

IGP Technical Conference

Notes

June 4, 2021, 9am-3pm HST

On June 4th, the Hawaii Public Utilities Commission hosted a Technical Conference where Hawaiian Electric shared its progress in implementing the directives included in Order No. 37740, filed in Docket 2018-0165. RMI facilitated the Technical Conference and compiled notes in support of stakeholder discussions on the Draft IGP Inputs and Assumptions and related deliverables. These notes are intended to serve as a detailed summary of discussions.

Table of Contents

Meeting Overview.....	1
Hawaiian Electric’s Initial Plan to Revise Inputs and Assumptions.....	2
Deep Dive #1: Energy Efficiency Modeling.....	2
Deep Dive #2: Fuel Price and Resource Cost Projections	4
Deep Dive #3a: DER and Load Forecasts – Baseline Inputs and Assumptions	5
Deep Dive #3b: DER and Load Forecasts – Modeling Different Scenarios and Sensitivities	7
Party Presentation: Progression Hawaii Offshore Wind Long-Term RFP	10
Deep Dive #4: Resource and Reliability Planning Criteria	10
Opportunities for Process Improvements	12
Next Steps.....	14

Meeting Overview

Meeting Objectives

- Review progress updates in developing revised IGP Inputs and Assumptions
- Discuss major areas of stakeholder questions, priorities, and feedback on IGP work products filed for the First Review Point
- Lay the groundwork for a collaborative IGP process moving forward

Ground Rules

- Be present
- Come with an open mind
- Practice the democracy of time

Hawaiian Electric's Initial Plan to Revise Inputs and Assumptions

- Hawaiian Electric provided an overview of stakeholder meetings and early feedback that has been incorporated, as well as initial ideas for timelines and collaborative avenues moving forward.

Q&A: Hawaiian Electric Presentation

- When will we have actionable results from the IGP process?
 - Grid Needs Assessment planning starts after Inputs and Assumptions approval which would take 6 months. This would lead to sourcing (programs and procurements to meet grid needs), which would lead to a plan with action items. No firm date provided.
- How does Hawaiian Electric view the balance/portfolio of pricing, programs, and procurements in meeting grid needs?
 - A lot of this material comes from the DER docket, and Hawaiian Electric will model time-of-use in bookend scenarios, model DER programs in meeting grid needs, and look at procurements for cost-effective resources
- Comment: For any new filings, Hawaiian Electric should file 3 months in advance to facilitate better use of time and effort

Deep Dive #1: Energy Efficiency Modeling

- In the Review Point Order, the Commission stated that Hawaiian Electric should evaluate energy efficiency on a comparable basis with supply-side resources by incorporating the most recent potential study findings into IGP.
- The Commission stated that Hawaiian Electric must allow all resources to compete equally within the capacity expansion model to develop the optimal portfolio of resources and ordered Hawaiian Electric to work with Applied Energy Group (AEG) to obtain the outstanding inputs necessary to effectively model energy efficiency on a comparable basis to supply-side resources.
- The purpose of this deep dive was to:
 - Discuss why modeling energy efficiency as a resource is critical
 - Outline best practices in modeling energy efficiency as a resource
 - Identify foundational approaches for modeling EE that can be applied to other DERs
 - Understand recent discussions between AEG and Hawaiian Electric in effectively modeling energy efficiency on a comparable basis to supply-side resources.

Q&A: LBNL Presentation (Natalie Mims Frick and Tom Eckman): Treating energy efficiency and other distributed energy resources as selectable resources

- What other states and/or utilities are incorporating energy efficiency in their planning and modeling processes best that Hawaiian Electric can look at?

