



Integrated Grid Plan

Stakeholder Council Meeting

June 1, 2020

LISTENING+ INTEGRATING+ COLLABORATING
to Reach 100% Renewables



Meeting Agenda

1. Welcome
2. Review Point Letter and Filing
3. Stage 2 Final Award Group Summary
4. Proposed Services for IGP
5. Looking Ahead

Nov '19	<ul style="list-style-type: none"> • Update on Working Groups • Challenges the Company Faces
Jan '20	<ul style="list-style-type: none"> • Review Preliminary Forecasts and Other Assumptions • Review Resilience Planning Criteria and Resilience Modeling Information • Public Meeting Preview
Mar '20	<ul style="list-style-type: none"> • Review Forecasts and Other Assumptions • Modeling Sensitivities (SEOWG) • Public Meeting Recap
May '20	<ul style="list-style-type: none"> • Review Stage 2 Final Award Group • Review Solution Optimization and Evaluation Process and Methodologies
Aug '20	<ul style="list-style-type: none"> • Review Needs Assessment Preliminary Results
Jun '21	<ul style="list-style-type: none"> • Review 5-Year Resource and T&D Solution Sourcing Preliminary Results
Nov '21	<ul style="list-style-type: none"> • Review Solution/Bid Evaluation and 5-Year IGP Plan

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Revised IGP Workplan and Schedule

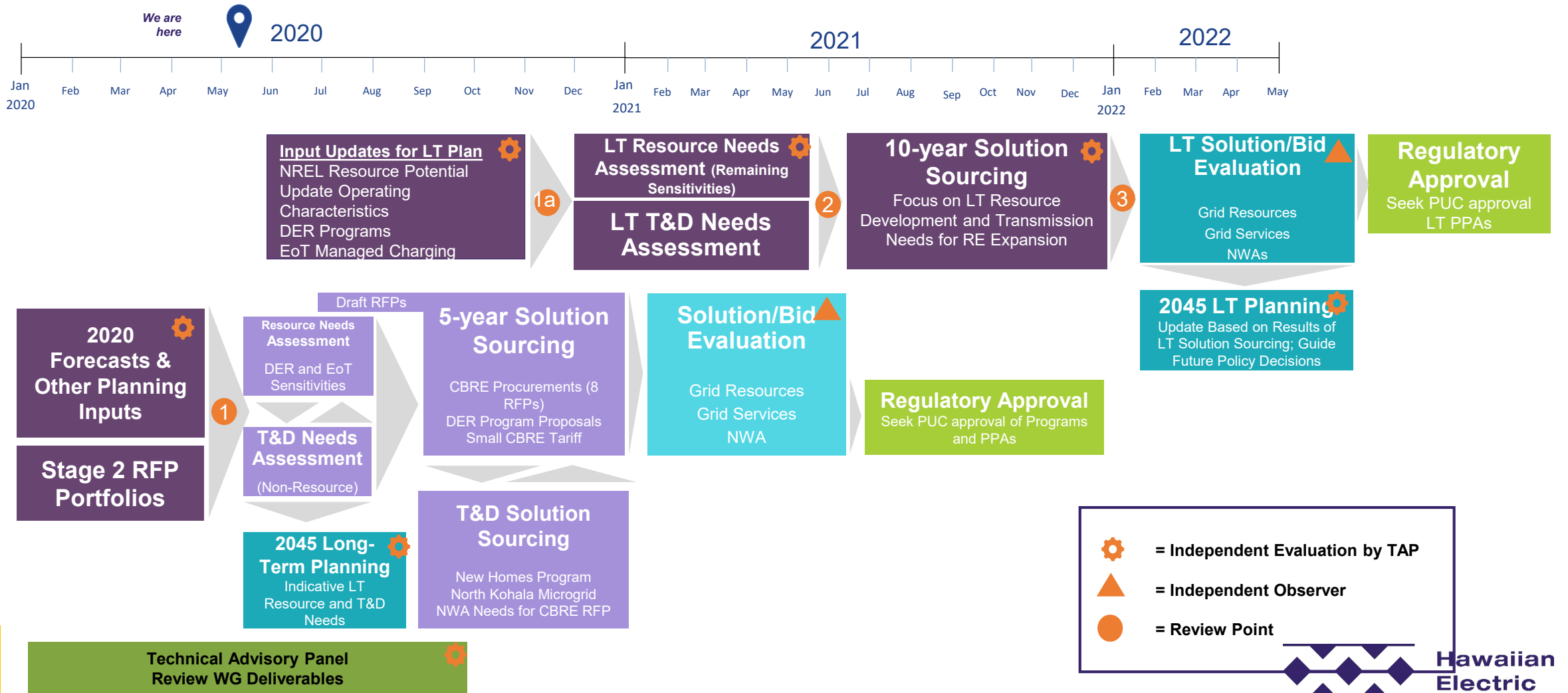
Review Point Letter Filing



Review Point Letter

- Updates the Commission on the status of the IGP
 - Schedule and Workplan
 - Working Group Deliverables
 - Interdependencies with Other Dockets
 - Reformed Technical Advisory Panel
- Previews the content to be included in Review Point 1, which will give the Commission an opportunity to provide any feedback or course correction regarding the working group deliverables
 - The IGP forecasts, inputs, and assumption will also be included for approval.

