IGP Stakeholder Technical Working Group Meeting

Friday, July 16, 2021
9:00am - 12:00pm
WebEx

Attendees

WebEx

Marc Asano, HE
Christopher Lau, HE
Addison Li, 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
Genevieve Lillis, RMI
Gina Yi, HPUC
Grace Relf, HPUC
Stakeholder Curtis, LOL
Jacqui Hoover, HIEDB
Jeffrey Burke, APS
Jeremy Laundergan, EnerNex
Kevin Favero
Kirsten Turner, HSEO
Kit Batten, ASU
Stakeholder Fripp, Ulupono
Michael Schwing, HSEO
Mike Wallerstein, HPUC
Stakeholder Clay, Ulupono
Noelani Kalipi, Progression HI Offshore Wind
Paul De Martini, Newport Consulting
Pete Polonsky, HPUC
Rene Kamita, DCA
Rick Rocheleau, HNEI
Rod Aoki, Rod S. Aoki Law
Samantha Ruiz, Ulupono
Stakeholder Glen, HSEO
Stephen Mariani, HPUC
Steven Rymsha, Sunrun
Terry Surles, HNEI
Stakeholder Wescoatt, Progression HI Offshore Wind
Ken Aramaki, HE
Li Yu, HE
Brian Lee, HE
Gemini Yau, HE
Lori Ann Fukuda, HE
Samantha Woodman, HE
Christopher Kinoshita, HE
Collin Au, HE
Amanda Yano, HE
Brian Lam, HE
Ryan Murai, HE
Robert Uyeunten, HE
Therese Klaty, HE
Anne Fuller, HE
Alyssa Nada, HE
Kent Kurashima, HE
Shuk Han Chan, HE
Lisa Dangelmaier, HE
Shannon Putnam, HE
Kurt Tsue, HE

Agenda

- Review of resource cost forecasts presented at June 4th Technical Conference
- Review of fuel cost forecast and sensitivities (high and low case) presented at June 4th Technical Conference
- Updated NREL solar and wind potential study based on Ulupono input
- Review of transmission analysis to identify renewable energy zones

Discussion

Resource Costs

I. Stakeholder: The NREL ATB 2021 update was just released. Would you be using those costs?
    a. HE: The costs shown are NREL ATB 2020 vintage. We'll review the new update from NREL.
II. Stakeholder: In the resource cost forecast, what is causing the inflection between 2030?
    a. HE: Driven by the source ATB forecast. Declining technology costs and learning curve improvements may cause costs to decline to 2030 but eventually costs increase in the long term.
    b. Stakeholder: Essentially no technology improvements after 2030?
    c. HE: Not to say there is no further improvements but inflation is driver for the cost increase.
III. Stakeholder: The orange bar for the onshore wind cost doesn't seem to track with what we're seeing.
    a. HE: We can follow up with you on this.
IV. Stakeholder: Is it true that HE believes there's no sites left for onshore wind?
    a. HE: We're using the NREL potential. However, what ultimately gets built is up to the procurement process.
    b. Stakeholder: It doesn't make sense to me to put in a faulty assumption into the model.
    c. HE: Are you suggesting we're taking onshore wind out?
    d. Stakeholder: Not exactly, I thought the agreement was to take costs relative to what we're seeing in Hawaii and align that to the NREL ATB trend.
V. Stakeholder: Does the levelized cost include the cost of land?
    a. HE: No. It's difficult to show the full costs without knowing where the project will be sited and those interconnection costs.
    b. Stakeholder: Agricultural lands that are not that optimal for agriculture could be used, so the relative costs may be minimal.
VI. Stakeholder: What is the lower blue line for PV? Are there comparable costs?
    a. Stakeholder: Suggest to use West Loch PV costs as a starting point. It has to be contiguous land. Should have a minimum capacity to tie to pricing.
VII. Stakeholder: It may be helpful to have the cost of fossil fuel to the graph so that people can make a comparison more easily. Need a conversion from dollar per barrel. ?

a. Stakeholder: Are you thinking more the avoided costs of fuels? They could put in a calculation and line for that as comparison.
b. HE: Yes, we can add it to the charts.