- Lots of utilities are considering energy efficiency as a selectable resource. The IOUs in the Pacific Northwest have been doing this the longest along with Northwest power and conservation council. Other utilities include several IOUs in Indiana, Xcel Minnesota, a little bit in Colorado. TVA and Duke have gone through some exercises of looking at energy efficiency as a resource.
- Both Oregon and Washington state Commissions have required consideration of energy efficiency as a selectable resource for IOUs at least 15 years.
- How do you see adaptive management analytically and in practice once a plan is in place as conditions change? What utilities can we look to where that is in place?
 - Using stochastic analysis, you can test various decision rules and agent-based analysis. You can test various decision criteria (e.g. long or short on energy margin), which helps you learn how to manage the system however conditions evolve in the future. When you see certain conditions evolving, you can reference that experience in your risk analysis and determine how to act accordingly.
 - Adaptive management focuses more on shorter (2-5 year) planning processes that can be changed based on conditions, rather than committing to new builds 10-15 years in the future.
- How do you develop supply curves that consider customer's decisions on participating in energy efficiency programs when electricity prices are variable?
 - Once you determine energy efficiency as a quasi-supply-side option, the utility is 'committing' up to a certain amount to pay for that resource plus administration, so the consumer's price is zero. Then the maximum incentive can be determined after the target is set assuming the utility would pay for the entire resource, though ratemaking does not necessarily have to be set like that. Set the target using a buy-out outright assumption, and then design the programs around rate design to incent purchase so you know it is cost-effective.
- How do you balance decisions between longer-term procurements and smaller resources?
 - If a longer-term resource is robust across a wide range of scenarios, then it could be a prudent procurement. The procurement could still be worthwhile if it is only valuable across a few future portfolios, but this all depends on management decisions.
- Is there a locational component to this evaluation of energy efficiency?
 - There certainly can be, but capacity expansion models do not typically involve locational characteristics, so this would probably need to be included in the inputs.

Q&A: Hawaiian Electric Presentation

- Can Hawaiian Electric do this (i.e., model energy efficiency as a selectable resource rather than a decrement to the load forecast)?

- Hawaiian Electric plans to incorporate energy efficiency as a supply-side resource.
- How do you appropriately bundle resources based on costs? What levels of granularity are meaningful for the modeling and development of supply curves?
 - This needs to be part of the discussions in setting up the modeling. What are the levels of granularity meaningful to modeling? The Company does have detail of data but needs to package that into supply curves.
 - This will be part of discussions as Hawaiian Electric outlines additional scope of work.
- How would Hawaiian Electric approach developing the packaging of energy efficiency measures outlined by LBNL? Does any of this change timing of IGP work?
 - Hawaiian Electric plans to model energy efficiency as a selectable resource, so that the capacity expansion model can select energy efficiency alongside any other supply-side resource. This will inform energy efficiency programs' cost-effectiveness and potential.
- Have you seen other states who have modeled energy efficiency as a resource include batteries as either an energy efficiency measure or modeled similarly?
 - In addition to energy efficiency, other utilities model battery storage, thermal storage, and distributed generation as selectable resource options in their portfolio, requiring the same types of information as energy efficiency resources for optimization. Electrification in general (and electrification of transport) has not been seen yet, but may be included as part of modeling efforts.
 - In theory when you're looking at supply curves, you can include solar, which works well for traditional energy efficiency. What Hawaiian Electric is trying to do in IGP is model the explicit energy efficiency programs and services, such as a dispatchable resource, to capture explicit values. They want to make sure neither to exclude nor double-count DERs.

Deep Dive #2: Fuel Price and Resource Cost Projections

- Fuel Prices:
 - Hawaiian Electric has been forecasting fuel prices using Facts Global Energy Forecast
 - The Commission requested Hawaiian Electric to explain why it chose the Facts Global Energy forecast over the publicly available EIA Advanced Energy Outlook Brent Forecast
 - The Commission also directed Hawaiian Electric to include a scenario using the Advanced Energy Outlook Brent Forecast that explained the major driver in the differences between the two forecasts.
- Resource Cost Projections:
 - Hawaiian Electric is using data from IHS Markit to project costs for PV, storage and onshore wind.

- The Commission directed Hawaiian Electric to include a sensitivity with the NREL Annual Technology Baseline for all resource cost forecasts and to explain the differences between the two forecasts.
- The purpose of this deep dive was for Hawaiian Electric to provide a status update on implementing the Commission’s directives, and a recap on recent discussions with Ulupono on this matter.

