

IGP Stakeholder Technical Working Group Meeting

Wednesday, July 14, 2021

8:30am - 11:00am

WebEx

Attendees

WebEx

Marc Asano, HE

Christopher Lau, HE

Alex de Roode, Maui County Energy
Commissioner

Audrey Newman

Barry Usagawa, Board of Water Supply

Chris Yunker, HSEO

Clarice Schafer, HPUC

David Parsons, HPUC

Dean Nishina, DCA

Derek Stenclik, Telos Energy

Genevieve Lillis, RMI

Gerald Sumida, Carlsmith Ball

Gina Yi, HPUC

Grace Relf, HPUC

Henry Curtis, LOL

Jeremy Laundergan, EnerNex

Kat Hofland, ASU

Keith Yamanaka, DoD

Kit Batten, ASU

Lisa Hiraoka, DCA

Matthias Fripp, Ulupono

Michael Schwing, HSEO

Mike Wallerstein, HPUC

Murray Clay, Ulupono

Paul De Martini, Newport Consulting

Pete Polonsky, HPUC

Rick Rocheleau, HNEI

Robert Harris, Sunrun

Rocky Mould, HSEA

Rod Aoki, Rod S. Aoki Law

Samantha Ruiz, Ulupono

Stephen Mariani, HPUC

Steven Rymsha, Sunrun

Terry Surles, HNEI

Wren Wescoatt, Progression HI Offshore
Wind

Ken Aramaki, HE

Li Yu, HE

Christopher Kinoshita, HE

Collin Au, HE

Amanda Yano, HE

Brian Lam, HE

Ryan Murai, HE

Robert Uyeunten, HE

Talin Sokugawa, HE

Therese Klaty, HE

Anne Fuller, HE

Alyssa Nada, HE

Kent Kurashima, HE

Shuk Han Chan, HE

Lisa Dangelmaier, HE

Agenda

- Overview and methodology of each IGP sensitivity
- Seek input on assumptions to use for each sensitivity
 - Data needs
 - Adjustment to assumptions
 - Assessing resource portfolio resilience by modeling prolonged poor weather scenarios
- Resource additions to enable unit deactivation or retirement of generating units
 - 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.

Discussion

IGP Scenarios and Sensitivities

- I. Base Case
 - a. Stakeholder: What are the inputs for distributed PV and BESS based on?
 - i. HE: The Base case forecast is being revised for HE's proposal in the DER docket.
 - ii. Stakeholder: Is there a correlation made in the forecast between DGPV and EV adoption? From what we're seeing, most customers who purchase an EV also purchase or have DGPV.
 1. HE: EVs and DGPV are forecasted as separate layers.
 - iii. Stakeholder: Are rate design proposals also being considered?
 1. HE: Not at this time.
- II. Faster Customer Technology Adoption Bookend
 - a. Stakeholder: The objective of the bookend would be to determine the lowest and highest possible demand. Does it change the resource mix dramatically? If the same types of resources are selected, then perhaps we shouldn't focus so much time on one bookend, e.g., increased EV uptake, etc.
 - b. Stakeholder: Test the high and low end bookends first to determine the impacts, and then go into a more granular analysis.
 - c. Stakeholder: What about non-DER/EV TOU? Does that have a material impact?
 - d. Stakeholder: Suggestion to look at low-income customers with high electricity bills. If you provide them with another way to save, they would be interested in participating. Low income would not have DER or EV.
 - i. HE: The DER load shape could be applied to non-DER/EV TOU to account for LMI impacts.
 1. Stakeholder: Loadshifting for LMI could be considered from other jurisdictions. AEG also had information on TOU rates.
 - ii. HE: Need to file our assumptions in August so not a lot of time to develop a non-DER/EV TOU shape.

1. Stakeholder: Could assume 10% shift from peak to midday.
 2. Stakeholder: A lot will depend on the outcome of ARDS.
 3. Stakeholder: Subject to check, in California, default TOU rate is a 6% shift in load with education, 3-4% without education.
- iii. Stakeholder: Would TOU be available to all?
 1. HE: Yes, but not approved yet.
- e. Stakeholder: Would the results of this test be used for TOU programs for all customers?
 - i. Stakeholder: It would be more important to talk about how this would be used rather than how to model it.
- III. Slower Customer Technology Adoption Bookend
- a. Stakeholder: Please clarify what is meant by 'slower' customer adoption.
 - i. HE: The adoption rate for each technology would be on a slower curve. Effectively, the load would be higher than the customer adoption rate.
 - ii. Stakeholder: Please include clarification in writing.
 - iii. HE: We will include it in our inputs and assumptions update for August 3rd filing.

Potential Program Design

- I. General Feedback
 - a. Stakeholder: Would the inputs and assumptions be updated iteratively based on the results of these bookend analyses?
 - b. HE: We will have the base case, bookends, and other cases. The intent is to share the results of the RESOVLE cases with the working group to discuss how the results influence the near-term actions and whether there are modifications we make to the base case to move forward.

