. At a minimum, Hawaiian Electric must create a separate tab in its workbooks with data for different scenarios or sensitivities. All calculations must be shared in Excel workbooks with all assumptions clearly stated and formulas intact. Hawaiian Electric must also apply the remaining nine sensitivities identified in Appendix E of the Grid Needs Assessment to the reference forecast. The Commission will review the Draft Grid Needs Assessment when Hawaiian Electric files it in a separate review point.

G.

Grid Services and Planning Criteria

Ulupono made a number of additional specific suggestions related to the Inputs and Assumptions and the Company responded only to some of them directly.[111] The Commission understands that some of these suggestions are on the cutting edge of utility planning processes, but given the ambition and novelty of the IGP

[111]See Ulupono Comments at 6-11.

process and the advanced state of renewable energy deployment in the State, further consideration of these suggestions with stakeholders is warranted. The Commission would like to better understand the merits and drawbacks of Ulupono's suggested approaches, and whether other stakeholders are aligned on desired modeling tactics.

To help answer this question, Hawaiian Electric must respond in writing to Ulupono's suggestions for: (1) allowing RESOLVE to "optimize the amount of storage needed for both stand-alone and paired with Solar PV sites,"[112] rather than requiring exactly four hours of storage with utility-scale solar; (2) using alternatives to the proposed ERM calculation or adopting "a reserve margin in later years that is tied to a reliability analysis"[113]; (3) assuming that "batteries and curtailed renewables will be able to provide virtual inertia when needed"[114]; and (4) assuming "30-year contracts as the life of the Solar PV system, or assum[ing] 20-25 with 5-10 year extensions (not rebuilds) that will be available at lower costs."[115]

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[112]Ulupono Comments at 9.

[113]Ulupono Comments at 9.

[114]Ulupono Comments at 9.

[115]Ulupono Comments at 11.

In its response, Hawaiian Electric must: (1) clearly identify its current approach and how it differs from Ulupono's recommended approach; (2) what Hawaiian Electric views as tradeoffs between the different approaches; and (3), which approach is preferred by the Parties, the TAP, and any other interested stakeholders, such as the new Stakeholders Technical Working Group.[116] In seeking input from Parties on these topics and in its written response, Hawaiian Electric shall clearly explain ancillary service, system balancing, and other relevant reliability planning criteria rules used in its modeling. Then, Hawaiian Electric shall offer these preliminary findings to the TAP for independent analysis and specific recommendations to adopt (either in full or modified) or reject each of the above alternatives. Hawaiian Electric shall seek this feedback from the TAP, in writing, and file it with the Commission no later than May 21, 2021. Once the Commission has reviewed the TAP's recommendations, the Commission will discuss the TAP's recommendations with the Parties at the technical conference, discussed further below. Hawaiian Electric shall be prepared to explain its recommended path forward for each item at that time, taking into account stakeholder feedback.

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[116]See Updated Workplan at 32.

Hawaiian Electric has already responded to certain concerns from the Joint Parties, the TAP, and Ulupono, regarding granular load forecasts, stating that it has provided updated granular load forecasts and will "add additional explanation on how the sample days are selected[.]"[117] Given this ongoing discussion and work, the Commission directs Hawaiian Electric to continue discussing with the TAP and with the Parties, and prepare to transparently explain the following decisions at the technical conference: (1) whether the additional information on RESOLVE Day Weights, Daily Loads, and Sample Days Hawaiian Electric has noted it will provide meets Parties' needs; (2) whether the bookend sensitivities adequately consider an appropriate range of scenarios, including a "worst case scenario"; (3) whether updated modeling of DERs appropriately captures pricing, potential, and uptake; and (4) whether system balancing and ancillary service rules are clear and justified.

Finally, the Commission notes Ulupono's concern that the TAP is heavily weighted towards industry-affiliated members and its recommendation to add experts largely from research institutions to the TAP.[118] The Commission is also concerned that the TAP provided only a brief, and high-level summary of the

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[117]Hawaiian Electric Reply Comments at 27.

[118]See Ulupono Comments at 14.

First Review Point.[119] After review, the Commission agrees with Ulupono's concern and directs Hawaiian Electric to add at least one expert on utility systems modeling to the TAP, ideally from the list of Ulupono's recommended experts. Should none of the recommended experts be willing and available, Hawaiian Electric shall work with Ulupono and the Stakeholder Technical Working Group to determine at least one suitable addition to the TAP. Ideally, Hawaiian Electric will expand the TAP in time for the new member(s) to provide feedback on the grid services and planning criteria discussed in this Section. If Hawaiian Electric has not added such a new member to the TAP by the June 4, 2021 technical conference, or if the Commission continues to have concerns with the TAP's work product, the Commission will consider appropriate alternatives.