Q&A: Hawaiian Electric Presentation

- When you compared past forecasts to historical trend, which forecast were most accurate?
 - Going back 10 years, Facts Global Energy’s forecasts were a bit low and EIA projections were higher.
- How will the volatility in fuel price inform resource planning? How will you handle this range of uncertainty through adaptive management?
 - Hawaiian Electric will apply reference to all scenarios to test robustness against a high and low forecast. Running a high and low on every scenario may be too unwieldy.
 - Hawaiian Electric need to work with Ulupono to find the right reference forecast and then perform stress tests. The Company is considering using high forecast and stress testing on low forecast.
 - Comment: More discussion is needed as to whether Facts Global Energy should be used as low case and EIA is high case or whether they should be averaged. Now, both are presented as a reference forecast. There is merit in doing plans that are more renewable and less renewable to do stress tests and assess risk. It’s a major challenge to find out the reference forecast.

Deep Dive #3a: DER and Load Forecasts – Baseline Inputs and Assumptions

- The Commission directed Hawaiian Electric to prioritize customer demand side resources in the first IGP cycle and explain:
 - How it used LoadSEER and Synergi models to develop and inform DER and load forecasts
 - Include qualitative summaries and quantitative results of its LoadSEER and Synergi findings
 - Best estimates of tariffs and programs to inform the “adjusting layers” of the baseline load forecast
 - Which EV charging assumption it is using to inform the baseline forecast
- The purpose of this deep dive was for Hawaiian Electric to describe what DER, EV and TOU inputs and assumptions were used or are under development to inform the baseline forecast, and how the LoadSEER and Synergi models were used to inform the DER forecast.

Q&A: Hawaiian Electric Presentation

- Do LoadSEER and Synergi allow Hawaiian Electric to develop locational avoided costs for transmission and distribution upgrades?
 - It would be identified in the Grid Needs Assessment. For example, if there's a particular need (i.e. substation, transformer) those costs would be identified and then they could be used for an NWA type procurement
 - The Company would use a combination of LoadSEER and Synergi to derive those solutions
- How does the load forecast layer need to be adjusted to model DERs as a resource?
 - The work being completed now takes the current forecast and models them into Synergi to evaluate hosting capacity to interconnect the 5-year DER forecast (to be provided by August). Once the Company has the high DER scenario/forecast as part of the bookends, or if additional DER is selected through the capacity expansion model, then we can update those hosting capacity numbers and any necessary grid upgrades
 - Hawaiian Electric could have a higher DER scenario within RESOLVE and PLEXOS that can be modeled to provide grid services, then adjust the baseline layers
 - If it turns out that the analysis shows that we are selecting DERs above the adjusting layer in the baseline forecast, the Company would account for the full amount and go back into the baseline and make an adjustment to incorporate that level into the LoadSEER modeling and Synergi. For the purposes of identifying local benefits, system benefits are done through RESOLVE and PLEXOS.
- How is the market for additional opportunities that could capture more of the DER market (beyond what was laid out for residential owner occupied, single family and multi-family) included in the forecasting? For example, is Hawaiian Electric's rooftop demonstration included in projections and forecasts?
 - This is an area where Hawaiian Electric can provide a forecast for new programs and adjust the addressable market. Specific to rooftop rental, we haven't yet explored the potential for that program.
 - The Company might add community-based renewable energy and rooftop rental as additional opportunities.
 - The Company talked about three levers on the DER forecast, one of which is non-traditional market (e.g. virtual net metering) and system size (currently incentives are only for right-sizing systems rather than economically/maximized sized).
 - Bookends represent an opportunity to explore a larger expansion of the market, and are looking at specific proposals in the DER docket.
- In initial IGP runs, community-based renewable energy was assumed as a fixed MW assumption, is that still the plan?
 - We would need to agree on what to assume for the community-based renewable energy (CBRE) program; LoadSEER includes small CBRE projects

Deep Dive #3b: DER and Load Forecasts – Modeling Different Scenarios and Sensitivities

- In the Review Point Order, the Commission required Hawaiian Electric to clarify different bookend scenarios and sensitivities specifically providing the following directives:
 - Further develop and clearly explain the assumptions and calculations used to develop bookend scenarios and sensitivities
 - Provide a clear narrative that describes how the scenarios or sensitivities adjust data in inputs and assumptions workbooks
 - Demonstrate how the probabilistic forecasts developed with LoadSEER will inform the different “bookends” scenarios
- The purpose of this deep dive was to better understand the assumptions and inputs used to inform these bookend scenarios and sensitivities.

