Integrated Grid Planning Workplan

Second cycle: 2025–2029

Updated March 2, 2026

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1 Executive Summary

Hawaiian Electric and our customers are rapidly transforming the ways Hawai‘i generates, transmits and uses electricity. Together, we are creating a safe, reliable, and resilient clean energy grid that will produce net-zero carbon emissions and be powered by 100% renewable resources by 2045.

Integrated Grid Planning (IGP) represents a pathway to achieve this clean energy future. It outlines actionable steps to decarbonize the electric grid on the State of Hawai‘i’s timeline, with a flexible framework that can adapt to future technologies and directional policies. The IGP process was designed to progress in three-to-five-year cycles to ensure that grid planning remains responsive to evolving conditions and technologies. Hawaiian Electric is embarking on the Second Cycle of IGP (Second Cycle). The Public Utilities Commission (Commission) indicated that this cycle’s planning phase will run through January 2029, followed by a review period from February 2029 through January 2030[1].

Building upon insights gained from the first IGP cycle (First Cycle) and guided by the Commission’s thoughtful feedback on open issues for the Second Cycle, Hawaiian Electric recognizes the importance of maintaining momentum while addressing evolving priorities, such as those identified in the Hawai’i State Energy Office’s “Alternative Fuels, Repowering, and Energy Transition Study,” Governor Josh Green’s Executive Order No. 25-01 “Accelerating Hawai‘i’s Transition Toward 100 Percent Renewable Energy,” and the Commission’s “2024 Inclinations on the Future of Energy in Hawai‘i”. The development of the revised IGP plan for this Second Cycle may encounter similar timelines as previously experienced, which extended the planned three-year cycle to five years. Hawaiian Electric and this workplan, however, is firmly committed to honoring the Commission’s mandated three-year planning process timeline.

Achieving this ambitious schedule will require full engagement and dedication from all parties involved, including prompt collaboration, prioritization of scenarios and analyses, and a proactive approach to minimizing iterations and re-work. Hawaiian Electric will actively seek opportunities to streamline tasks and maximize schedule flexibility, working closely with the Commission and stakeholders to reach consensus on a planning scope that meets both near-term and long-term energy needs. The proposed timeline has been refined to focus on key milestones and streamline the process. Figure 1-1 illustrates the updated schedule for the Second Cycle, which is organized around three primary phases: Data Collection, Plan Definition, and Plan Acceptance. This approach underscores Hawaiian Electric’s ongoing commitment to transparency, responsiveness, and partnership with the Commission and all stakeholders.

[1] *See* Order No. 42230 at 11

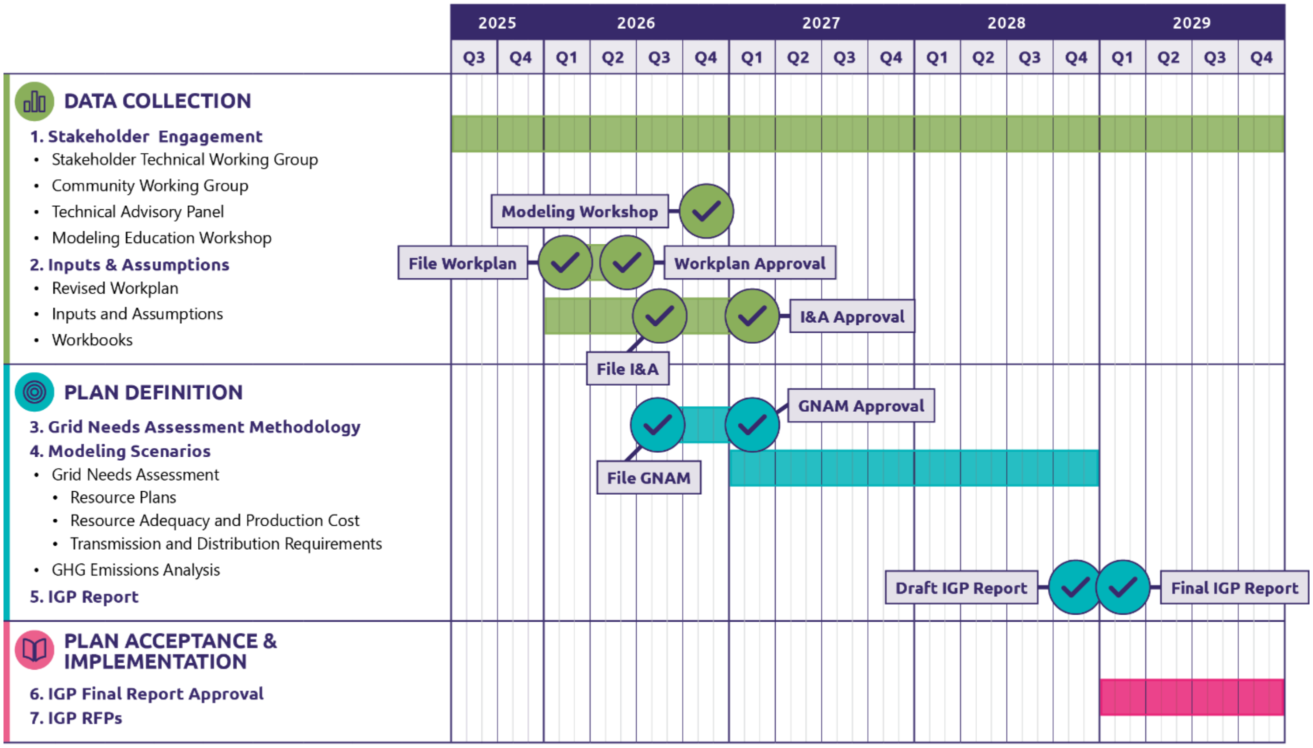

Figure 1-1: Proposed timeline for the Second Cycle

Data Collection

Hawaiian Electric has begun to meet with the stakeholder groups, such as the Stakeholder Technical Working Group (STWG), to gather feedback on inputs and assumptions. As part of its commitment to incorporating community engagement into the grid planning process, the Company has also established a new Community Working Group (CWG).

Hawaiian Electric is committed to using a variety of in-person and virtual strategies with technical and community working groups to share information and gather input. Meeting materials—such as slide decks, agendas and notes—will continue to be posted online to Hawaiian Electric's website for public transparency and access.

A set of engagement materials are currently being developed—including a new Energy Modeling website[2] and handouts—to better explain the modeling process used to identify resource, transmission, and distribution grid needs. Hawaiian Electric will host a modeling-education workshop to provide more transparent information about how the models and their outputs are used to inform decisions.

Forecast assumptions are currently being developed for demand, fuel price, and resource cost using 2025 vintage datasets or latest available data. The Initial Inputs and Assumptions (I&A), detailed further in Section

[2]Accessible at: https://hawaiipowered.com/energymodeling/

8: Inputs and Assumptions, Appendix B: Initial Inputs and Assumptions, and Workbooks 1-3, include Energy Efficiency (EE) forecasts, Electrification of Transportation (EoT) forecasts, fuel and resource cost forecast, generation characteristics, and greenhouse gas (GHG) emissions assumptions and calculation methodologies. Additional I&A elements will be incorporated in future filings as they are developed.

Hawaiian Electric is actively pursuing the designation of two Renewable Energy Zones (REZ) on Oʻahu by June 2026 to meet the Commission's "2024 Inclinations on the Future of Energy in Hawaiʻi". As part of this effort, the Company is collaborating with the CWG to provide ongoing input and feedback to support the designation of the two REZs.

Plan Definition

Hawaiian Electric will follow the same planning analysis process used in the First Cycle to identify grid needs, with some modifications based on Commission feedback, such as running the Base, High Load, and Low Load scenarios through the full process. The Company will also develop resource plans for additional scenarios, including one assuming high fuel prices and another assuming liquified natural gas (LNG) is an available resource. Over the coming months, the Company will collaborate with stakeholders to discuss developing resource plans for additional scenarios. Modeling is expected to start in 2027 when the final Inputs and Assumptions are approved by the Commission and continue through 2028.

The planning analysis will start with calibration of the energy reserve margin (ERM) target used in the capacity expansion model (RESOLVE). Like the First Cycle, Hawaiian Electric plans to calibrate the ERM in RESOLVE to a 0.1 day/year loss-of-load-expectation (LOLE) target. The Company also plans to assess how changing the hourly dependable capacity (HDC) from the 80th-percentile to the production profile affects the ERM calibration.

Once the ERM is calibrated, the scenarios will be run through the capacity expansion planning model (RESOLVE). For the Base, High Load, and Low Load scenarios the full modeling process includes a resource adequacy analysis to ensure the resource portfolio meets the 0.1 day/year LOLE reliability target, a production cost simulation to generate hourly dispatch and cost projections, a system security analysis to ensure the portfolio meets the transmission planning criteria, and a distribution planning analysis to identify distribution hosting capacity and location-based grid needs. Ultimately, this planning analysis process will produce a set of resource plans and portfolio of grid needs that is optimized to meet our planning objectives.

Hawaiian Electric will seek input from stakeholders and community groups throughout the planning process to provide inform the modeling methodology and preliminary results. The final IGP preferred plans will be presented for Commission approval in January 2029.

Plan Acceptance and Implementation

Following Commission approval of the preferred plans, the Company will actively work to obtain the grid needs identified through requests for proposals (RFPs) and procurements, infrastructure investments, and customer programs. In addition, the Company will continue providing IGP Action Plan Annual Updates so stakeholders and the community can stay connected to our progress.