H.

Data Access and Transparency

The Commission recognizes and appreciates Hawaiian Electric's efforts to provide transparency and access to data as part of the IGP process. The recently developed Excel workbooks documenting many input and assumptions are a significant improvement to IGP that will strengthen the contributions of

[119]See First Review Point, Exhibit A3.

stakeholders and the credibility and usefulness of the resulting plans. But Hawaiian Electric must continually improve access to IGP data and qualitative information. This includes revising IGP webpages, timely notifying Parties via email with direct links when Hawaiian Electric post updates to major work products and carefully following Commission-recommended procedures when providing any spreadsheet or workbook within the IGP process. Therefore, the Commission provides the following direction for improving communications focused on ease of access to information and data transparency.

1.

Access to Information

Currently, the IGP webpages contain a vast amount of data, information, and notes from stakeholder meetings. However, the information is organized by working group and by meeting date, requiring stakeholders first to click through multiple webpages and then to either know which working group and meeting covered relevant topics, or to search through often voluminous meeting materials individually. Hawaiian Electric must streamline the IGP home webpage to improve access to information and offer a simple directory to IGP materials.

In particular, the IGP homepage must provide clear links to: (1) the most up-to-date version of Hawaiian Electric's IGP

workplan; (2) the overall IGP timeline, where Hawaiian Electric currently is in the timeline, any upcoming meeting dates, dates to provide feedback, and other decisions that stakeholders should be aware of; (3) a list of active working groups, their scope of work, existing work products, information on how to get involved, and upcoming meetings; and (4) an up-to-date directory to or listing of information and data, organized by topic, including links to relevant Commission orders, a clear and easily accessible repository for quantitative data that delineates the most recent version of documents but also archives previous versions to allow for easy comparison of updates over time, and a list of past working groups and their work products. When organizing and presenting IGP information by topic, Hawaiian Electric must still maintain meeting dates and dates when information was presented. When updating existing IGP documents, Hawaiian Electric must provide narrative summaries of the changes made, and redline/strikeout versions of the prior document, to make it easy to see what changes have been made, and where.

Hawaiian Electric must also update its IGP webpages more frequently and improve communication about webpage updates. For example, the second item on the IGP homepage lists a meeting

for the "Soft Launch" on March 3, 2020[120] and the Stakeholder Engagement landing page currently lists an upcoming meeting for the Stakeholder Council on August 18, 2020, and was last updated in July 2020.[121] These pages are obviously out of date. Hawaiian Electric must update IGP webpages at least monthly or when new stakeholder meetings are scheduled. Each page should clearly show when the webpage was last updated. This is critically important when there has been a re-organization of the stakeholder engagement processes or working groups (such as changes to the Stakeholder Council, the creation of the Stakeholder Technical Working Group, and the shifting of work and deliverables between working groups). In essence, Hawaiian Electric's IGP webpages must make it clear, at a glance: what has happened in IGP, what is happening in IGP, and what is going to happen in IGP. Hawaiian Electric shall dedicate the necessary resources to make this happen.

The Commission is also concerned that Hawaiian Electric updates IGP webpages without notifying Parties, which places the burden on Parties to frequently check back for updated information.

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[120] https://www.hawaiianelectric.com/clean-energy-hawaii/integrated-grid-planning, accessed March 22, 2021.

[121] https://www.hawaiianelectric.com/clean-energy-hawaii/integrated-grid-planning/stakeholder-engagement, accessed March 22, 2021.

For example, to the Commission's knowledge, Parties were not made aware that the Inputs and Assumptions workbook had been updated on March 12, 2021, which is listed under the September 25, 2020, date on the Forecast Assumptions Working Group Documents page. Hawaiian Electric's approach of updating documents and listing them under the dates they were previously provided removes previous versions that are important to preserve for comparison and for archiving the evolution of the process. This also buries updates under old meeting headers, making them difficult to find. For this reason, the Commission directs the Company to notify Parties via email with direct links when the Company has posted updates to any working group's work products. Hawaiian Electric shall allow individual stakeholders to opt-out of these emails upon request. In listing updates to working group materials on IGP webpages, Hawaiian Electric shall post in reverse chronological order, so that the newest document is at the top and the oldest is at the bottom.

2.