Q&A: Hawaiian Electric Presentation

- Can you explain the major differences in DER program proposals being used in the bookends?
 - The differences are in the incentive level (e.g. adoption of solar only versus solar + storage that affect uptake)
 - Rate design can also influence uptake
 - DER Parties proposed performance payments (not upfront) to recognize the value of the actual services being provided and focused on existing and new customers. Hawaiian Electric's proposals mostly focused on retrofitting existing programs and was only two years
- The upper end seems to be focused on centralized generation, ignoring the fact that you can use energy efficiency, distributed generation, hydro, offshore wind (even if there's available land). Is there a preference for centralized solar/wind to determine the bookends?
 - Hawaiian Electric think it's the opposite given how we are looking at the bookends. The layers are essentially saying that the various DER technologies are the primary lever that we're looking at (e.g. shape the load first) and can be shaped by the stakeholders' vision of the future

Party Q&A and Comments Shared After Technical Conference

- It would be helpful to know the underlying assumptions beyond HECO's managed charging layers.
- The EV forecast should account for Hawai'i's state and county commitments to EV transportation by 2045.
- EV load forecasts will be affected by the Commission's forthcoming decisions on TOU rates in the DER docket and the various electrification of transportation dockets. If these rates are approved before IGP is complete, then IGP may need to be updated to reflect this. For future IGP cycles, HECO should include EVs as a selectable resource, as it is now doing for EE. HECO should establish more

robust managed charging and smart charging programs, as are being implemented in Colorado. HECO should also begin developing programs for vehicle to grid services, as is being done in California.

Breakout Discussions

Participants were broken into random breakout groups and discussed 2 prompts.

1. *Do the proposed bookend sensitivity and additional standalone sensitivities adequately capture a range of DER and load forecasts?*
 - It may be useful to look at whether several of the potential DER business models, rates and programs discussed today and in the Stakeholder Technical Working Group meeting fit within the high case bookend.
 - Can the impacts/values of individual resources (e.g., energy efficiency, unmanaged EV charging, managed EV charging) be easily ascertained in the Bookends Scenarios? Is there a particular reason why Hawaiian Electric no longer plans to run these stand-alone sensitivities?
 - Yes. One reason why Hawaiian Electric doesn't plan to run these as standalone sensitivities is that the bookend scenarios cover them. The other reason why Hawaiian Electric doesn't plan on running these as standalone sensitivities is that the Company may not have enough time to do this.
 - There is an inability to isolate the effect of individual assumptions within the slower or faster technology customer adoption approaches, and the use of a range of DER forecasts that are not based on similar underlying assumptions.
 - How are the individual assumptions within the bookend scenarios being layered, and does the modeling allow for interactions between different assumptions (such as fuel prices and EV adoption)?
 - Recommend an individual scenario in which Hawaiian Electric models 100% rooftop solar uptake in Hawaii as a "max-DER" scenario.
 - Would like to see more details on where, when DERs show up modeled in scenarios.
 - The intent of the bookends is "DER first" and then the grid-scale fills in
 - There are different levers (cost, size, where sold). "High forecast" presumably means all "levers being fully pulled" and "low" as being the opposite
 - Still trying to grapple with whether resources should be on load forecast side or resource side. Resources may benefit from being on demand side since they are assumed at a fixed amount, as opposed to competing with other resources in the model.
 - Past projections from Hawaiian Electric have not been reliable; the inputs are really critical to understanding how accurate they are.
 - What information would be helpful to understand whether they are accurate or not?
 - Land use concerns, parking lots and consumer preferences
 - How will you take stakeholder input to form the bookend sensitivities?