Fuel Costs

I. Stakeholder: Although the EIA high and low fuel prices appear unrealistic, throughout history there have been points in time where those costs were breached (e.g., due natural disasters). We should use something larger than +/- 15%.
   a. HE: Under the EIA high, the high prices are sustained for a long time.
   b. Stakeholder: If you look at the forecast from the mid 90's, we have been above the high fuel price forecast for quite some time.
   c. HE: For the purposes of a stress test, EIA high could be reasonable as long as we understand the impacts of what those higher fuel prices will result in.
   d. Stakeholder: Open to a range of forecasts. EIA and FGE are paid to do this more systematically so I don't know if we should change it.
   e. Stakeholder: Are you making any assumptions of moving to an import price?
   f. HE: In the event that we do need to import our fuel, say the refineries close, the Fuel Department feels it wouldn't have a significant impact on the overall price but be a small marginal adder.
   g. Stakeholder: What about Docket 2020-0090?
   h. Stakeholder: HE was supposed to go back to their Fuels Department to see if a larger % cost increase would be needed if we would have to import. The EIA high is a separate discussion. If we import, would the fuel cost be higher?
   i. Stakeholder: What type of fuel would be imported? It seems like from 2030, we might need to have an import-based cost.
   j. Stakeholder: Is there any pricing on these costs, if a refinery goes down, what would the imported refined product be? +/- 15% seems too low. Do we have something resembling a market bid/price for imported refined product? Could look at that differential today.
   k. Stakeholder: I think the docket with the Par agreement has some numbers though I think its confidential.
   l. Stakeholder: It's possible that contract vs import has enough of a difference to make a decision but I think what we are hearing is the difference isn't enough.
   m. HE: Would folks be comfortable with using the EIA high to cover some of the factors we're discussing?
   n. Stakeholder: I don't think I would be comfortable with that. The issue being raised is different. We are talking about an incremental addition to the cost due to a supply arrangement.
   o. Stakeholder: What I was proposing is 4 lines: EIA ref, EIA plus adder, EIA high and low.
   p. HE: Better to have 3 lines at most.
   q. Stakeholder: Is it reasonably certain we are going to switch to import pricing?
   r. HE: We can add the adder when we think the switch will happen.

s. Stakeholder: The high forecast is based on the cost of the resource itself, does not take into account the import arrangement. I do think that there is a significant increase in price if we are talking about importing. Maybe we can have fuel folks present why they think it is immaterial.
t. Stakeholder: The value of forecasting crude oil prices is to predict the price of low sulfur fuel oil that HECO will be purchasing. So if you are purchasing it after it has been brough to Hawaii and distilled here vs world market, there is a relevance to understand the price of crude as long as HECO is relying on LSFO.
u. Stakeholder: Please include diesel in the follow up discussion as that is used for the neighbor islands.
v. HE: We will set up a follow up meeting for those interested in this topic.
w. Stakeholder: Clarifying question for HE – who are the "fuels folks" you mentioned working with on this? Are these internal staff at HE, consultants or otherwise?
x. HE: Our internal HE fuels department.

NREL Solar and Wind Potential Update

I. Stakeholder: Are you following what is going on with city and county with setback for wind?
    a. HE: We are familiar with those bills and it is still uncertain how that will come out. It may affect what is able to be proposed in the docket. I want to go back to identifying needs and whatever the market is able to give then we will evaluate those proposals. While there is a proposal for a 5 mile setback, in terms of long term planning and assumptions, we can't keep on adjusting assumptions everything something may change.
II. Stakeholder: Using the resource potential maps developed by NREL, the red circles represent lands that are not available or optimal for building PV. Reference: https://www.hawaiianelectric.com/documents/clean_energy_hawaii/integrated_grid_planning/stakeholder_engagement/working_groups/stakeholder_technical/20210716_progression_hawaii_offshore_wind_presentation.pdf
    a. Stakeholder: I looked at PV 1-3, calculated 907 MW. It includes golf courses and class A land. The military land is land leased, Army owned, if available land costs will be higher.
    b. Stakeholder: We should try to have realistic assumptions. The higher resource potentials from Ulupono Scenarios (i.e., steeper slopes) are not realistic. A lot of the area is greater than 15% slope and too steep – I have not found a developer willing to build a project on this slope land for safety and technical reasons.
    c. Stakeholder: However, there are projects that are built on steeper slopes, e.g., Waianae Solar
    d. Ulupono maintains that a solar potential using a two cost structure for 0-15% and 15-20% slope land is prudent unless there are actually fata and facts that these lands cannot be developed. "Harder" projects will need to be developed to reach 100% RPS.