Revised Schedule and Workplan



Substantial Progress Made on Working Group Deliverables

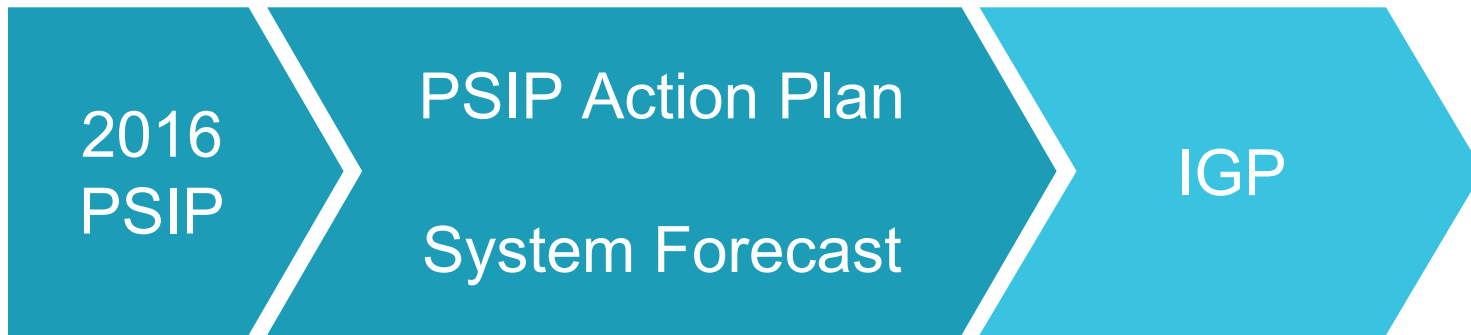
Development Tasks	Expected Completion	Status	Comments
● = Complete ● = On-schedule ● = Slightly behind schedule ● = Delayed			
GSPA Standardized Contract		●	
Soft Launch RFP		●	Independent Observer Final Report to be filed with Review Point 1
Resilience WG Report	May 2020	●	To be filed with Review Point 1
2020 System Forecast and Input Assumptions	May 2020	●	To be filed with Review Point 1
Distribution Planning Methodology	May 2020	●	To be filed with Review Point 1
NWA Opportunity Evaluation Methodology	May 2020	●	To be filed with Review Point 1
Competitive Bid Framework Revisions	July 2020	●	Ongoing discussions with CPWG stakeholders
SEOWG Deliverable (Grid Service Definitions, Sensitivities, Needs Assessment Methodology, and Solution Evaluation Methodology)	June 2020	●	Discussions ongoing with SEOWG stakeholders. Technical Advisory Panel has been participating in WG.
NREL Resource Potential Study Update	July/August 2020	●	Work has been delayed due to COVID-19 and contracting

Interdependencies with Other Dockets

- The Commission recently issued two orders in Docket No. 2015-0389 (CBRE) and Docket No. 2019-0323 (DER)
 - CBRE Order No. 37070 commenced Phase 2 of the CBRE Program. The CBRE order expanded the program capacity to 235 MW.
 - DER Order No. 37066 included the development of two programs for residential and commercial customers: a basic export-only program and an advanced program to compensate energy and grid services.
- These dockets should be aligned with IGP

Interdependencies with Other Dockets

Initial IGP interdependency:



The Company is open to discussion to align the CBRE and DER directives with IGP and use these opportunities to validate the novel grid planning processes proposed in the IGP working groups

Opportunities for alignment with IGP:





Technical Advisory Panel Changes

Review Point Letter Filing



Technical Advisory Panel to Serve as Independent Evaluator

- Hawaiian Electric and HNEI developed a collaborative approach to reform the TAP to better fulfill its role as an independent evaluator
- The co-developed proposal intends to address current limitations and improve the efficacy of the TAP to meet the Company's goals

TAP Member Engagement

- Reform the TAP membership with new members that will be involved and have expertise relevant to the Company's challenges.
- TAP members to be assigned to review specific working group outputs and provide an overall, independent assessment of WG deliverables.
- The TAP will review and provide feedback on Review Point filings. Review points are intended to be outputs of the analytical steps.

TAP Member Engagement

- TAP meetings will focus on addressing specific agenda items and questions
- At the conclusion of each TAP meeting, meeting summaries will be developed to capture issues raised and resolved as well as recommended follow-up actions
- HNEI will present meeting summaries at Stakeholder Council meetings



Stage 2 Final Award Group Summary



Oahu, Maui, Hawaii Island RFP Selections

	Consolidated	Oahu	Maui	Hawaii Island
RFP Targets		1,300,000 MWh + 200 MW storage capacity 50 MW FFR	295,000 MWh + 40 MW storage capacity	173,000 MWh* + 18 MW FFR
No. of Projects	16	9	4	3
Total Energy Potential (MWh)	1,349,887	682,909	325,228	341,750
Technology Types	<ul style="list-style-type: none"> • 13 PV plus Storage • 2 Load Shifting BESS • 1 Contingency BESS 	<ul style="list-style-type: none"> • 8 PV plus Storage • 1 Standalone Storage 	<ul style="list-style-type: none"> • 3 PV plus Storage • 1 Standalone Storage 	<ul style="list-style-type: none"> • 2 PV plus Storage • 1 Standalone Contingency Storage
PV (MW)	459	287	100	72
BESS (MW)	696	472	140	84