- The Company is having discussions in other dockets (DER, electrification of transportation) to develop the different layers and haven't heard any feedback that those assumptions may be conflicting yet.
- Hawaiian Electric wants to cast a wide net approach at first.
- How and when do we want to align electric vehicle IGP planning with state and county goals for clean transportation? We already have 2025 goal in place at the county level, and other interim goals. The existing market forecast fall far below 2045 goal, so how do we get from market forecast to 100%?
 - Initial electric vehicle adoption rates for 2045: 51% Oahu is drastically different from 100%. There is a tension between overbuilding and underbuilding EV infrastructure.

2. *Are LoadSEER and Synergi models being sufficiently utilized and integrated into the overall IGP process?*

- LoadSEER and Synergi distribution analysis as part of an integrated system planning is cutting edge in the industry. It has two potential roles: i) distribution system upgrade needs (e.g., opportunities for NWA) and ii) hosting capacity, and increasingly to support the utilization of DER by assessing deliverability of DER services (not unlike transmission type deliverability analysis).
- Hawaiian Electric is currently using these models to determine Hosting Capacity and identify any needed distribution upgrades. Since LoadSEER has the capability of producing DER and electrification of transport related forecasts, do you plan to use the tool for these purposes as well?
 - No. These models are used to help assist with distribution planning. You need system-level DER and electrification of transportation forecasts for system planning. The DER and electrification of transport layers from the baseline forecasts will inform LoadSEER and Synergi modeling.
- What happens with the modeling if there is a policy or technology change that could cause some drastic change in the forecast. How would this change be incorporated in future IGP iterations? (For example, dramatic uptake in EV's because of Ford's electric F-150 announcement)
 - Once Hawaiian Electric will start providing the LoadSEER data, parties will have visibility around which circuits are saturated.
 - For load forecast, the Company is not really using LoadSEER other than for the peak forecast. Synergi is just a timestamp view, EPRI's tool is being used to consider dynamic input from those tools and can tell which hours of the day are a bottleneck.
- On the demand side, Hawaii has significant granularity of big commercial loads and they could be teased out separately from residential load to better capture benefits.

Party Presentation: Progression Hawaii Offshore Wind Long-Term RFP

- In the Review Point Order, The Commission invited any Party to propose agenda topics for today's technical conference, and to make a presentation on that topic.
 - Progression Hawaii Offshore Wind proposed that long-term RFPs be added to the agenda based on the importance of a LT RFP process in ongoing IGP efforts.

Q&A: Progression Hawaii Offshore Wind (Noe Kalipi and Wren Wescoatt): Long-Term Request For Proposal

- Given the 10-12 years to develop an offshore wind project and if we assume PUC will not release request for proposal tomorrow, when do you envision your system coming online the quickest?
 - If there is a request for proposal in 2022, we believe the offshore wind project Progression has been working on, could be operating by 2032. Bureau of Ocean Energy Management has a long leasing process that requires years of studies.
- Which jurisdictions do this best?
 - This is geared towards what we are doing now and what we need to do locally.
 - Hawaii is the only place where we have one utility. Given Hawaii specific market, isolation, DER penetration, what should we be doing here?

Deep Dive #4: Resource and Reliability Planning Criteria

- In the Review Point Order, the Commission directed Hawaiian Electric to:
 - Clarify how RESOLVE day weights, daily loads, and sample days were used in its modeling
 - File a unit retirement plan for use in the baseline forecast as part of its revised Draft IGP inputs and assumptions.
 - Better explain and analytically support its grid services and planning criteria
- Ulupono made several suggestions relating to grid services and planning criteria. The Commission would like to better understand the merits and drawbacks of both Ulupono's and the Companies' approaches and hear Hawaiian Electric's recommendations based on the TAP's review.
- The purpose of this deep dive was to:
 - Clarify how RESOLVE day weights, daily loads, and sample days were used in its modeling, and discuss whether this meets Parties needs
 - Provide an update on retirement schedules under development for the baseline forecast and relevant sensitivities
 - Clarify the impact of system balancing, ancillary services and other relevant reliability criteria rules and assumptions used in its modeling
 - Review initial recommendations based on stakeholder discussions and the TAP's review