We look forward to working collaboratively with the State, Commission, stakeholders and the community over the next few years to develop plans that will meet our islands' needs for safe, reliable and resilient clean energy.

PART 1: SECOND CYCLE VISION

2 Reflections from the First Cycle

Figure 2-1 provides a visual summary of the steps in the First Cycle and the time spent developing inputs and methods, analyzing models, using the IGP assumptions and methods to support analytical work in other proceedings, and setting targets for future procurements.

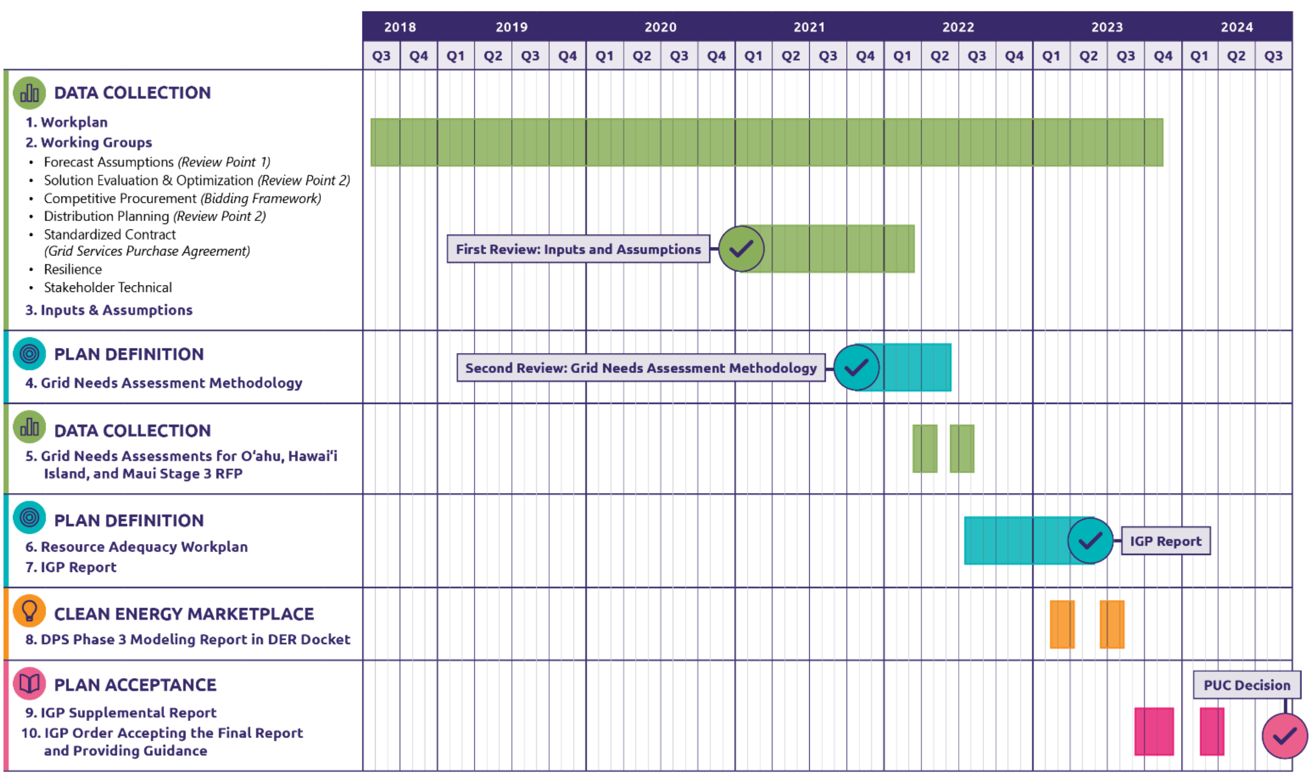

Figure 2-1: IGP First Cycle timeline

Based on Hawaiian Electric's review of the First Cycle, roughly three and one-half years were needed to develop materials for the first and second review points (inputs and assumptions, followed by grid needs assessment methodology, stakeholder review and Commission approval). Below is a summary of major deliverables from the First Cycle, along with their schedule impacts and the time required to complete them. A more comprehensive list of First Cycle milestones and timeline can be found in Appendix D: First Cycle Timeline.

- **First review point (inputs and assumptions) – 14 months:** Hawaiian Electric filed its first review point to seek approval of its inputs and assumptions in January 2021. The proposed assumptions were modified as a result of extensive stakeholder discussion through working group meetings and in the docket. Finalizing the inputs and assumptions spanned 14 months from initial filing to Commission approval (March 2022), not including prior work done by the forecast assumptions working group.

- **Second review point (grid needs assessment methodology) - 7 months:** Hawaiian Electric filed its second review point to seek approval of its grids needs assessment (GNA) modeling methodology in November 2021, along with the renewable energy zones (REZ) study that analyzed transmission requirements for initial REZ. Like the first review point, the proposed methodology was also discussed through the working groups and in the docket proceedings. Finalizing the modeling methodology spanned seven months from initial filing to Commission approval (June 2022), not including prior work done by the solution evaluation and optimization working group.

- **GNA for Oʻahu, Hawaiʻi Island and Maui Stage 3 RFPs – 15 months:** In parallel to finalizing the modeling methodology for the second review point, Hawaiian Electric used the methodology as it was defined at the time to prepare GNAs for Oʻahu, Hawaiʻi Island and Maui. These assessments provided the supporting modeling analyses for the Stage 3 RFP targets for those three islands. Hawaiian Electric filed the assessment for Hawaiʻi Island in April 2022 and Oʻahu and Maui in July 2022. Conducting an interim GNA to support the Stage 3 RFP diverted time and resources away from the overall IGP process. Instead of requiring interim GNAs, RFPs that occur in the middle of the IGP process could use the most recent IGP Action Plan Annual Update to guide RFP target setting with adjustments for updated planned project timing until a new IGP plan is approved or accepted.

- **Resource adequacy workplan - 21 months:** Along with approving Hawaiian Electric's modeling methodology, Order No. 38482, issued in June 2022, introduced a new directive for Hawaiian Electric to begin the process of developing an effective load carrying capability (ELCC)-based resource adequacy criteria for use in future rounds of IGP, due in August 2022. In July 2022, Hawaiian Electric filed a motion for reconsideration of this order, given the progress Hawaiian Electric made in revising and adjusting its energy reserve margin (ERM) and hourly dependable capacity (HDC) criteria per the Technical Advisory Panel's (TAP) guidance. In Order No. 38606, issued in September 2022, the Commission denied Hawaiian Electric's motion to scope the resource adequacy workplan to evaluate ELCC and clarified that the workplan should address whether ELCC or other alternatives are appropriate for the next IGP cycle. Following the Commission's order, Hawaiian Electric filed their resource adequacy workplan to evaluate three different capacity planning criteria. In Order No. 38606, the Commission provided feedback on the workplan, stating that Hawaiian Electric's proposed comparison of the three criteria meets the Commission-directed framework for the workplan and that Hawaiian Electric should begin the work to evaluate the criteria before completing the IGP analyses. In April 2024, Hawaiian Electric filed E3's resource adequacy planning methods report based on the workplan.

- **IGP report – 15 months:** Once the modeling methodology was approved, Hawaiian Electric commenced the planning phase of the process. Initial modeling results were shared with the working groups and TAP in December 2022, and a draft IGP Report was filed in March 2023 to encourage additional feedback from the public. Hawaiian Electric filed a final IGP report in May 2023 that addressed approximately 300 comments and clarifications received on the draft report. Following the approval of the first and second review point, developing the final modeling results and finalizing the IGP report spanned 15 months, with Commission's final approval (March 2024) six years after the IGP docket opened.

In addition, requests for planning analyses in other proceedings (RFP, DER) using the IGP assumptions and methodologies, as well as reconsideration of key inputs like the planning criteria through the resource adequacy workplan, added several months to the IGP schedule that were not originally envisioned in the IGP workplan that was first approved. To stay aligned with the Commission's three-year planning timeline, the Second Cycle needs to stay focused and carefully consider additional scenarios or risk delays in the planning process.

IGP implementation is still underway. Based on the updated draft IGP RFP, the proposed schedule intended the RFP to be issued on July 25, 2025 with the final award group to be selected the following year on August 28, 2026.[3] However, the IGP RFP has not yet been initiated, as Hawaiian Electric is awaiting further guidance regarding its release. As a result, the end-to-end process for the First Cycle, starting with the filing of the IGP workplan in July 2018 and ending with the selection of the IGP RFP final award group will span for more than 8 years.

While Hawaiian Electric shares the Commission's optimism that the lessons learned from the First Cycle can help to expedite the Second Cycle, the schedule should maintain flexibility to be able to accommodate emergent planning issues and coordinate with other proceedings. In the draft Workplan, the overall schedule for the Second Cycle was proposed increase from five years to seven years[4]. Pursuant to the Commission's recent Order No. 42230, managing to a five-year cycle will be very aggressive, and requires all parts of the process to be completed on time, including stakeholder and Commission review of required steps. In addition, the five-year cycle essentially leaves no room for more than one modeling iteration – meaning should stakeholder input drive toward additional iterations or scenarios, tradeoffs with inclusion and schedule impacts must be assessed before proceeding.

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3 *See* Hawaiian Electric Companies' Submission of the Updated Draft Integrated Grid Planning Request for Proposals for O'ahu and Hawai'i Island, filed on June 27, 2025, in Docket No. 2024-0258.