Other Sensitivities

- I. Low Renewable Generation
 - a. Stakeholder: Can you please describe how these inputs are derived?
 - i. HE: The graph shows the average rating factor across 10 years per hour. The solid lower line shows the average hourly minimum rating factor. We would model an 8760 profile using the minimum hour from the 10 years of data.
 - ii. HE: We're open to other methods to create that shape.
 - iii. Stakeholder: Focus on the single day with the lowest wind and solar production in the 10-year period. It should give you the lowest day in the 1-in-10 years event period.
 1. HE: We can look at the daily energy and use that instead.
 - iv. Stakeholder: You could pick the worst week or couple of days too.
 - v. Stakeholder: The worst day may be worse than the blue line you're showing. On an hourly basis, that might not tell you enough.

- b. Stakeholder: What are your key considerations for selecting which sensitivities you will run?
 - i. HE: We would determine that after our preliminary runs, to see which sensitivities have the largest impact to the resource plans.

Virtual Inertia Results

- I. Stakeholder: Are you saying that biomass will be built on all islands and geothermal will be built on Hawaii island?
 - a. HE: In the model, both biomass and geothermal are proxies for the types of grid services needed. We are not suggesting that biomass or geothermal will be the resource that is built.
- II. Stakeholder: But you're still saying that biomass is needed on Hawaii Island?
 - a. HE: Biomass and geothermal are proxies for the type of grid services that the system needs.
- III. Stakeholder: Could you please explain what inputs and assumptions went into these base cases? It looks different than what we've seen last year.
 - a. HE: The changes include updates to our resource costs since last year (NREL ATB, EIA), changes to the federal ITC schedule.
 - b. Stakeholder: What about retirement schedules?
 - c. HE: In our previous analyses from October, we didn't assume a set retirement schedule. Oahu has been updated to use the retirement schedule that we filed as part of the KES docket IR responses.
 - d. HE: Are you looking for a comparison of the assumption changes?
 - e. Stakeholder: It would be helpful to understand why there are more resources being selected than before.
 - f. HE: Once we finalize our base case assumptions, we can run a few preliminary plans and show what's changed. What is being shown here was just to test the inertia constraint, to show the impacts of having the inertia constraint switched on or off, and to show that other resources were still needed without the minimum inertia constraint.
- IV. Stakeholder: In the Oahu base case, are these replacements in the model for the Kahuku and Kawaihoa Wind projects? Are these units coming offline or new units coming online?
 - a. HE: We can have a discussion on this topic after our August 3rd filing. The intent of this slide was to answer the question of whether we should keep the minimum inertia requirement in the model.
- V. Stakeholder: For the simple cycle and combustion turbines, what assumptions go into that?
 - a. HE: We've selected resources that are typically used in the industry. Inputs include the manufacturer's equipment specifications, our IGP resource costs, and fuel type (e.g., biodiesel).
- VI. Stakeholder: Are you actively looking into studies regarding this, specifically grid forming inverters and batteries?

- a. HE: Yes, we had shared our island wide PSCAD studies in the working group meeting on June 30. The purpose was to include something directional in the modeling process. The studies indicated we'll need physical inertia in the foreseeable future.
 - b. Stakeholder: If the system needs to run on a combination of inverters and spinning machines, then that would be an update to the inertia requirement assumptions.
 - c. Stakeholder: In this comparison, it looks like what you're saying is the system still needs thermal units. My question is more of why do we need more thermal units?
 - d. Stakeholder: Recommend to get the inertia requirement right based on the studies. This also goes for the ERM requirement. If the inertia requirement is only for short circuit current, then that should be separate from inertia need based on synchronous machines/condensers.
 - e. Stakeholder: Are you saying that in your findings that you can replace synchronous machines with inverter-based resources on a one for one basis in year 2045? It would be helpful to have a better idea of all that was considered in this analysis.
- VIII. Stakeholder: What is the most efficient way of analyzing the inertia need? If you run RESOLVE with the inertia requirement, you may end up with too many resources than what is needed to meet the inertia requirement in the system security analysis. If you remove the inertia requirement from RESOLVE, you may need to redo RESOLVE with the inertia requirement if the system security analysis shows that the plan doesn't meet the inertia need. Which way is more efficient?
- f. HE: If we take the inertia requirement out of RESOLVE, we may not have to iterate all the way back to RESOLVE if system security shows the plan is short of meeting the inertia requirement. We may just need to redo PLEXOS. It may be a little less efficient to remove the inertia requirement from RESOLVE but it may remove some of the issues surrounding using inertia in RESOLVE. May just mean that we need more time to do the Grid Needs Assessment.
 - g. HE: The system security study will look into more than frequency stability needs, but also other system needs, such as voltage needs, fault current needs.
 - h. Stakeholder: Perhaps a different perspective might be, could the system security/stability analysis performed later test whether certain resources that are selected due to inertia needs (if retained as part of the Resolve modeling) can be eliminated without sacrificing system security?
 - i. HE: Link to slide deck from June 30 meeting (grid-forming analysis):
https://www.hawaiianelectric.com/documents/clean_energy_hawaii/integrated_grid_planning/igp_meetings/20210630_presentation_slides_igp.pdf

ERM Criteria Testing

- I. Stakeholder: Where did the 60% ERM come from? Wanted to know from a resiliency perspective.