Q&A: Hawaiian Electric Presentation

- Can RESOLVE provide output to retire certain fossil units, or does it have to be an input?
 - RESOLVE can economically retire units, which takes into account price of fuel, but does not accelerate fossil retirements in large quantities or in a timely manner.
 - Unit retirements were included as inputs.
 - PLEXOS can tell Hawaiian Electric if certain units have low run levels and can inform retirements.
- When we arrive at a “no” in modeling process flow, does that mean RESOLVE re-runs and it finds a better solution, or is there a planning judgment required on the type of error?
 - It’s both. It’s never going to be black-and-white, there are many engineering judgments to decide which level to re-iterate or what level of manual adjustments to make (e.g. If we want to meet a minimum threshold of reliability, we need to figure out the extent we are short on reliability in short-term / near term versus short on reliability in the long-term, depending on magnitude, we may overlook the reliability shortfall if it is not a near term risk). Will try to be transparent on decision-making, but it’s difficult to determine the clear lines of judgment.
- While you can’t predict what you will do ahead of time, in revised submissions can you make it clear when the shortfall was found and whether engineering judgment and model re-runs were used?
 - Hawaiian Electric will bring RESOLVE runs and results to stakeholders to determine how decisions will be made and how the process will move forward into further modeling phases.
- Why did TAP not recommend the “worst day” scenario? You tell RESOLVE about everything you will encounter (e.g. 99% of days are sampled and 1% of weights have very difficult days) and then you are less reliant on the planning reserve margin, which affects all days,
 - The TAP did not intend to recommend against including the “worst day.” We did not find that including that day would preclude running additional capacity planning margin tests.
 - RESOLVE is probably not the right tool to be looking at the worst day. It’s meant to be a least cost optimization.
- Does the result from PLEXOS tell you how likely certain shortfalls are to occur to help inform the engineering judgment that you discussed?
 - PLEXOS can provide similar metrics as Hawaii Natural Energy Institute.
- Can TAP review inertia, frequency fast response, and capacity grid service definitions and methodologies to the extent that they’ll be included as constraints in the inputs and assumptions?
 - Yes, they can include that in TAP review.

- Comment: Many people assume high renewable grids will be high inverter-based grids, and that the capability will be there in next 10-20 years. This is saying we will make a 30-year investment in Synchronous Condensers, to meet a 5-year need.
 - The TAP encouraged Hawaiian Electric to model with forward-looking assumptions, but make sure that near term needs are also met. How to hedge near-term reliability and minimum investment is Hawaiian Electric's decision to make.

Opportunities for Process Improvements

- Parties expressed concern that their feedback had not been addressed or included.
- The Commission directed Hawaiian Electric to provide an updated timeline and stakeholder engagement plan for implementing its planned changes, incorporating directives, review from the TAP, and integrating stakeholder feedback.
- The purpose of this session is to gather stakeholder input to inform Hawaiian Electric's updated stakeholder engagement plan (due June 18) and to improve future IGP stakeholder engagement

Breakout discussions

Participants were broken into random breakout groups and discussed 2 prompts.

1. *What topics are most important for future stakeholder engagement? Why?*
 - The most important thing right now is to get the assumptions that go into the main models.
 - The inputs, assumptions and calculations used to develop bookend scenarios and stand-alone sensitivities (making sure they are clearly presented in organized workbooks).
 - Hawaiian Electric should follow through with what it says it will do in meetings and clearly document how changes occur between multiple iterations.
 - Large-scale projects are hitting more and more resistance in the area (e.g. Mountain View) because Hawaiian Electric does not secure enough community input in their development process. The simplest method would be for the Commission to open a docket to have a sit-down discussion to develop a better stakeholder process. Interested parties would include Consumer Advocate, Hawaiian Electric, developers, state energy office, Hawaii Energy, and others.
 - It seems that there are more and more topics added to each discussion, and it's not clear what topics need to be addressed in the first iteration of IGP. We could leverage stakeholder engagement to identify these priority topics. We 'shouldn't let perfect get in the way of good.'
 - It feels like Hawaiian Electric has had a "painful" number of meetings and not a lot of interacting leading to repetition. The recent direction from the Commission has helped.