4 *See* Hawaiian Electric's Draft Integrated Grid Planning Second Cycle Workplan, https://hawaiipowered.com/igpreport/Dkt_2018-0165_2025-08-01_HECO_Ltr_IGP_Second_Cycle_Workplan_Update.pdf

3 Shifting Policy Environment

IGP is conducted in a policy environment that continues to evolve at both the federal and state levels. Several key policies remain pending or subject to change and could materially affect planning assumptions, resource selection, procurement timing, and system reliability. This is not an exhaustive list, and will change. Key examples include:

Regional Haze and environmental compliance requirements[5]

If enacted or clarified, regional haze requirements could affect the timing and availability of existing thermal generation, including the need for additional controls, operational limits, or unit retirements. Short-term flexibility in the resource plan may be needed to maintain reliability, including extending the use of existing generation for resilience and contingency purposes and optimizing unit retirement selection, while providing bridge time for new resources to be procured, permitted, and placed into service.

Federal tax credits, trade policy, and available grant funding

Changes to federal tax credits, tariffs, or domestic content rules may significantly affect the cost of renewables, energy storage, and related technologies. Adjustments to Federal grant goals will shape which technologies receive funding, influencing project costs and timelines, especially for emerging solutions aligned with IGP objectives.

Fuel policy and greenhouse gas accounting guidance

Evolving state or federal policy regarding lifecycle greenhouse gas accounting and the role of fuels such as LNG could influence which firm resources are considered viable in planning scenarios. Scenario design and preferred plans may need to be adjusted to reflect revised emissions treatment, compliance pathways, or policy constraints.

Offshore wind policy and permitting rulings[6]

Changes in federal policy, leasing availability, permitting processes, or judicial rulings related to offshore wind could affect whether and when offshore wind is feasible within the planning horizon. Continued restrictions or delays could limit offshore wind availability to the long term, while policy reversals or permitting clarity could re-introduce offshore wind as a viable option. Planning assumptions may need to be revisited to either continue excluding offshore wind from the mid-term resource mix or, if conditions change, evaluate offshore wind in future scenarios or subsequent IGP cycles, including implications for transmission planning and REZ development.

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[5] *See* https://www.epa.gov/system/files/documents/2026-02/guidance_signed_regionalhazeguidance_20260210.pdf

[6] *See* https://www.whitehouse.gov/presidential-actions/2025/01/temporary-withdrawal-of-all-areas-on-the-outer-continental-shelf-from-offshore-wind-leasing-and-review-of-the-federal-governments-leasing-and-permitting-practices-for-wind-projects/

Given these uncertainties, the Second Cycle of IGP is intentionally structured to be flexible and adaptive. Hawaiian Electric will revisit assumptions, scenarios, and preferred plans as policy direction becomes clearer, while continuing to prioritize system reliability, affordability, resilience, and progress toward the State's clean energy and greenhouse gas reduction goals.

4 Vision for the Second Cycle

The IGP process helps Hawaiian Electric develop long-term plans for providing safe, reliable, and resilient clean energy across the islands. It outlines actionable steps to decarbonize the electric grid on the State's timeline, with a flexible framework that can adapt to future technologies. This work includes considering potential future locations for clean energy projects and grid infrastructure.

The IGP process was designed to progress in three-to-five-year cycles to ensure that grid planning remains responsive to evolving conditions and technologies. The First Cycle took place from 2018 through 2023 and represented more than five years of dedicated, in-depth engagement from partners and community members across the islands. Hawaiian Electric is now embarking on the second cycle of IGP. In Order No. 42230, the Commission provided an updated timeline to illustrate its guidance on the Second Cycle.

- January 2026 – January 2029: Formal, docketed process for the Second Cycle
- February 2029 – January 2030: Implementation efforts—for example, IGP Second Cycle requests for proposals (RFPs) and Commission evaluation of second cycle

Achieving this timeline will require a more concise scope of planning analyses; otherwise, the Second Cycle could have a similar schedule length as the First Cycle. Given the policy guidance provided by Governor Green and the Commission, the development of new resources through programs and RFPs to meet RPS and GHG goals in 2030 and 2035 may take precedence over broad, comprehensive utility planning which may take longer to develop, and consequently, limit the time for plan execution to achieve the 2030 and 2035 goals. Hawaiian Electric will work with the Commission and stakeholders to develop an appropriate scope that can balance the need to identify near and long-term energy needs while also allowing enough time for plan execution.

Hawaiian Electric's vision for the Second Cycle is to carry forward and build on the collaborative spirit of the First Cycle. Throughout the process, Hawaiian Electric will share updates on progress and welcome community members and stakeholders to stay involved and provide their input. Hawaiian Electric will continue to engage stakeholders, technical experts, and community partners early and often to ensure all viewpoints are considered as future resource plans are developed to meet statewide policy goals.

5 Planning Objectives

Today’s planning environment is informed by several policies and guidance provided by the State Legislature, Commission, and state and federal governments. These policies play a critical role in shaping Hawai‘i’s energy transition by setting renewable energy and emissions reduction timing and targets.

Hawai‘i’s energy planning environment is shaped by a combination of statutory requirements, Commission Inclination and decisions, and executive directives. These policies collectively support the State’s long-term energy and decarbonization goals, though they sometimes differ in their targets, timelines, and implementation strategies. As newer directives emerge—such as Commission Inclinations or Governor’s Executive Orders—they may introduce interim goals or priorities that extend beyond or differ from existing statutes. The Company appreciates guidance from the Commission and stakeholders on how to best navigate balancing near-term directives with long-term statutory goals while maintaining flexibility as Hawai‘i advances toward its clean energy future.

Table 5-1 below summarizes the varying RPS and GHG emissions goals provided by the Governor’s Executive Order, the Commission’s Inclinations, GHG Law, and RPS law. Hawaiian Electric proposes the outlined goals as the base assumption for the Second Cycle, reflecting our commitment to advancing Hawai‘i’s clean energy future. Modeling scenarios and sensitivities to assess varying renewable and decarbonization targets are further discussed in Section 9: Modeling Scenarios and Sensitivities.

Table 5-1: Summary of RPS and GHG goals

Zone	2030	2035	2040	2045
Statewide	40% RPS 50% GHG reduction[7]		70% RPS	100% RPS Net-zero emissions
O'ahu	60% generation from non-oil sources 50% GHG reduction	70% GHG reduction		
Hawai'i Island	60% generation from non-oil sources 50% GHG reduction	100% RPS		
Maui County	60% generation from non-oil sources (each island) 50% GHG reduction (each island)	100% RPS		

Governor's EO	Commission Inclinations	GHG Law	RPS Law	Proposed Base Assumption

5.1 Renewable Portfolio Standard

Hawai'i Revised Statutes (HRS) § 269-92 defines the RPS that Hawaiian Electric must meet for renewable generation as a percentage of net electricity generation of 40% by 2030, 70% by 2040 and 100% by 2045.

5.2 Greenhouse Gas Targets

HRS § 225P-5 establishes a zero emissions clean economy target to sequester more GHG than emitted by 2045 and reduce statewide greenhouse gas emissions by 50% by 2030 compared to 2005 levels.

[7] While statewide emissions targets in HRS § 225P-5 include all industries, they are assumed to be Hawaiian Electric targets for modeling purposes.

5.3 Commission Inclinations and Governor's Executive Order

Recent guidance from the Commission's "2024 Inclinations on the Future of Energy in Hawai'i" provides additional goals in the near-term for Hawaiian Electric to meet[8]. The inclinations listed that each island would have at least 60% of generation come from non-oil sources by 2030. In meeting this goal, DER should represent 5% or approximately 400 MW of new renewables by 2030. The planning for large renewable project siting and interconnection will also be expanded by establishing at least two REZs on O'ahu by second quarter of 2026.

The Governor issued Executive Order No. 25-01 "Accelerating Hawai'i's Transition Toward 100 Percent Renewable Energy" that similarly adds near-term requirements that Hawaiian Electric needs to account for in its planning. For Hawaiian Electric's service territory, by 2035, the counties of Hawai'i and Maui will need to meet 100% RPS and O'ahu will need to achieve a 70% reduction in GHG relative to 2005 levels. In meeting these goals, 50,000 new distributed renewable energy installations will need to be added before 2030.

5.4 Reliability Target

In addition to RPS and GHG targets, the Commission Order No. 42230 directs Hawaiian Electric shall use a 0.1 day/year loss-of-load expectation (LOLE) as the standard for planning and determining resource requirements, however this standard may change as the Hawaii Electric Reliability Administrator (HERA) works to develop recommendations for a future reliability standard.[9]

As noted in the draft workplan, establishing a reliability standard at the start of the Second Cycle and maintaining that standard over the duration of the planning process will help to streamline the planning analyses. Therefore, Hawaiian Electric request that any changes in a reliability standard from 0.1 day/year LOLE be incorporated in the next cycle of IGP. This will allow for ample time to incorporate those changes and analyze any possible impacts.

[8]Accessible at: https://puc.hawaii.gov/wp-content/uploads/2025/01/Hawaii-PUC-Energy-Inclinations-White-Paper-FINAL.12.31.24_signed.pdf

[9] The Hawaii Electric Utilities Reliability Standard and Generation Resource Adequacy Criteria working group convened in Non-Docketed Case No. PC-201715.

6 Cross-Docket Coordination and Interdependencies

Commission guidance will be especially important to coordinate how impacts of other key dockets and proceedings can be integrated into IGP, and conversely, how impacts of IGP can be integrated into other key dockets. Hawaiian Electric believes that IGP should be settled first to drive other dockets. For example, if IGP identifies a grid need for grid-scale resources or DER, other proceedings like community-based renewable energy (CBRE) or wheeling could be allocated a portion of that need.

