Hawaiian Electric

# IGP Technical Advisory Panel

March 10, 2022

# Agenda

- Provide overview of Order 38253 issued on March 3, 2022
- Present a proposed process and assumptions for conducting the probabilistic Resource Adequacy (RA)

# Summary of IGP Order 38253

## Accepted Items

- Ample opportunities for stakeholder feedback
- Description of purpose/functionality of modeling tools
- Assumptions and models HE used to develop the underlying load forecasts
- Assumptions for each of the five DER forecasts, range of the forecasts, and use for the scenarios and sensitivities
- EV inputs and assumptions
- Fuel price forecasts
- Resource potential using the Alt-1 scenario but agrees that an appropriate cost adder must be included for development on sites with slopes greater than 15%
- Data presentation

## Items to be revised to finalize the I&A

- Update Underlying peak forecast for 2017 class load study
- Adjust EE for free-riders, June 2020 C&S, and include all other Achievable Technical Potential in supply curves
- Justify not including a low fuel price forecast in any scenario
- Include a capital cost adder of five cents per watt for utility-scale PV on slopes greater than 15%
- Model a faster customer technology adoption scenario in addition to the high and low load bookends
- Analyze how proposed unit retirement plans affect the optimization of new resources, outside of RPS compliance
- Add comparative statistics and historical data for forecast layers
- Update the IGP webpage for process graphic, model description, meeting recordings, and descriptions of working group pages

## Items to be revised in the future

- Include TAP review as part of all review point filings
- Develop alternatives to HDC approach
- Develop different scenarios for underlying load
- Establish a plan to integrate AMI data
- Model EE supply curves in all load sensitivities, include historical program impacts and future C&S within load forecast, and provide clear definitions of free-riders and naturally occurring EE
- Work with stakeholders on how additional resource cost adjustments will be factored into REZ analysis
- Assess the incremental cost and potential for wind and solar projects to be developed on DoD lands
- Evaluate base and high EV adoption with and without managed charging
- Consider economy wide policy and GHG performance in scenario design
- Open access to the modeling tools

# Stochastic Assumptions

- 250 samples – based on a balance of LOLE convergence and reasonable run time (less than a day)
  - 50 outage draws x 5 years of PV and wind patterns (2015 – 2019)
- Test year would be based on the specific year identified for a future procurement to confirm the reliability need
- Outage draws are weighted more heavily as part of the sampling because of concerns with continued reliability of the thermal generating fleet as they age through the planning horizon.
  - As variable renewable resources are added through future IGP cycles/procurements, additional weather years can be added and outage draws reduced, with consideration for the test year and any future firm unit additions

# Assumptions

- Thermal Units
  - 50 outage draws
- PV
  - 5 years of NREL data (2015 - 2019) from Resource Potential study
- Wind
  - 5 years of historical data (2015 - 2019)
- Hydro
  - 5 years of historical data (2015 - 2019)
- Load
  - Future cycles may consider adjustments to the modeled load, either through scenario analysis or correlations developed against historical temperature/humidity

# LOLE Benchmark Testing

- The Company's 2021 calibration factor report will be used to establish an LOLE benchmark that represents the current system.
- This LOLE benchmark is specifically for testing purposes, to measure against the LOLE resulting from the probabilistic RA conducted on the RESOLVE resource plans per the IGP modeling framework.

# Calibration Factor Report

- The calibration factor is determined by using PLEXOS to simulate the operation of the utility production system for a recorded year, called the “calibration year,” and determining the ratio between the model outputs and recorded amounts for the calibration year.
  - The calibration factor is a constant multiplier used to adjust the fuel consumption determined by a computer production simulation to account for actual operating conditions that are not accurately simulated by the computer model.

See Hawaiian Electric’s 2020 Report here: https://dms.puc.hawaii.gov/dms/DocumentViewer?pid=A1001001A21C15B53358E01738

# Reliability Indices

- The probabilistic RA will examine the following reliability metrics:
  - LOLE
  - LOLH
  - LOLEv
  - EUE

# Modeling Issues

- PLEXOS reliability indices are calculated in the LT and MT phase, before the ST hourly simulations. LOLE is manually calculated from simulated hourly data.
  - Can the built in PLEXOS reporting calculate a range of statistics for all the samples from a single test?
  - Should the sample results be summarized at certain percentiles? P90? P80? P50?

# O‘ahu Renewable Firm RFP

- Seeks to acquire 500-700 MW of capacity
  - 300-500 MW in service by end of 2029
  - 200 MW in service by end of 2033
- Assumes existing facilities such as Kalaeloa would need to submit a bid
- RFP targets were based on capacity needs identified using the August 2021 IGP inputs and assumptions including:
  - Sales forecast
  - Assumptions to no longer dispatch certain existing firm generating units
  - Considerations for developable resource potential from the NREL Alt-1 and Land Constrained scenarios

See https://www.hawaiianelectric.com/documents/clean_energy_hawaii/selling_power_to_the_utility/competitive_bidding/oahu_renewable_firm_rfp_transmittal_exhibit_1_background.pdf

# Next Steps

- Test the probabilistic resource adequacy for the O‘ahu Renewable Firm RFP targets