e. Stakeholder: This is meant to be a typical project that HE will see bid into an RFP. Smaller projects (3 MW) will have a different price from a 5 MW project, so those additional costs would also need to be included. As we go forward and some of these industry standards are not met, the cost will go up. I think the cost that was showed earlier was for a very nice ideal project. If we look at land that is steeper or have less irradiance, the price is going to increase and that has to be in the model. Can't keep same price.
f. Stakeholder: The NREL model is a gross screening model to look at the what-ifs of land potential. What is of importance now, is knowing what the inputs are going into these models. The goal now is to think about how to get to 2030 in the best way possible. The other point that hasn't been brought up is the socio-economic issues that are a part of this. Do people even want this?
g. Stakeholder: It is a rough screening process but there's a lot more land available than we need. If we say that we can only develop 10% of Class B and C lands, then we leave out a lot of developable lands. In reference to the costs, to build on smaller parcels or land that is steeper, we shouldn't just exclude those lands.
h. Stakeholder: It would be useful to look at a constrained case of solar and wind if it's not possible to build them to the resource potential. What do we do then?
i. HE: Thank you everyone for the valuable discussion. We agree, there are constraints on building new transmission and we will discuss that in the next section.
j. Stakeholder: If you restrict land available for solar, the more you get pushed into needing more biofuels, combined cycle plants and offshore wind plants. At a high level, this becomes the answer to that question.
k. Stakeholder: We just don't have a future market so we have to do our best estimating what the market will provide in the future.
l. Stakeholder: Another value of this process, aside from understanding what types of projects the model predicts are needed in the future, is to think about what steps we need to take to prepare for the resources with longer lead times for infrastructure and interconnection.
m. Stakeholder: Common standards are based on cheapest and easiest to develop. Projects being built now in Hawaii, it seems, do include 15-30% slope.

Renewable Energy Zones

I. Stakeholder: What project size are you considering for pumped-storage hydro?
    a. HE: We are looking for suggestions.
    b. Stakeholder: Lake Wilson would solve multiple issues.
    c. Stakeholder: Suggest about 150 MW pumped storage hydro.
    d. Stakeholder: If the study is meant to be technology agnostic, then perhaps you should remove the notation that it is for solar and wind technologies.
II. Stakeholder: Suggestion for clarity, to have an earlier community engagement step in the transmission REZ process, both in Step 6 and Step 2. It would be helpful to emphasize that more.

a. HE: Steps 1 through 4 describe the study steps for technical feasibility. The results would produce proposed optimal renewable energy zones that we would then share with the community and gather feedback.
b. HE: We are discussing internally how to socialize these concepts with the community sooner than later.
c. Stakeholder: Open to discussing community engagement opportunities offline.

III. Stakeholder: Can you use the second NREL study for the renewable energy zones selection?
a. HE: Yes, we can look at the updated renewable potential and see where they align.
b. Stakeholder: Is Schofield generator considered renewable and on military land?
c. HE: Yes
d. Stakeholder: Schofield burns 100% biodiesel?
e. HE: Yes
f. Stakeholder: Does this mean Schofield is excluded from this land?
g. HE: DOD lands are considered when DOD makes them available to us, so it is difficult to assume there is set potential there.
h. Stakeholder: I thought this was meant to be the technical potential, not what a landowner wants. If we change the focus to the perspective of what the landowners want, then all land potential becomes suspect.
i. HE: While we're looking at these lands, there will be potential corridors that will be picked up. The NREL study is being used as a basis.

IV. Stakeholder: In Group 4, HE had to bury the lines due to community concerns, is that being considered in your assumptions?
a. HE: No, that is not included.

V. Stakeholder: Are you considering putting in substations at the same time to reduce costs, or are you assuming that the developers will pay for that cost?
a. HE: If there is a need to expand existing transmission or substations (e.g., upgrade breakers, add gen-ties), then that would be packaged as an additional cost. This study is more of an initial step before we get into the details of associated costs. Costs related to the interconnection of specific projects (e.g., line extensions, new substations for interconnection, etc.) would be defined in the Interconnection Requirements Study for the specific project.

VI. Stakeholder: Does the third bullet mean that the generation is from existing plants to serve evening peak?
a. HE: Yes, it is from existing plants. In one scenario, we can describe the load as being served by one plant or a split between two, e.g., 50% Kahe/ 50% Waiau.

VII. Stakeholder: Regarding our earlier conversation, what if the NREL study is overestimating the developable solar resource on Oahu by 90%. Would the REZ Transmission lines still be feasible? I like the thoughtful planning, but it shows the importance of starting with valid assumptions.

