

**TAP Resource Adequacy and Modeling Subgroup
06/02/2022**

This feedback to HECO is based on HECO's slides and presentation on 06/02/2022.

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Other participants on the call

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Sub-committee chair summary:

HECO provided an update to the TAP subgroup, based on slides sent in advance, on the latest work related to resource adequacy. First, the TAP discussed the new distributed PV data based on the NSRDB instead of historic monthly capacity factors, as had been suggested on the last call. Results showed a less reliable system when using new data – discussion focused around the potential need to develop new high quality datasets.

Most of the discussion related to the new results based on updated outage rates – these reflected more recent actual outage rate experience. In general, they make reliability results worse, and potentially show the need for firm resources (thermal) in a 2029 case, even if renewables were accelerated at a high level. Several suggestions were made, particularly around additional cases with intermediate levels of renewables between the Base (582 MW) and Base_Accel (2,159 MW) case and firm resource amounts between 0 and 300 MW. Ideally, costs would also be considered to show the reliability-cost-resource tradeoffs.

The final subject, on using HDC curves for thermal as well as renewables, was covered quickly and will be a focus of future TAP subgroup meetings.

TAP feedback and comments are divided into three categories:

1. Informational, no action needed
2. Action required, expected in coming months
3. Concern or suggestion, for future discussion or consideration
4. Clarification needed

TAP Comments During the Meeting and HECO Responses

- DPV data
 - Capacity factor of existing HECO data had higher output compared to NSRDB data provided
 - Metrics were worse as might be expected by lower capacity factor (and in line with discussions from previous call)
 - What's used for utility solar? Also NREL data
 - Other analysis (HECO, Telos both performed) may have overestimated simulated solar output from the utility-scale projects relative to actual. However this is tough to calibrate because the actual data is in MW, after curtailment.
 - Trying to determine sources of NSRDB errors. Is it the irradiance data that is off (NSRDB) or is it the conversion to power (System Advisor Model)
 - Much of the error may be on tracking systems – potential calibration on SAM
 - Action: Recommend HECO develop a long-term historical record of correlated wind and solar data for each island, potentially contracting with a third-party vendor for the dataset. This is not needed in the near-term, and HECO's approach is reasonable for now.
 - Action: need to think about updating DER and maybe all solar data
- Outage rates
 - Increasing outage rates increased potential need for firm generation

- Base_Accel is where additional renewables built in 2030 are moved to 2029
- Could Base Accel also have a sensitivity with new VG beyond moving the 2030 forward?
- Outages happening during high thermal resource days
- HECO: will assume recent outage rates and showing new results based on those
- Reliability seems to be impacted more by outage rates than solar penetration at Base, but with Base_Accel, there may be more of an impact from solar availability as well as outage rates
- More analysis needed to determine whether outage rates are suitable relative to historical record and trend in the data.
- Not sure whether 300 MW firm is needed? HECO: planning to procure additional firm – 200 MW-300 MW solar +storage, beyond 582 MW shown on slide 14. Looking to also add transmission to get more than that. Firm generation is 6*50 MW CTs
 - May want to look at a variable amount between 582 MW and 2159 MW
 - Also look at higher storage amounts?
 - HECO clarified that storage is charged by thermal or variables
- Would need better view of variable for thermal needs to be determined – maybe at higher solar penetration long duration storage (e.g. hydrogen) becomes attractive and may be an option compared to thermal capacity
 - Could HECO look at 150 MW or 100/200 MW firm instead of 300 MW?
 - Focus should be on high variables case, and whether still have a need for thermal capacity – Will additional variable renewables enable additional retirements of existing, less-efficient resources such that there are net emissions reductions even though new thermal capacity is added to maintain reliability?
 - EVs are expected to ramp up by 2030 so might be that being long (300 MW) is worth it
 - Operational flexibility is very important for all of this and should be main way of thinking about this from operations perspective.
 - Perfect foresight assumptions should be examined in detail – does that overly optimize resource mix? No forecast uncertainty modeled currently
 - May want to model the forecast uncertainty
 - Could costs be shown for different cases in the future?
- HECO asked the TAP if they thought their analysis justified a need for a firm resource. However, the TAP should be focused on methods, assumptions, and analysis – and not being asked to weigh in on the need for new procurement.
- Before using this analysis to potentially justify a new firm resource procurement, HECO should clearly show alternatives (i.e. more storage, solar+storage, and solar+4-hr storage) and both the resource adequacy results and cost comparisons.
 - After Stage 1 and Stage 2 deployment and additional thermal retirements, the system is likely at a point where energy limitations (on charging the storage) are the main resource adequacy challenge. But HECO should evaluate this explicitly.
- HDC updates
 - Short update provided by Marc, but will discuss more in future
 - Different HDCs were applied to thermal to reflect outages as discussed on last call