- a. HE: For the small islands, the 60% was based on the loss of a largest unit.

Additional Comments

- Stakeholder: What is V2G?
 - HE: V2G is Vehicle to Grid
 - Stakeholder: How about ATB and AMI?
 - HE: ATB is Annual Technology Baseline and AMI is Advanced Metering Infrastructure.
- Stakeholder: Are the analyses for all islands combined, is that right? Or just Oahu? For low income people with high electricity bills, they would be highly motivated to adjust their time of use. These customers are unlikely to have DER or EVs. I think this would be worth including. Laundry too.
 - HE: There are models for each of the five islands. The sensitivities will be run through each model separately.
 - Stakeholder: Great! Would it be possible to have a meeting with our Molokai group to talk about the results of the Molokai sensitivities?
 - HE: Yes, we can arrange that.
- Stakeholder: This is a preprint of the paper we're working on, on the value of dynamic pricing in Hawaii with a lot of renewables. We'd be happy to share the load profiles in more detail if that would be useful. <https://uhero.hawaii.edu/variable-pricing-and-the-cost-of-renewable-energy/>
- Stakeholder: Some of the work we are doing in CA implies that TOU pricing would actually be detrimental to low-income families as they would be time-limited to change basic chores such as laundry and cooking. The tendency would be to favor folks who have the flexibility and resources to take advantage of TOU.
 - Stakeholder: Mahalo for that info. Good point and I can see that it's complicated.
- Stakeholder: Has there been any consideration of running a "No Offshore Development" in case offshore wind does not work out?
 - Stakeholder: This may be less of a concern if offshore wind is built further out in the resource plan.
- Stakeholder: Is there an estimated retirement schedule for Molokai?
 - HE: There's no planned retirements for Molokai and Lanai.
 - Stakeholder: When do you know the unit is defunct?
 - HE: The retirements described here for the other islands are for the purposes of modeling. There are, however, other ways we can look at retirement. For example, once we do all the analysis, if we see that a unit is not running, we may consider whether it is possible to retire it.
- Stakeholder: Have you performed any analyses on the costs and benefits of different retirement schedules?
 - HE: Our analyses on the ERM would likely shed light on that, as well as the high fuel sensitivity.
 - Stakeholder: Can you compare the additional O&M costs to keep the units online until 2045?

- Stakeholder: Perhaps it would be helpful to describe at what point the costs increase and you would then want to retire the unit and replace it with renewables?
- HE: We can look at the run hours and number of times these units start. These would be additional data points to consider.
- Stakeholder: For Lanai, what if we could build a large renewable system without a [undersea] cable and change the resource mix entirely. Is there a way to use that network to drive down the costs for those people?
 - Stakeholder: Interested in 100% renewables without any fossil units for Lanai.
- Stakeholder: Just reiterating a look at the proposed rate design changes in association with the bookends: a higher minimum bill + demand charge would likely result in an average \$70 a month bill for DER customers, which would likely eliminate a lot of the value proposition.
- Stakeholder: There is no way that solar can be built on land that has slope greater than 15%. It is difficult to build on land with slopes between 10% and 15% and would be very expensive. Before we assume that renewables can be built on land greater than 15%, we should check with industry.
 - Stakeholder: That assumption came from utility scale developers, but we are checking with others to verify.
 - HE: We can think about this and discuss at Friday's meeting.
 - Stakeholder: Think the industry standard is 10%, but 15% is possible.
- Stakeholder: We would need to be able to explain to the community/public why the utility would build new thermal units despite the goal of achieving 100% renewables by 2045. Suggestion to have community outreach.
 - HE.: Yes, that is definitely on our radar. As we build out our analyses and resource plans, once we finalize that, we'll need to work on the messaging to ensure we can clearly explain that.

Areas of Consensus

- Inertia does not need to be modeled as part of the RESOLVE analysis. System security performed at the end of the planning process will assess inertia needs. This may increase iterations and duration to complete the Grid Needs Assessment analysis.
- Evaluate non-DER/EV TOU impacts. This forecast layer will not be ready by Aug 3 but the Company will look into it.

Parking Lot Items

- No Additions

Next Steps

- Next Meeting July 16, 2021, 9AM HST

- If anyone would like to present on any of the topics at a future meeting, please let us know.
- Stakeholders may provide feedback on today's discussion to IGP@hawaiianelectric.com