*173,000 MWh assumes with PGV available, Hu Honua not available



Proposed Grid Services for IGP



Proposed Grid Services for IGP

Grid Service	Description	Represented in RESOLVE & PLEXOS	Represented in PSSE/PSCAD/ASPEN
Energy	A continuous, controllable, and predictable supply of megawatt-hours to serve system load needs in response to an AGC signal	✓	Not Represented
Energy Reserve Margin	A guideline to minimize risk of insufficient generation capability from a diverse mix of generating resources available to the system in long-range generation expansion studies	✓	Not Represented
Load Reduce	Capacity that can be provided by a generator, storage or controlled load to reduce system load in the required timeframes and durations in response to a remote dispatch signal	✓	Not Represented
Load Build	Capacity that can be provided by storage or controlled load to increase system load in the required timeframes and durations in response to a remote dispatch signal	✓	Not Represented
Regulating Reserves	A reserve capacity provided by generating and load resources to allow continuous energy balance over the next 1 minute and 20 to 30-minute time interval due to the variability in renewable resources and load that can be called upon in response to an AGC signal	✓	Not Represented

Proposed Grid Services for IGP

Grid Service	Description	Represented in RESOLVE & PLEXOS	Represented in PSSE/PSCAD/ASPEN
Inertia*	Contribution to the capability of the power system to resist changes in frequency by means of an inertial response from a generating unit, network element or other equipment that is electromagnetically coupled with the power system and synchronized to the frequency of the power system.	✓	✓
Primary Frequency Response (PFR)*	Automatic and autonomous response to frequency variations through a generator's droop parameter and governor response	ⓘ	✓
Fast Frequency Response (FFR1)	An autonomous and predictable capacity to limit the frequency drop resulting from a frequency disturbance.	✓	✓
Voltage Support*	Ability of generators or other equipment to produce or absorb reactive power to maintain the system voltages within specified limits.	Not Represented	✓
Short-Circuit Current*	Available current under fault conditions at a given location. A minimum value is required for proper coordination of protective devices and a safe and reliable operation of protection system.	Not Represented	✓

*Work in progress descriptions

Proposed Grid Services for IGP

Grid Service	Description	Represented in RESOLVE & PLEXOS	Represented in PSSE/PSCAD/ASPEN
RPS	% of annual retail sales forecast	✓	Not Represented
Transmission Capacity*	A supply and/or a load modifying service that DERs and grid-scale resources provide as required via the dispatch of power output for generators and electric storage, and/or reduction in load that is capable of reliably and consistently reducing net loading on desired transmission infrastructure	ⓘ	✓
Distribution Capacity	A supply and/or a load modifying service that DERs provide as required via the dispatch of power output for generators and electric storage, and/or reduction in load that is capable of reliably and consistently reducing net loading on desired distribution infrastructure	ⓘ	Not Represented
Distribution Reliability	A load modifying or supply service capable of improving local distribution reliability under abnormal conditions	ⓘ	Not Represented

Grid Service Capability by Technology based on feedback from TAP

Service by Resource	Inertia	Short-circuit current	Volt. Supp.	Fast freq. resp.	Prim. freq. resp.	Trans. Capac.	Dist. Capac.	Energy	Energy Reser. Margin	Load Red.	Load Build	Reg. Reser.	RPS
Conv. Therm.	Green	Green	Green	Red	Green	Green	Green	Green	Green	Green	Red	Green	Yellow
Wind	Yellow	1	Green	Green	Green	Green	Green	Green	2	Green	Red	Green	Green
GS PV	Yellow	1	Green	Green	Green	Green	Green	Green	2	Green	Red	Green	Green
Dist. PV	Yellow	1	Green	Green	Green	Green	Green	Green	2	Green	Red	4	Green
GS BESS	Yellow	1	Green	Green	Green	Green	Green	Green	3	Green	Green	Green	Red
Dist. BESS	Yellow	1	Green	Green	Green	Green	Green	Green	3	Green	Green	4	Red
PSH	Green	Green	Green	Red	Green	Green	Green	Green	Green	Green	Green	Green	Red
Sync. Cond.	Green	Green	Green	Red	Red	Red	Red	Red	Red	Red	Red	Red	Red
Load Control	Red	Red	Red	Green	Green	Green	Green	Yellow	Yellow	Green	Green	4	Red

1. Requires grid forming inverter capability; 3-5 years away (Technology in transition)
 2. Contribution to ERM limited by hourly dependable capacity
 3. Contribution to ERM subject to change as resource portfolio changes
 4. Requires controllability/communications for frequent dispatch signals

Not capable
Fully capable
Partially capable





Getting to **100% Renewable**

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