VIII. Stakeholder: Which of the proposed black lines go through conservation lands?
a. HE: That is a good question, the intent of this illustration is to show where the lines could run, we haven't yet investigated the actual siting of the lines.

b. Stakeholder: When the original lines went in, in 1964 there were no EIS requirements. Now that there are EIS/EIA requirements and community concerns, it will be very difficult to achieve this.
c. HE: It would not be easy, but this is more illustrative to show what it would take to expand our existing transmission system to support the integration of large tranches of renewable energy.
d. Stakeholder: In terms of costs, are you considering offshore wind transmission infrastructure?
e. HE: We could incorporate those costs as an additional scenario.
f. Stakeholder: For example, BOEM is considering three offshore wind sites, would we want to include those into these analyses?
g. HE: In the NREL study that is being conducted for Oahu, the interconnection costs are included in the resource costs provided to us. We can follow up on what went into creating those interconnection costs.

IX. Stakeholder: When you say upgrade the conductor, are you saying upgrade from a 46kV to 138kV?
a. HE: Yes, increase the voltage.
b. Stakeholder: What will be the capacity of the larger 138kV?
c. HE: It is around 300MW.

X. Stakeholder: If you look at Group 4 - Zone 5 bus, is there enough land there to expand the infrastructure, or will it be relocated?
a. HE: We currently don't have that information.

XI. Stakeholder: Would the 138kV go along the roadside or be located further inland to avoid flood zones – regarding green dotted lines?
a. HE: The green dotted lines are the proposed new 138kV lines, and the blue lines are existing 46kV lines. So right now, they are shown as sections of the 46kV that would need to be upgraded.
b. HE: Although the new 138kV lines run alongside the existing 46kV, if necessary, we would need to relocate those lines to be out of the flood zones.

XII. Stakeholder: Would the transmission towers need to be taller to accommodate the increased voltage from 138kV to 345kV?
a. HE: Yes, in general any increase in voltage along our transmission lines will have major impacts externally (e.g., community) and internally to the Company. This is being shown as a technical option, but all the options must go through further analyses and evaluation.
b. Stakeholder: This discussion is very helpful to show us what it will take to get to 100% renewables.

XIII. Stakeholder: This is just for solar resources? If these maps were aimed at additional wind resources, we would be looking at increasing the lines where there's only capacity left so Kahuku mountains (not Kahuku town) and the Kahe ridge by Kahe Power Plant. We would also want to consider the three locations NREL is studying for offshore wind and determining what could be accommodated by the existing transmission infrastructure. What would the transmission upgrades look like for that? Another thing that would be helpful aside from the system build out, a couple of years ago, HE

provided maps to developers via NDA (non-disclosure agreement) process (Land RFI) to show what was the available interconnection sites and capacity.

a. HE: We will look at adding the latest NREL study results to this report.

XIV. Stakeholder: Are you putting any of these transmission costs into the RESOLVE model?

a. HE: Yes. We will be including the interconnection costs for the various zones.
b. Stakeholder: You could probably model transmission between zones, as a separate investment. Effectively these are just feeder ties/gen-ties back to the system, so in some situations there might not be transmission expansion costs.
c. HE: We're going to break up the solar options into zones in RESOLVE.
d. Stakeholder: There is a risk that after we come up with the plans and go to the public, the public may not want transmission lines near their homes. It will be iterative for sure, but a good start.

XV. Stakeholder: Has HE considered any future procurements by REZ? HE could also consider awarding RFPs based on preferred locations.

a. HE: That would be the idea, to figure out what is the interest from the market to bid into a REZ.
b. HE: All transmission line upgrades require extensive community outreach before they get approved or constructed.

Additional Comments

- Stakeholder: Regarding Hawaii Island Near-Term Grid Needs Assessment document, https://dms.puc.hawaii.gov/dms/DocumentViewer?pid=A1001001A21G15B33213H01082, will the Hawaii Island Grid Needs Assessment be filed in 2018-0165 too?
  - HE: We'll check with our internal team and let you know if we'll file in the DER docket as well.
- Stakeholder: Just a quick note, the proposed REZ approach is largely consistent with what we have been trying to encourage but I agree that community outreach needs to be earlier.

Areas of Consensus

- HE to review resource costs forecasts
  - Adjust PV and wind costs for recent projects (e.g., West Loch, Na Pua Makani)
  - Calibrate consistently and note whether all the resources are factoring in land costs
- Update resource costs for the recently released 2021 NREL ATB
- Consider transmission needs for offshore wind locations based on the NREL offshore wind report
- Community engagement is needed early in the process to communicate additional transmission needs

Parking Lot Items

- No Additions

Next Steps

- Schedule follow up discussion on fuel price forecasts. Consensus has not been reached.
- Stakeholders may provide feedback on today's discussion to IGP@hawaiianelectric.com