Transparency

The Commission believes that IGP stakeholders can and will provide important feedback on quantitative data. As noted above, Hawaiian Electric provided updated workbooks of Inputs and Assumptions to stakeholders on February 18, 2021, March 12, 2021,

and again on March 30, 2021, through its IGP webpages, without explaining what updates it made to the workbooks. This places the burden on stakeholders to surmise what updates were made and why. So that stakeholders may fully understand changes to quantitative data and provide informed feedback, the Commission directs Hawaiian Electric to do the following with any spreadsheet and/or workbook provided within the IGP process: (1) provide a clear narrative explanation; (2) provide only live and unlocked workbooks with cell logic intact; (3) use plain language to describe data, tabs, and cells; (4) provide references or citations for all data included; and (5) format every document to improve user understanding.

Narrative explanations. Every IGP workbook or other presentation of quantitative data must contain an introductory tab in the spreadsheet itself, rather than as a separate document, to facilitate ease of access to and understanding of the information therein. The narrative must clearly and in plain language explain what the spreadsheet is intended to convey, the contents of the spreadsheet, the date it was provided, and any instructions for users. If the spreadsheet uses any acronyms or other terms of art, it must also have a glossary with a clear explanation of every acronym and term.

Live and unlocked workbooks. Hawaiian Electric shall provide every spreadsheet in only live and unlocked workbooks with

cell logic intact. This is critical to understanding derivation and interconnection of data and helps users to better connect the dots across data points to follow the narrative of workbooks.

Plain language. Plain language to describe data, tabs, and cells is critical to helping stakeholders understand IGP processes and decisions. Wherever possible, Hawaiian Electric must provide plain language descriptions in all spreadsheets. If it is not possible to use plain language due to cell logic references, Hawaiian Electric must provide clear descriptions of the data instead.

References. Hawaiian Electric must provide references or citations for all data it includes. If Hawaiian Electric developed that data internally, it must explain how the data were developed internally. If Hawaiian Electric got that data from an outside source, it must provide a direct link or other clear direction to that outside source.

Formatting. The Commission directs Hawaiian Electric to review how other utilities present their planning data, including Puget Sound Energy and AEMO.[122] Based on this review,

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[122]See Puget Sound Energy Resource Planning, available at: https://pse-irp.participate.online/2021-irp/reports, and AEMO's Integrated System Plan, available at: https://aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp. AEMO's "2019 Input and Assumptions workbook" provides clear presentation of key scenario data used as inputs in AEMO's market models. See "2019 Input and Assumptions workbook v1 5 Jul 20.xlsx,"

Hawaiian Electric must design and format every IGP communication to improve user understanding. For example, on a large scale, each document must be thoughtfully organized so that its contents are easy to find. On a small scale, every axis of every graph must be clearly labeled. Any acronyms or terms of art in these labels must be clearly defined.

The Commission has repeatedly emphasized the need for transparency throughout the IGP process.[123] The Commission appreciates Hawaiian Electric's efforts to solicit, track, incorporate, and respond to the significant number of comments received on the process and work products to date. However, Hawaiian Electric must do more to improve and streamline its data presentation and clarify its qualitative information to improve stakeholders' understanding of this complex and important work. The Commission believes that making these improvements now will be rewarded later in the IGP process with reduced time required to address comments and answer questions. The Commission will monitor these efforts and may provide additional guidance as needed.

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available at: https://aemo.com.au/energy-systems/major-publications/integrated-system-plan-isp/2020-integrated-system-plan-isp/2020-isp-inputs-and-assumptions.

[123]See Opening Order at 20, First Guidance Order at 6-7, Second Guidance Order at 13-15, and Third Guidance Order at 12-16.

I.

Energy Efficiency

The Commission recently stated that

> Hawaiian Electric should evaluate energy efficiency, like all demand-side resources, on a consistent and comparable basis with supply-side resources by incorporating the most recent potential study findings into IGP, by: (1) developing supply curves for energy efficiency; (2) modeling these supply curves as portfolio options that compete with supply-side options; and (3) explicitly analyzing for any cost and risk reduction benefits of demand-side resources.[124]

Hawaiian Electric responded that, "[i]t is not immediately clear what the Commission intends with its guidance regarding EE, given that EE is the responsibility of Hawaii Energy."[125] Hawaiian Electric also states that to model EE on a comparable basis to other supply-side resources, Hawaiian Electric would need Applied Energy Group ("AEG") to develop the following modeling inputs: (1) Annual developable potential for each modeled EE resource; (2) Hourly load shape of the EE resource; (3) EE resource service life and assumed annual degradation of the resource impacts, if any; (4) Annual cost of the EE resource; and (5) Operational limits on the EE resource that constrain its usage.[126]

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[124]Third Guidance Order at 6-7.