The IGP process utilizes a planning framework that is both highly dependent on and influential to various ongoing regulatory proceedings. Interdependencies from other key dockets and proceedings arise because these proceedings inform the planning foundations used within IGP. Commission decisions in other dockets and proceedings shape the modeling assumptions, risk assessments, and timelines embedded in the IGP workplan. For example, decisions and guidance about resource and program costs, revenue structure, and timing of resources in other dockets affect the inputs and assumptions used for IGP. Interdependencies not only impact assumptions used for IGP, but also the ability of other proceedings to use outcomes from IGP to inform those other proceedings. For example, grid needs assessments, resource portfolios and costs resulting from IGP may be used to inform other dockets and proceedings to support subsequent procurement or policy efforts.

These bidirectional interdependencies across key dockets and proceedings underscores the need for coordination to identify important deliverables and awareness of procedural schedules and decisions. Timing is critical because delays or shifts in cross-docket deliverables can affect the assumptions, sequencing, and decision points within IGP, potentially requiring schedule adjustments or even pauses to incorporate outcomes from other proceedings. Additionally, Hawaiian Electric can adjust its IGP schedule to ensure that interim IGP results are made available to inform those discussions in other dockets. While a pause in the IGP schedule may not be preferrable, the IGP process steps proceed sequentially, and depending on the nature of the decisions made in other dockets, it could potentially restart the entire IGP planning process.

Table 6-1 provides a summary of the key dockets and proceedings with IGP interdependencies.

Table 6-1: Key dockets and proceedings for IGP coordination[10]

Docket or Proceeding	Description	Informs IGP	Informed by IGP
PC-201715	Hawaii Electric Utilities Reliability Standard and Generation Resource Adequacy Criteria Working Group (HERA)	• Planning criteria changes may impact IGP modeling scope, schedule, and results.	
2019-0323	Distributed Energy Resources Program Structure (DPS)	• New pricing and program proposals or changes	• Avoided costs from IGP may be used to develop pricing and program proposals
2018-0088	Performance Based Ratemaking (PBR)	• Revenue and cost recovery framework changes	
2024-0258	IGP RFP	• Resource procurement timing and quantity changes may impact the Second Cycle modeling processes and assumptions	• Resource procurement (timing and quantity) was identified in the First Cycle.
Pending[11]	IGP Long-Term RFP(s)	• Changes to the timing and quantity of resources procured	• Resource procurement (timing and quantity) was identified in the First Cycle.
2022-0250	Energy Equity (Equity Docket)	• Incorporate lessons learned from community engagement efforts	• Create metrics to track equity-related outcomes
2024-0200	Establishment of Electricity Wheeling	• Potential new DER/utility-scale program	• Portions of grid needs or DER identified in IGP could be allocated for wheeling • Identify locations where wheeling may be feasible

The following section describes key regulatory proceedings, initiatives, and upcoming decisions that influence the Integrated Grid Planning (IGP) process and outcomes.

- **HERA (PC-201715)**
  - HERA Working Group outcomes could significantly impact IGP if updated reliability standards and resource adequacy criteria are required to be used in the Second Cycle. HERA initial recommendations are anticipated by end of year 2026.

[10] Depending on the timing and need across dockets, information and analyses between work done in dockets may be subject to change.

[11] Request for Information (RFI) for Long-term Renewable Energy Development was issued December 20, 2024. At the time of this filing, a new docket was not yet created for the Order to issue a final RFP.

- As previously mentioned, Hawaiian Electric requests to use the reliability standard from 0.1 day/year LOLE for the Second Cycle and any updates to the reliability standards be used in the future IGP cycles. Should HERA recommend changes to the reliability standard for generation or transmission & distribution and the Commission require these changes be implemented in Second Cycle, adjustments to the Second Cycle schedule will be necessary to incorporate the revisions.

- **Distributed Energy Resources Program Structure (Docket 2019-0323)**
  - In the First Cycle, Hawaiian Electric ran a DER Freeze scenario to determine the value of customer-sited DERs by comparing the Base scenario's resource plan with a resource plan that assumed no new DERs installations. Through this approach, the value of new DER programs would capture the short-run and long-run marginal costs associated with its adoption.
  - In this cycle, the Company will assume the program structure of the Distributed Energy Resources Program Structure (DPS) programs —Smart Renewable Energy and Bring-You-Own-Device (BYOD)— established under Order No. 40418 as an initial assumption. The Company has also partnered with Energy + Environmental Economics (E3) to further mature its approach to valuing new DER systems by updating its analysis of the DPS programs to incorporate additional values streams outlined in the same order. Hawaiian Electric plans to use the STWG to gather stakeholder feedback on the valuation methodology and analysis results. Updates to the DPS programs are anticipated in March 2027, as outlined in Order No. 40418.

- **Performance Based Ratemaking (Docket 2018-0088)**
  - PBR shapes IGP outcomes by establishing revenue mechanisms, incentives, and cost-recovery structures that influence the financial assumptions used in IGP.

- **IGP RFP (Docket 2024-0258)**
  - The IGP RFP was intended to be the result of the plan implementation step from the First Cycle. However, this RFP is still under review and has not yet been initiated. Should the procurement timelines, targets, and ultimately, the amount of resources selected for the final award group vary significantly from the initial RFP targets that were identified in the planning, the timing and quantity of resources selected during the Second Cycle planning process will similarly need to be adjusted.

- **Long-Term RFPs**
  - The First Cycle suggested the development of a Long-Term RFP to procure resources with commercial operation in 2035 or later. The Company is currently focused on the IGP RFP for near-term resources, and will follow with this Long-Term RFP. Depending on the timing and results from the Long-Term RFP, potential resources could serve as an input to the Second Cycle. Should the procurement timelines and amount of resources selected for the final award group vary significantly from the initial RFP targets identified, this could impact the timing and resources selected during the Second Cycle planning process.

- **Energy Equity (Docket 2022-0250)**
  - Community engagement from the Energy Equity proceedings will be used to inform the IGP progress by incorporating lessons learned and community feedback.

- In Order No. 41022, the Commission indicated its intent to coordinate future IGP efforts with the Equity Docket, including creating metrics to track equity-related outcomes and identifying best practices in community engagement and outreach. The Company welcomes this direction and looks forward to supporting this effort and collaborating with other agencies and stakeholders.

- **Establishment of Electricity Wheeling (Docket 2024-0200)**
  - Decisions on how third-party wheeling is structured could influence or impact the allocation of grid needs and DER opportunities identified in the IGP process. A portion of these grid needs and DER could be allocated where wheeling is feasible.

PART 2: DATA COLLECTION

7 Community and Stakeholder Engagement

Hawaiian Electric views the public and stakeholders as partners in our planning processes. Hawaiian Electric will communicate transparently and keep community members and stakeholders informed throughout the IGP process. The Company will continue to build partnerships with community members by listening, learning, and integrating ideas and feedback into the IGP process.

Hawaiian Electric is committed to equitable, inclusive and transparent community engagement throughout the IGP process. This means:

- **Providing accessible and inclusive opportunities to engage,** including offering multiple forms of engagement – both online and in person – hosting events in locations that are accessible by public transportation, and, upon request, providing information in multiple languages and in formats that meet or exceed accessibility standards.
- **Reaching out to and integrating feedback from customers in underserved communities,** including prioritizing outreach to communities most impacted, such as those who live in rural areas or live closest to areas where new energy facilities may be located. This also means listening to community members' experiences, priorities and vision, and using their feedback to shape the outcomes of IGP.
- **Being accountable to feedback received,** including reviewing and considering public feedback as part of the decision-making process, such as where to locate new energy facilities and transmission corridors, and clearly communicating how community input shapes outcomes throughout the planning process.
- Receiving faster, real-time feedback during regular stakeholder meetings in addition to written feedback through the docketed process, especially from the Commission, Commission staff, parties to the IGP docket and stakeholders to enable faster turnaround on process improvements. Feedback given before the modeling phase begins will also minimize impacts to the schedule by avoiding rework of the modeling scenarios.

Over the next three years, Hawaiian Electric will draw on previous IGP community engagement and utilize additional virtual and in-person outreach tools to share information with the public and gather input. These efforts include:

- Developing an educational website on modeling[12] and hosting a workshop to increase transparency on Hawaiian Electric's modeling and decision-making processes
- Continuing to use hawaiipowered.com as a central hub for information sharing, in tandem with updates on hawaiianelectric.com
- Reinstating various working groups—including the Stakeholder Technical Working Group (STWG)—to provide information and solicit regular feedback and insights throughout the IGP process. This also includes forming the Community Working Group (CWG) to gather more local, customer and community-focused feedback to help inform IGP and prioritize REZ selection
- Conducting outreach related to REZ and community benefits
- Attending local community fairs and festivals, hosting open houses, delivering presentations to community organizations and providing IGP team contact information for any follow-up questions

Summaries of stakeholder feedback received so far, along with past stakeholder meeting materials, are available in Appendix A: Stakeholder Feedback.

7.1 Stakeholder Groups

Hawaiian Electric will work with the following advisory groups to provide information to different audiences and gather feedback throughout the IGP process. Table 7-1 provides an overview of the Stakeholder Technical Working Group, Community Working Group, and Technical Advisory Panel. A full list of stakeholder feedback and the working group charters can be found in Appendix A: Stakeholder Feedback and Appendix C: Working Group Charters.