- Stakeholders won't always agree which is hard to take into account and can get overwhelming. How do we (Hawaiian Electric) manage that responsiveness to stakeholders' concerns without going down a path of constant analysis. We need to reach common ground on what to do.
- I keep seeing the perfect being the enemy of the good. This was always meant to be multiple cycles but twice now we've been sent back and it is hard to make progress. Some stakeholders are trying to bake in their preferred outcomes to Step 1, even before we get to Step 2 or 3.
 - Stakeholders do have very different opinions but I do think the bookend approach can serve the variety of opinions that exist.
- IGP is focused on strategic issues, and so engagement should be about identifying what stakeholders see as strategic issues.
- We focus on strategic issues (as opposed to technical issues) because that's where outside perspectives can come in and help to shape the thinking and provide feedback that may not have come to the table in Hawaiian Electric's internal discussions. Hawaiian Electric should play a management consultant role on upcoming strategic issues—the role of Stakeholder council participants is to be able to provide serious strategic solutions, since they are being asked serious strategic questions.
- Is there a way we can make this run more efficiently? The purpose was to make the planning process faster and more iterative but we are 2 years in, and we're still addressing fundamental things.
- The models are complex. How much do we need to know?

2. *What resources are necessary for you to provide material feedback to Hawaiian Electric in ongoing IGP efforts?*

- There needs to be many more rounds of iterative review along with constant check-ins with the Parties and PUC along the way. At this early stage, it easy to talk in generalities but there is a lot that needs to be done to make this more concrete. There is a tendency and risk that Hawaiian Electric says it will do all of these things and then ends up not doing it. More frequent meetings with the PUC and stakeholders would help keep Hawaiian Electric honest and on track.
- Clear workbooks and narratives that are aligned with submitted workbooks submitted. Including with enough time to review.
 - The Excel workbook that Ulupono submitted with its First Review Point submission, which clearly laid out the back-and-forth discussion and iterations between Hawaiian Electric and Ulupono, is an extremely helpful tool.
- Open-source models would be helpful to see and learn what is going on in more detail (for example, have a preliminary illustrative model run that demonstrates why the model is picking particular resources at various times).
- Long term, a public-facing tool that allowed people to explore scenarios would be very helpful.

- For each stakeholder session, planning a good agenda for full collaborative participation. “Feedback on feedback” i.e. two-way communication.
 - Clear documentation and presentation of materials (better/simpler visuals and a clear presentation of stakeholder feedback).
 - Consistent communication, it is hard to stay up to date and remember after months of non-participation.
 - There is a need for increased transparency on the manual adjustments (Hawaiian Electric’s judgement) made to RESOLVE.
3. *What would need to be included in Hawaiian Electric’s updated stakeholder engagement plan for you to feel that your feedback has been addressed?*
- Building time into the schedule for multiple iterations and meetings to review each iteration. Changes made for each iteration should be clearly summarized at the beginning of each document and clearly laid out throughout.
 - Attending a meeting versus leaning in and participating are very different. Folks need to feel like they’re being heard. There must be a two-way communication. Stakeholders want to know that Hawaiian Electric hears the concerns of the stakeholders.
 - There is no expectation that everything will be accepted, but there is an expectation that stakeholders will receive status reports throughout the process on what can be done (why, how) and to which dockets.
 - Ultimately in the decisions that are made, stakeholders can see where their input was incorporated. It is important for us (Hawaiian Electric) to explain why decisions were made, and how stakeholder’s suggestions were adapted.
 - A clear and upfront plan and timeline for how they will solicit and address feedback on bookend inputs.
 - How does Hawaiian Electric like to receive feedback?
 - Emails are best. This gives folks time to gather up on their side and provide collected and thought-through feedback
 - In-person/virtual meetings are good to get the initial, knee-jerk reactions
 - How can stakeholders help when there is conflicting feedback?
 - It is helpful to have everyone’s opinion, and then we (Hawaiian Electric) can clearly explain how things went
 - Redlines on stakeholder feedback would be helpful. Addressing how stakeholder feedback was considered and/or incorporated.

Next Steps

- Hawaiian Electric will continue Stakeholder Technical Working Group meetings, vet changes with the TAP and refile inputs and assumptions by August 3rd.
- Hawaiian Electric will begin grid needs assessment following Commission approval.