[125]Updated Workplan at 5.

[126]See Updated Workplan at 5.

Energy efficiency is an important system resource that is often least-cost, mitigates risk, and is critical to the State's clean energy goals. Although Hawaii Energy is the energy efficiency program administrator for the State, it is not relevant to the modeling who delivers the energy efficiency programs. Rather, Hawaiian Electric must allow all resources to compete equally within the capacity expansion model to develop the optimal portfolio of resources. This can provide valuable information to Hawaiian Electric and to Hawaii Energy about how energy efficiency resources can be designed and deployed most effectively to meet system needs. Additionally, the Commission notes that the Inputs and Assumptions workbook Hawaiian Electric provided on March 12, 2021, appears to include hourly energy efficiency impacts as a decrement to load and that Hawaiian Electric may also already have access to some of the data identified above as part of AEG's Market Potential Study. Hawaiian Electric shall obtain the outstanding inputs necessary to effectively model EE on a comparable basis to supply side resources.

The Commission intends to further explore how the model treats and selects DERs, including energy efficiency, during the coming stages of the IGP process. To facilitate this exploration and to prepare for modeling EE on a comparable basis to supply side resources in the solutions optimization phase, Hawaiian Electric shall discuss with AEG the scope of

work associated with developing each of the above identified data sets and prepare a summary of that discussion for the upcoming IGP technical conference. Hawaiian Electric should include Hawaii Energy in this conversation and invite Hawaii Energy to attend the June 4, 2021 IGP technical conference. The Commission will provide further guidance on this topic if needed.

J.

Summary, Next Steps, and Conclusion

1.

Summary

The Commission cannot accept the First Review Point as filed. Overall, the IGP process has strayed from its objectives. As detailed above, it does not sufficiently incorporate stakeholder feedback or otherwise explain the choice not to incorporate that feedback. Hawaiian Electric continues to materially update inputs and assumptions after the filing date. To correct this, as detailed above, the Commission directs Hawaiian Electric to: (1) adjust its resource/technology cost projections; (2) adjust its fuel price forecasts; (3) adjust and better explain its DER and load forecasts; (4) provide qualitative and quantitative summaries of LoadSEER findings and disaggregated location-specific load forecasts; (5) provide the results of the probabilistic DER hosting capacity analysis from the Synergi

circuit models; (6) demonstrate how the probabilistic forecasts developed with LoadSEER will inform the different reference case load forecast scenarios to be established using the "bookends" approach; (7) develop a retirement schedule for the baseline forecast; (8) further develop and clearly explain its modeling sensitivities; (9) better explain and analytically support its grid services and planning criteria; and (10) work with AEG to develop modeling inputs for energy efficiency.

2.

Next Steps

The Commission will host an IGP technical conference on June 4, 2021. The Commission or its designee will facilitate this discussion. Hawaiian Electric should come prepared to discuss how it plans to meet the directives in this Order.

Before the technical conference, Hawaiian Electric must: (1) convene additional discussions with stakeholders as described in Section III.G., above; (2) strive to expand the TAP in time for the new member(s) to opine on the resulting recommendations, as discussed in Section III.G., above; and (3) and prepare a summary of its discussions with AEG, as described in Section III.I., above. Hawaiian Electric must be prepared to discuss these results at the technical conference.

At the technical conference, Hawaiian Electric must come prepared to discuss its progress in developing revised Draft IGP Inputs and Assumptions, as discussed in Section III.A., above, and transparently explain: (1) whether the additional information on RESOLVE Day Weights, Daily Loads, and Sample Days Hawaiian Electric has noted it will provide meets Parties' needs; (2) whether the bookend sensitivities adequately consider an appropriate range of scenarios, including a "worst case scenario"; (3) whether updated modeling of DERs appropriately captures pricing, potential, and uptake; and (4) whether system balancing and ancillary service rules are clear and justified. The Commission hopes that this technical conference will start a new phase of IGP, which models better collaboration with stakeholders that Hawaiian Electric carries forward. To that end, the Commission invites any Party to propose agenda topics for the technical conference, and the opportunity to make a presentation on that topic. Any Party wishing to make such a proposal shall do so no later than May 21, 2021, by filing a letter in this docket. The Commission will then provide a detailed agenda for the technical conference.