[12] Accessible at: https://hawaiipowered.com/energymodeling/

Table 7-1: IGP Second Cycle working groups

Group name	Participants	Purpose or outputs	Meeting frequency and format
Stakeholder Technical Working Group	Representatives from cities, each island, the State, partner agencies, experts in energy technologies and engineering, developers.	Provides strategic guidance to Hawaiian Electric and helps to ensure alignment with interests across the islands.	Every other month. Can be increased as needed through IGP process/milestones.
Community Working Group	Representatives of community-based advocacy and resource groups across the islands.	Provide community-focused input at key milestones through the IGP process, serve as ambassadors and identify concerns.	Intended every other month. When all islands are meeting together, meetings will be held virtually. If island-specific meetings are held, meetings may be held in-person or virtually, dependent on participant preference.
Technical Advisory Panel	Representatives from research organizations, utilities, and market operators.	Provides independent review of Hawaiian Electric planning process.	Recommend every other month, can be adjusted as needed through IGP process/milestones.

7.1.1 Stakeholder Technical Working Group (STWG)

Hawaiian Electric will work with the STWG to share information with customer and stakeholder representatives. This group will be tasked with providing feedback to Hawaiian Electric to ensure alignment of the updated IGP with customer and stakeholder interests. Participants will include:

- City and county representatives
- Community delegates from each island
- Consumer advocate
- Hawai‘i Public Utilities Commission
- Commercial and industrial customers
- Office of State Planning
- Solar developers
- State of Hawai‘i Department of Business, Economic Development and Tourism
- U.S. Department of Defense
- Electric vehicles industry experts
- Energy efficiency industry experts
- Energy storage industry experts
- Environmental advocates
- Local and national sustainability advocates

In addition, the STWG will include industry peer group experts with representatives from internationally recognized utilities, market operators, and research organizations who have demonstrated engineering expertise in methodologies and technologies involving resource, transmission, and distribution planning for large-scale and distributed renewable resources. The STWG will meet every other month and discuss a variety of topics as they arise through the planning process.

7.1.2 Community Working Group (CWG)

On Jan. 13, 2026, Hawaiian Electric kicked off the CWG to strengthen communication with the public, with particular focus on communities that may be most affected by IGP outcomes. The group's priority is to promote transparency and inclusivity by ensuring diverse community perspectives, and to advise and inform Hawaiian Electric on community priorities related to reliability, sustainability and resilience. The CWG will:

- Review and provide input and feedback on planning assumptions, modeling scenarios and proposed solutions
- Advise on community engagement strategies and outreach efforts as appropriate
- Identify potential social, economic and environmental impacts of integrated grid planning decisions and REZ selections
- Recommend ways to integrate community priorities into planning outcomes

The group includes representatives from community advocacy and resource groups and intends to meet (every 1-2 months), with occasional island-specific meetings as needed. If other community members are interested in participating, information will be provided to them about future opportunities. Participants currently include:

- Hawaiʻi's Carbon Capture Storage and Utilization (CCSU) Consortium
- Hoʻāhu Energy Cooperative Molokai
- Hui O Hauʻula and Hauʻula Community Association
- Hui Ulu Mea ʻAi
- Lāhainā Strong
- LEI Foundation
- Sustainable Energy Hawaiʻi
- Sustainable Molokaʻi
- Vibrant Hawaiʻi

Community Working Group meetings will not be recorded or available live to allow for a focused environment that promotes conversation and collaboration. However, meeting agendas and materials presented will be available on the Hawaiian Electric website.

7.1.3 Technical Advisory Panel (TAP)

Hawaiian Electric will continue to convene the TAP to provide independent peer assessment of the IGP development process, methodologies, tools, and results. The group will consist of industry experts participating voluntarily from utilities, market operators, and research organizations with demonstrated engineering expertise in resource, transmission, and distribution planning.

Like community working group meetings, the TAP meetings will not be recorded to foster collegial, balanced discussions but meeting agendas and materials will also be available on the Hawaiian Electric website.

7.2 Modeling Education

Hawaiian Electric is committed to openly communicating its modeling process so it is clear and understandable for all stakeholders. To that end, Hawaiian Electric has published a modeling education dashboard as part of the Hawai'i Powered website at hawaiipowered.com/energymodeling. The dashboard provides clearer insights into Hawaiian Electric's modeling and how the models and their outputs inform decisions. It highlights key questions in the IGP process and explains how modeling helps answer them and describes how the different models overlap and interact.

To further increase transparency, Hawaiian Electric will hold stakeholder meetings, including a workshop, to improve model comprehension and provide additional context and explanation around the modeling process. This workshop will walk attendees through the modeling dashboard, the modeling process, provide insights into modeling inputs and outputs, and what those mean to Hawaiian Electric's decision making.

7.3 Information Sharing

Hawaiian Electric will continue to use the Hawai'i Powered website (hawaiipowered.com) as a central hub to share information with the public and gather feedback. This will include annual updates from the First Cycle and updated information about the process, including an explanation of why Hawaiian Electric updates the Integrated Grid Plan. Hawai'i Powered will also provide opportunities for stakeholders and the public to provide input throughout the process.

Hawaiian Electric also uses its main Company website (hawaiianelectric.com) to share documents and basic information about the planning process. The content will have specific details and documents about the IGP process. In addition to digital updates, Hawaiian Electric may also send information through the mail using bill inserts or using contact information provided to the IGP team.

Hawaiian Electric plans to develop workbooks of its modeling assumptions, like those that were provided in the First Cycle. Hawaiian Electric will post the workbooks on its website for stakeholders to review. The workbooks will detail the modeling assumptions used in the capacity expansion planning model (RESOLVE) and the resource adequacy analysis/production cost simulation model (PLEXOS), with descriptions added to the top of each model assumption tab to provide an overview of the data being provided. Assumptions for other models used in the modeling framework can be discussed in the working groups.

Following the modeling workshop, Hawaiian Electric can provide access to its models to align with past practice. Model access would be limited to stakeholders who are not market competitors and would be contingent on the stakeholder signing a non-disclosure agreement. For stakeholders who represent industry associations, a specific person will need to be named as the representative to receive model access. Stakeholders may need to contact the model vendors to comply with any licensing requirements for the model.

7.4 REZ-Related Outreach

Hawaiian Electric has started outreach efforts aiming to designate two Renewable Energy Zones (REZs) on O‘ahu by June 2026. This outreach is being conducted through the Integrated Grid Planning (IGP) process, involving the Stakeholder Technical Working Group (STWG), Community Working Group (CWG), and other engagements with state agencies, state representatives, and local communities. The outreach will include educational sessions about REZ and the routing process, offering community members opportunities to provide input that will inform REZ identification and address specific community sensitivities. Community feedback will help Hawaiian Electric refine and prioritize locations and routes aligned with shared objectives.

Hawaiian Electric plans to host both in-person and virtual events and will be available for individualized site visits and discussions to collect land-use information and collaboratively develop technical and routing solutions with community members and landowners. A dedicated webpage will focus on REZ, providing up-to-date information and accessible resources. While engagement will primarily revolve around identifying two initial REZs on O‘ahu, CWG members from all islands also participate in developing potential REZs under the IGP framework.

8 Inputs and Assumptions

The planning process is grounded in a set of inputs and assumptions used to evaluate a range of possible scenarios as Hawai‘i continues toward a clean energy future. The Company will work with stakeholders to gather feedback and further refine the inputs and assumptions, which will be available through multiple workbooks. A brief description of some of the main inputs are provided below, and a more in-depth discussion is available in Appendix B: Initial Inputs and Assumptions.

8.1 Load Forecast

Hawaiian Electric will forecast electricity demand by layer (underlying load forecast and adjusting layers: energy efficiency, DER, and electrification of transportation) using the same approach as the last IGP cycle. Additionally, we will evaluate integrating customer advanced metering infrastructure (AMI) data into the demand forecasts. Continuing to forecast by layers will enable Hawaiian Electric to evaluate low load and high load bookends and determine whether the breadth of the forecasts causes significantly different resource needs. In response to feedback in Order No. 41022, the low load and high load bookends will be further evaluated through the full modeling process to determine the suite of grid needs, including additional transmission and distribution needs that may be required under the high-load bookend or avoided under the low-load bookend.

8.2 Fuel Forecast and Resource Cost Forecast

Consistent with earlier Commission guidance provided in Order No. 37730, issued in April 2021, Hawaiian Electric will continue to use publicly available information for its fuel price and resource cost forecasts and avoid the use of proprietary information in IGP. Therefore, Hawaiian Electric will base the resource costs on the National Laboratory of the Rockies (NLR), formally National Renewable Energy Laboratory, 2024 Annual Technology Baseline (NLR ATB)[13], and the 2025 fuel price forecast based on the Energy Information Administration Annual Energy Outlook (EIA AEO)[14]. Hawaiian Electric may compare resource costs produced by the NLR ATB against the results of recent procurements for similar resource types. If the difference in resource cost is significant and the working group is amenable to changes to the publicly available cost data, Hawaiian Electric may propose an adjustment to the resource cost forecast to reflect its observed cost of procured resources.

8.3 Greenhouse Gas Emissions

The Company's base assumption is that the GHG policy targets apply only to non-biogenic emissions. However, based on feedback provided by the Commission in Order No. 40651 Accepting the 2023 Final IGP Report and Providing Guidance, Hawaiian Electric plans to report both non-biogenic and biogenic CO_2 emissions in this cycle of IGP. The CO_2e factors and methodology for the various fuels that will be used to calculate the GHG emissions are provided in Workbook 1 and Appendix B: Initial Inputs and Assumptions.

[13] Accessible at: https://atb.nrel.gov/electricity/2024/data
[14] Accessible at: https://www.eia.gov/outlooks/aeo/

8.4 Resource Potential and Offshore Wind

The NLR resource potential developed in the first round of IGP is currently being updated and is expected to be completed by Q1 2027.

In 2025, President Trump issued a memorandum for the temporary withdrawal of all areas on the outer continental shelf from offshore wind leasing, pursuant to the Outer Continental Shelf Lands Act. In that same memorandum, President Trump issued a temporary cessation of new or renewed approvals, rights of way, permits, leases, or loans for onshore and offshore wind projects pending the completion of a comprehensive assessment and review of Federal wind leasing and permitting practices. While this withdrawal is noted to be temporary, it is stated to be in effect until revoked. Given the long lead time to develop new offshore wind, this may mean that no new offshore wind can be assumed to be developed in the mid-term of planning horizon and may not be available until 2040 or later.

On O'ahu, the Honolulu City Council changed land use regulations that increased the setbacks for wind turbines to a new distance that is the greater of 1.25 miles or 10 times their height, which will make it difficult for new projects to come online and existing facilities to be repowered.[15]

For planning purposes, as a base assumption, offshore wind will be unavailable throughout the entire planning horizon. On Oʻahu, onshore wind will also be excluded, utility-scale onshore wind will assumed to be available for Maui and Hawaiʻi Island, and distributed onshore wind will remain available for Molokaʻi and Lānaʻi, similar to the First Cycle.

8.5 Treatment of Energy Efficiency

Energy efficiency (EE) is a component of the demand forecast and will be evaluated as part of the demand forecast through the demand forecast bookends. As discussed in the 2023 IGP final report, if Oʻahu is land-constrained, thereby making future land-based renewable development difficult, customer-sited resources including energy efficiency will play a key role in meeting future demand growth.

In the First Cycle, the Company explored modeling EE as both a load layer and a supply-side resource. Since then, the Company has received mixed, but limited, stakeholder feedback on whether EE is better considered as a load forecast layer or a supply-side option[16].

Another consideration is the timing of the next EE Market Potential Study (MPS). West Monroe (formally 2050 Partners), the EE consultant to the Commission, shared at the February 18, 2026, EEPS Technical Working Group meeting that the updated MPS is expected to be completed in mid-2028 and to provide revised EE forecasts and supply curves. Given that no updates have occurred to the existing supply curves since the First Cycle and adjusting the supply curves will be more challenging than the forecasts, it may be

[15] *See* Honolulu City Council Ordinance No. 25-2 (Jan. 13, 2025). Accessible at: https://hnldoc.ehawaii.gov/hnldoc/measure/2784

[16] *See* Appendix A: Stakeholder Feedback

more prudent to wait for the updated MPS rather than rely on assumptions and modifications that may soon be obsolete.

There is also no clear guidance on the expected outcomes from modeling EE as a supply-side resource. During the September 21, 2023, STWG meeting, the Company discussed with stakeholders the possibility of a procurement for EE as service, similar to a grid services RFP, but that was left unresolved[17].

Considering these factors and to streamline the Second Cycle to meet the planning process timeline, Hawaiian Electric proposes to maintain EE as a load forecast layer in all scenarios. Once an updated Market Potential Study is available, the Company can revisit the treatment of EE with stakeholders.

8.6 Treatment of Emerging Technologies in Planning and Procurement

In its planning and procurements, Hawaiian Electric has relied upon commercially ready technologies to define its resource plans and subsequent RFPs. This is especially important for planning purposes because it ensures that resources can be fully defined in the planning models in terms of costs, operating characteristics and technical potential. Emerging technologies that could meet future demand growth or renewable portfolio standards (RPS) goals may not be directly considered by Hawaiian Electric in its planning.

At the August 28, 2025, STWG meeting, Hawaiian Electric sought feedback from stakeholders on incorporating emerging technologies in the Second Cycle. One stakeholder noted that we should avoid spending a lot of time and effort on emerging technologies that are unlikely to be commercially available for the next decade. Instead, they advised us to mention them as future possibilities and don't neglect them, but don't do a comprehensive analysis that turns out to be largely academic[18]. As a result, Hawaiian Electric plans to continue to focus our modeling on commercial ready technologies, while noting that although specific resources are identified in the resource plans, they are not intended to be prescriptive. Those resources are proxies for the grid services they provide and, ultimately, Hawaiian Electric would procure for those same services through RFPs. The resulting resource mix could be different than the resource plans, depending on the response from project developers.

8.7 Reliability

Based on Commission guidance in Order No. 42230, Hawaiian Electric shall use a 0.1 day/year loss-of-load expectation as the working LOLE standard. Like the First Cycle, in the resource adequacy step, Hawaiian Electric plans to continue to model five weather years (2015-2019) and 50 outage samples for a total of 250 samples.

Similar to the First Cycle, Hawaiian Electric plans to calibrate the ERM used in RESOLVE to a 0.1 day/year LOLE target. Calibrating the ERM percentage in RESOLVE to a 0.1 day/yr LOLE target may reduce differences

[17] Accessible at: https://www.hawaiianelectric.com/a/12954
[18] Accessible at: https://www.hawaiianelectric.com/a/15611

between the capacity expansion process step and resource adequacy process step, thereby reducing the need to iterate on the initial resource plan developed by RESOLVE. Given the refinements in Hawaiian Electric's outage modeling for assessing resource adequacy and potential changes to the HDC, the calibrated ERM percentage may differ from the First Cycle.

PART 3: PLAN DEFINITION

9 Modeling Scenarios and Sensitivities

The demand, fuel price, and resource cost forecasts are some of the main inputs that Hawaiian Electric uses to develop different planning scenarios. These scenarios help to better understand how resource, transmission, and distribution needs will change over time, over a range of possible futures, and in response to changing assumptions.

Table 9-1 provides the scenarios that Hawaiian Electric proposes to model using this same process as the First Cycle. The scenarios are composed of several forecast layers and assumptions, each with their own sensitivities (such as high, base, low). Several scenarios that were run in the First Cycle will continue to be run in the Second Cycle. In addition, the Company proposes two new scenarios: “No New Combustion” and “LNG (Oʻahu only)”. The “No New Combustion” scenario was added in response to the Commission’s order to include a scenario that minimizes lifecycle GHG emissions associated with combustion[19]. This scenario is intended to analyze how aggressively minimizing GHG emissions affect the resource plan and various metrics. The Company also proposes to run a scenario where LNG is an available resource option for Oʻahu due to the recent shift in state-level policy, as reflected in the Strategic Partnering Agreement signed in October 2025 by JERA Co., Inc. and Office of the Governor of the State of Hawaiʻi[20].

Additionally, the modeling scenarios will now assume the high resource cost forecast as the starting assumption based on stakeholder feedback in the August 2025 STWG meeting[21]. Hawaiian Electric will have further discussions with stakeholders on additional scenarios for the Second Cycle, with the understanding that any additions may result in delays in the planning process.

[19] *See* Order No. 41022 at 27

[20] Accessible at: https://energy.hawaii.gov/jera-and-state-of-hawaii-sign-strategic-partnering-agreement-to-advance-energy-transition/

[21] Accessible at: https://www.hawaiianelectric.com/a/15611

Table 9-1: Modeling scenarios

Number	Modeling Case	Full Process	RESOLVE Only	Purpose	Assumptions						
					DER Fcst	EV Fcst	EE Fcst	EV Load Shape	Fuel Price Fcst	Res. Cost Fcst	Res. Potential
0	Status Quo	✗	✗ PLEXOS Only	Status quo case if no new resources are selected and no existing units are retired	Base Forecast	Base Forecast	Base Forecast	Unmanaged EV Charging	Base Forecast	**None**	**None**
1	Base	✓	✗	Reference Case	Base Forecast	Base Forecast	Base Forecast	Unmanaged EV Charging	Base Forecast	NREL High Forecast	Full Potential / **Land-Constrained for O'ahu**
2	High Load Bookend	✓	✗	Understand the impact of customer adoption of technologies for DER, electric vehicles, and energy efficiency that leads to higher loads.	**Low Forecast**	**High Forecast**	**Low Forecast**	Unmanaged EV Charging	Base Forecast	NREL High Forecast	Full Potential / **Land-Constrained for O'ahu**
3	Low Load Bookend	✓	✗	Understand the impact of customer adoption of technologies for DER, electric vehicles, and energy efficiency that leads to lower loads.	**High Forecast**	**Low Forecast**	**High Forecast**	**Managed EV Charging**	Base Forecast	NREL High Forecast	Full Potential / **Land-Constrained for O'ahu**
4	High Fuel Price	✗	✓	Understand the impact of higher fuel prices on the resource plan.	Base Forecast	Base Forecast	Base Forecast	Unmanaged EV Charging	**EIA High Fuel Price Forecast**	NREL High Forecast	Full Potential / **Land-Constrained for O'ahu**

Number	Modeling Case	Full Process	RESOLVE Only	Purpose	Assumptions						
					DER Fcst	EV Fcst	EE Fcst	EV Load Shape	Fuel Price Fcst	Res. Cost Fcst	Res. Potential
5	No New Combustion	✘	✓	Understand the impacts of aggressively minimizing GHG emissions from new generation resources	Base Forecast	Base Forecast	Base Forecast	Unmanaged EV Charging	Base Forecast	NREL High Forecast	Full Potential
6	LNG (O'ahu Only)	✘	✓	Understand the impact of LNG	Base Forecast	Base Forecast	Base Forecast	Unmanaged EV Charging	Base Forecast	NREL High Forecast	**Land-Constrained**

10 Grid Needs Assessment (GNA)

In the First Cycle, Hawaiian Electric proposed and implemented an iterative process for identifying and quantifying grid needs for generation, transmission and distribution. Hawaiian Electric plans to use this same process and same planning models to continue to identify grid needs.