After the technical conference, by June 18, 2021, Hawaiian Electric shall provide an updated timeline and stakeholder engagement plan that explains how it will implement the directives in this Order, and the date by which

Hawaiian Electric intends to file its revised Draft IGP Inputs and Assumptions. Hawaiian Electric shall file revised Draft IGP Inputs and Assumptions only after implementing the directives in this Order, the TAP has thoroughly reviewed the revised Draft IGP Inputs and Assumptions, stakeholders have had ample opportunity to provide corrective feedback, and Hawaiian Electric has either incorporated that feedback, or clearly explains why it did not. Hawaiian Electric shall file its revised Draft IGP Inputs and Assumptions no later than August 3, 2021. As Hawaiian Electric develops its revised Draft IGP Inputs and Assumptions, Hawaiian Electric may continue parallel efforts such as developing the long-term RFP concept, or the Draft Grid Needs Assessment, which the Commission will review at a later review point.

3.

Conclusion

Forecasts represent the foundation of the electric planning process. They allow planners to quantify the gaps between expected demand and supply that inform investment priorities to ensure the lights stay on. In addition to their central role in resource planning and rate cases, forecasts also influence the design of rate structures, customer programs, public policy, and utility risk mitigation strategies.

There is inherent uncertainty in predicting the future, so it is impossible to determine the accuracy of a forecast result *a priori*. Developing an accurate forecast is both impossible and paramount for effective and prudent planning. To address this paradox, and increase confidence in projections for an uncertain future, the Commission has repeatedly pushed Hawaiian Electric to employ best practices, focusing on stakeholder engagement, developing appropriate scenario and sensitivities, and pursuing complete transparency to enable effective review. By continually adapting these practices to address the evolving electricity ecosystem, Hawaiian Electric can demonstrate forecasting rigor and reasonableness through transparent justification of their forecast to stakeholders and the Commission. Once a reasonable forecast is established, subsequent planning steps can help prepare the electric system to serve customers, no matter what the future holds.

Although implementing the changes required in this Order will delay the IGP process, the Commission will not allow this to delay other parallel efforts.[127] The Commission greatly appreciates the hard work by the IGP stakeholders since this process began. IGP has progressed significantly since its inception, and the Commission believes that it will ultimately

[127]See Third Guidance Order at 17.

lead to valuable plans. By implementing the directives in this Order, Hawaiian Electric will bring IGP closer to its goals of a transparent, collaborative, customer-centric planning process that creates greater market opportunities for DERs, enables the development of an optimal portfolio of solutions, and benefits from truly independent technical review.[128]

IV.

ORDERS

THE COMMISSION ORDERS:

1. Hawaiian Electric shall revise its IGP forecasts and assumptions pursuant to the directives in this Order.

2. The Commission will convene a technical conference on June 4, 2021.

A. The Commission invites any Party to propose agenda topics for the technical conference, and the opportunity to make a presentation on that topic. Any Party wishing to make a proposal shall do so no later than May 21, 2021, by filing a letter in this docket. The Commission will then provide a detailed agenda for the technical conference.

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[128]See "Planning Hawaii's Grid for Future Generations, Integrated Grid Planning Report," filed on March 1, 2018, at 2.

B. Pursuant to Section III.G., above, regarding Grid Services and Planning Criteria, Hawaiian Electric shall seek feedback from the TAP, in writing, and file it with the Commission no later than May 21, 2021. Hawaiian Electric shall strive to expand the TAP in time for the new member(s) to provide feedback on the Grid Services and Planning Criteria.

3. By June 18, 2021, Hawaiian Electric shall file an updated timeline for implementing the directives in this Order, including an updated stakeholder engagement plan, and a projected date by which it will file revised Draft IGP Inputs and Assumptions, provided that the date for filing revised Draft IGP Inputs and Assumptions shall be no later than August 3, 2021.

DONE at Honolulu, Hawaii APRIL 14, 2021.

PUBLIC UTILITIES COMMISSION
OF THE STATE OF HAWAII

By James P. Griffin, Chair

By Jennifer M. Potter, Commissioner

APPROVED AS TO FORM:

Mike S. Wallerstein
Commission Counsel

By Leodoloff R. Asuncion, Jr., Commissioner

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CERTIFICATE OF SERVICE

Pursuant to Order No. 37043, the foregoing Order was served on the date it was uploaded to the Public Utilities Commission's Document Management System and served through the Document Management System's electronic Distribution List.

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COMMISSION

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