In Order No. 40651, the Commission raised concerns that since Hawaiian Electric did not use the full modeling process for all scenarios, there may be reduced confidence that all scenarios were sufficiently examined to develop the preferred plans. As a result of this feedback, in the second cycle of IGP, Hawaiian Electric plans to model the following scenarios through the full modeling process:

- Base
- High Load Bookend
- Low Load Bookend

Modeling the load bookends through the full process provides a meaningful compromise and balance of modeling work to ensure that the second cycle of IGP can be completed in a reasonable amount of time while sufficiently examining a wide range of grid needs for generation, transmission, and distribution across the load bookends to inform the preferred plans.

The remaining sensitivities will be modeled only in RESOLVE to identify whether the new scenario assumptions cause a dramatic difference in resource build-out compared to the base case, or to serve as initial analysis for more detailed work in a separate docket.

For the transmission and distribution planning analyses, grid needs will be quantified across the load bookends. For transmission planning, a review will be performed to analyze power flow, dynamic stability, and protection for cases with high load, a high number of new large-scale projects interconnecting to the transmission system, and high DER / high EV adoption. For distribution planning, analyses for location-based and DER hosting capacity will be conducted for the base case, high load, and low load bookends.

Consistent with the discussion in the October 2023 STWG meeting[22] and shown below in Figure 10-1, Hawaiian Electric plans to utilize the following steps to develop the preferred plans:

[22] Accessible at: https://www.hawaiianelectric.com/a/13016

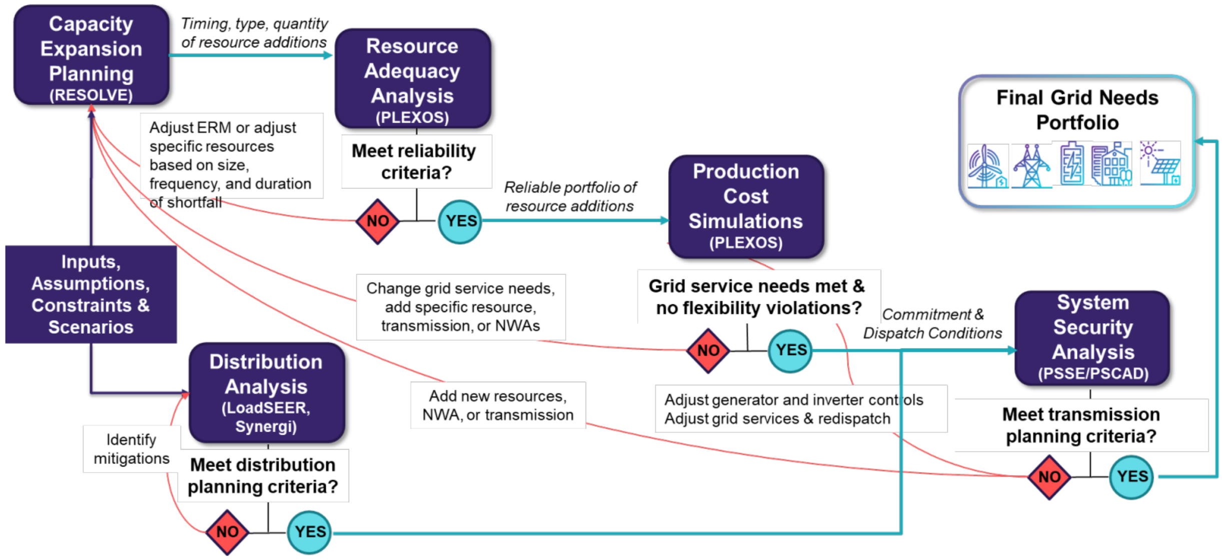

Figure 10-1: Grid needs assessment modeling framework

1. **Capacity expansion (all scenarios):** Initial resource plans for all scenarios will be developed in the RESOLVE model under the capacity expansion planning step. Working group and community feedback are then incorporated into the resource plan to reflect sentiment about certain resources identified in the plans. For example, in the First Cycle, onshore wind in certain REZ groups was removed based on feedback from the West Oʻahu and North Shore communities, and the duration of paired and standalone BESS was increased to four hours based on feedback from the TAP regarding current market conditions.
2. **Resource adequacy (base scenario and load bookends):** The reliability of the base, high load, and low load RESOLVE resource plans will be verified in PLEXOS in the resource adequacy analysis step. If there are reliability shortfalls in any of the three resource plans and the size and cost of the new resource needed to meet the reliability shortfall is a relatively small percentage of the total plan cost and total new resource build, then a new resource may be added manually to the resource plan to address it. Otherwise, the process steps will be repeated, and the RESOLVE model may be re-run with a higher ERM percentage to allow RESOLVE to select additional resources to meet the reliability need. Conversely, if the plans are overly reliable relative to a 0.1 LOLE, some future firm additions may be removed during the preferred plan development, similar to what was done in the First Cycle.
3. **Production cost simulation (base scenario, status quo scenario, and load bookends):** The production cost simulation step will then be run to determine the cost of the plans and develop the set of initial dispatch conditions for the system security analysis step.
4. **Integrate system security study findings:** Constraints identified in the system security study will then be folded back into the production cost simulation. Such constraints are primarily a function of the type and capabilities of resources added, interconnection locations, capacity of resources, and iterated with solutions that may address certain

constraints. For example, new reserves may need to be added to the PLEXOS model like grid-forming headroom reserve for dynamic stability, or the sizes of certain REZ may need to be reduced to avoid large transmission costs.

5. **Assess reasonableness of transmission planning requirements (base scenario, status quo scenario and load bookends):** The plan costs can then be compared with and without the transmission constraints to assess whether the transmission constraints have a significant impact on costs. If the change in production cost with the transmission constraints is relatively small compared to the cost of new transmission infrastructure, then the constraints can be deemed reasonable.
6. **Develop distribution system requirements (base scenario, status quo scenario, and load bookends):** Distribution upgrades required to support the projected loads and distributed resources in the base scenario and load bookends will be identified.
7. **Determine rate and bill impacts (base scenario, status quo scenario, and load bookends):** Rate and bill forecasts can then be developed using the production simulation costs, as well as capital costs for grid needs identified in the transmission and distribution analysis.
8. **Develop the preferred plans:** The preferred plans can incorporate results from the base case as well as the load bookends. Since the base case represents the most reasonable set of assumptions, the preferred plans should derive most of their elements from the base case results. However, if the rates and bills for the high load bookend are similar to the base case, it may make sense to include certain generation, transmission, or distribution investments from the high load bookend in the preferred plans as a means of mitigating the risk of higher loads. Conversely, if the rates and bills for the low load bookend are much lower than the base case, it may make sense to identify certain generation, transmission, or distribution investments that could be deferred from their original timing in the base case as a means of mitigating the risk of over-investment due to lower loads. Through this process, the final preferred plans will continue to place emphasis on the base case, but the load bookends may also influence the timing and quantity of generation, transmission, and distribution needs.

Given the convention in RESOLVE to model every five years of the planning horizon (e.g., 2035, 2040, 2045), generating resource additions may be added in five-year increment across the three cases at different amounts. This is illustrated in Figure 10-2, the Oʻahu RESOLVE build chart from the 2023 IGP final report. The five-year increments represent a reasonable planning assumption to identify resource grid needs that allows for adequate time to develop future RFPs, seek Commission approval of the RFP, select projects through the RFP evaluation process, and file project applications.

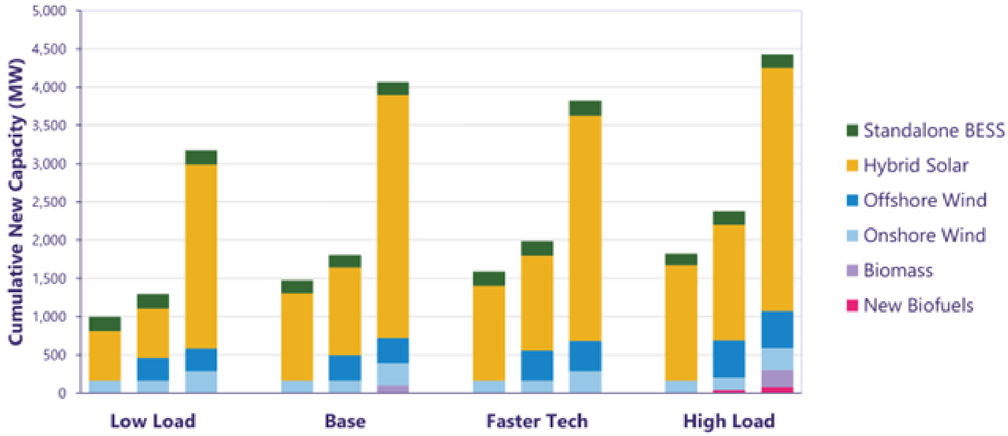

Figure 10-2: O'ahu capacity selected by RESOLVE in 2030, 2035 and 2050

Table 10-1 walks through an example of how Hawaiian Electric could use the low load, base case, and high load resource plans to further inform RFP targets as part of the preferred plan.

Table 10-1: Preferred plan development example

Year	Low Load	Base	High Load	Preferred plan
2035		Resource 1 - Base 10 MW	Resource 1 - HL 12 MW	RFP 1 Procure for target of 10 MW, up to 12 MW, of grid service provided by Resource 1 with required COD in 2035, preference for earlier COD in 2033-2034
2036				
2037				
2038				
2039				
2040	Resource 1 - LL 8 MW	Resource 2 - Base 5 MW Cumulative – 15 MW	Resource 2 - HL 9 MW Cumulative – 21 MW	RFP 2 Procure for target of 5 MW, up to 9 MW, of grid service provided by Resource 2 with required COD in 2040, preference for earlier COD in 2038-2039
2041				Assuming RFP 1 procured the full MW target and because the RFP 1 target (10 MW) was larger than the Low Load grid needs in 2040 (8 MW), consider whether other existing generating units can be retired
2042				

To account for the resource build differences in the preferred plan, the RFPs should target the grid needs in the base case but allow the RFP flexibility to procure up to the grid needs in the high load case. This will help to account for changes in resource mix and policy that could set Hawaiian Electric on the pathway to higher load. The RFP would also use the base case build year as the commercial operations date (COD) target but because of the five-year build interval, would have preference for CODs that can be achieved earlier, e.g., by one to two years. By preferring projects with shorter timelines to reach commercial operations, this gives further flexibility to revise targets for the next RFP should projects withdraw or higher loads develop.

To account for slower resource build out under the low load case, Hawaiian Electric can evaluate whether grid needs in the low load case were previously addressed by an earlier RFP (RFP 1 in Table 10-1). If the grid needs in the low load case were met, then the following RFP (RFP 2 in Table 10-1) could adjust its target to account for any additional needs or consider whether additional existing generating units could be retired. The decision to retire additional generating units would be contingent upon the cumulative response to both RFP 1 and RFP 2 and the likelihood that the selected projects receive Commission approval and reach commercial operations.

PART 4: PLAN ACCEPTANCE AND IMPLEMENTATION

11 Growing the Clean Energy Marketplace

Following Commission approval of the Integrated Grid Plan, the Company will work on implementing the preferred plans identified through the IGP process.

Using the preferred plans and identified system needs, the Company will translate the plans into actionable steps such as targeted procurements, infrastructure investments, and program initiatives to implement the plan in a manner that supports a safe, reliable, and resilient electric grid.

- **Targeted procurements:** Requests for Proposals (RFPs) will be developed by translating the preferred plans into specific procurement targets to align with the grid needs and timing identified. The RFPs will follow the Framework for Competitive Bidding to ensure a fair process where solutions are selected from the market at the best prices for customers and community benefits programs for host communities.
- **Grid improvements:** The Company will advance associated transmission, distribution, and non-wires alternative implementation needed to support expansion of resources (i.e., REZ), such as transmission network expansions, substation upgrades, and distribution grid enhancements, to address grid needs identified and enable large-scale resource procurements.
- **Customer programs:** The plans developed in IGP will be used to inform and develop customer programs and options with incentives to encourage customer adoption of rooftop solar, energy storage, vehicle charging, and energy efficiency.

Throughout implementation, the Company will continue to engage with stakeholders and the community on plan implementation and provide updates on progress through the IGP Action Plan Annual Update filings.

12 Renewable Energy Zones (REZ)

Hawaiian Electric is advancing Renewable Energy Zones (REZs) from a planning concept to early implementation to support long-term, higher-capacity renewable resources and associated transmission. REZs are intended to help meet Hawai'i's clean energy goals by concentrating large-scale renewable development in areas that balance technical feasibility, land availability, and community considerations.

As noted in the Commission's Inclinations, REZs can streamline renewable project siting and interconnection while addressing community concerns. Consistent with this guidance, the Commission directed Hawaiian Electric to work with appropriate government agencies to designate two REZs on O'ahu by the second quarter of 2026.

12.1 Current REZ-Related Work

Hawaiian Electric has begun early REZ activities focused on coordination, information gathering, and engagement, including:

- Initiating coordination with state and county agencies to understand permitting, land use, and infrastructure considerations
- Preparing to engage consultants to support technical analysis, routing considerations, and stakeholder engagement
- Developing the groundwork for an application to the Commission seeking confirmation of near-term plans for REZ designation

Early work is focused on understanding potential interconnection pathways, land requirements for generation and transmission, and key constraints that may affect feasibility. These efforts are intended to inform the identification of candidate REZs rather than pre-select specific sites.

12.2 Engagement and Routing Approach

An integrated routing and engagement process is being developed to identify opportunities, constraints, and community sensitivities early in the process. This approach will:

- Use a routing and engagement framework informed by industry best practices and local engagement needs

- Incorporate phased discussions and information-gathering to narrow potential corridors and sites
- Include both in-person and virtual engagement, as well as opportunities for site-specific discussions with landowners and community members

Community input will help inform how REZ locations and associated transmission routes are refined and prioritized, alongside technical and environmental considerations.

12.3 Near-Term Next Steps

Looking ahead, Hawaiian Electric plans to:

- Continue REZ-related outreach through the IGP Stakeholder Technical Working Group, Community Working Group, and other forums
- Provide accessible, up-to-date REZ information through a dedicated webpage

While initial REZ efforts are focused on designating two zones on Oʻahu, the IGP framework allows for future REZ development across the islands as planning, policy, and system needs evolve.

PART 5: NEXT STEPS

13 Next Steps

A high-level schedule of proposed next steps is presented below, summarizing current work in progress and estimated milestones.

- 2026 Q1:
    - Host first IGP Community Working Group meeting, completed January 2026.
    - Submit Final IGP workplan herein
    - Submit Initial Inputs and Assumptions herein
- 2026 Q2:
    - Designate 2 REZ projects on O’ahu by Q2 2026
- 2026 Q3
    - Submit Final Inputs and Assumptions by end of August 2026
    - Submit Final Grid Needs Assessment by end of August 2026
- 2026 Q4
    - Host Modeling Workshop
- 2027–2029:
    - Modeling Scenarios Q1 2027 – Q4 2028
    - IGP Report Q4 2028 – January 2029
    - Commission review, February 2029 – January 2030

APPENDICES

14 Appendix A: Stakeholder Feedback

Some of the stakeholder groups created during the First Cycle to facilitate engagement and communication continued meeting after the filing of the IGP report. The Community Working Group was formed in preparation for the Second Cycle. The materials discussed and stakeholder feedback are shown below.

14.1 Stakeholder Technical Working Group

The Stakeholder Technical Working Group (STWG), continued meeting after the acceptance of First Cycle's IGP Report, discussing various technical topics supporting the development of the next Integrated Grid Plan. Table 14-1 includes a list of meeting dates and links to meeting notes. This information along with supporting documents are available within the Key Stakeholder Documents Library[23].

The Stakeholder Technical Working Group (STWG), continued meeting after the acceptance of First Cycle's IGP Report, discussing various technical topics supporting the development of the next Integrated Grid Plan. Table 14-1 includes a list of meeting dates and links to meeting notes. This information along with supporting documents are available within the Key Stakeholder Documents Library[24].

[23] Accessible at: https://www.hawaiianelectric.com/clean-energy-hawaii/integrated-grid-planning/stakeholder-and-community-engagement/key-stakeholder-documents

[24] Accessible at: https://www.hawaiianelectric.com/clean-energy-hawaii/integrated-grid-planning/stakeholder-and-community-engagement/key-stakeholder-documents

Table 14-1: List of STWG meetings and material since the filing of our Draft Workplan

Date	Notes
August 28, 2025	General Presentation Meeting Summary
October 23, 2025	General Presentation Meeting Summary
December 18, 2025	Renewable Energy Zones Presentation Energy Efficiency Presentation Meeting Summary

14.1.1 Summary of Survey Responses

Meeting 1 – August 28, 2025 – Review Draft Workplan

The input survey received one response.

The respondent shared that they would like to cover the following topics during an upcoming working group meeting:

- HERA
- PSPS and EFT impacts on sales forecast
- How HECO's resilience plans fit into IGP and how that in turn fits into multi year rate plan
- Future climate weather modeling
- Estimated load growth from AC/building cooling; weather normalization to peak loads
- DER disaggregation – propensity based models that account for behavior of customers, geographic location
- Non-wires alternatives
- How the sausage is made: coordination between HECO's various planning departments for IGP

Regarding suggestions or feedback for Hawaiian Electric regarding enhancing upcoming working group meetings, the respondent shared there doesn't seem to be much time for discussion after the presentations, but they think the survey helps with this, giving stakeholders time to digest the info and provide more meaningful feedback.

Regarding if Hawaiian Electric should streamline the scope of the analyses for the Second Cycle to focus on near term renewable portfolio standard (RPS) and greenhouse gas (GHG) goals in the Governor's Executive Order No. 25-01 and the Public Utility Commission's 2024 Inclinations—or conduct a broader, longer-term comprehensive analysis that addresses a wider range of planning issues, the respondent shared Hawaiian Electric should streamline the scope of the analyses to focus on near term renewable portfolio standard (RPS) and greenhouse gas (GHG) goals in the Governor's Executive Order No. 25-01 and the Public Utility Commission's 2024 Inclinations. However, given the Governor's recent agreement with JERA, the Trump administration's backing of natural gas, and the broader national conversation around energy affordability, they believe addressing LNG at a future STWG meeting is warranted and it should be included among the other fuels in the Fuel Price Forecast.

The respondent shared their recommendations for Hawaiian Electric to adjust resource costs from the NREL Annual Technology Baseline (ATB): Establish a transparent and mandatory adjustment process for NREL ATB data based on locally observed costs and the impacts of recent policy changes. Formalize the process of comparing NREL ATB resource costs against the results of recent local competitive procurements for similar resource types. If the difference in resource cost between the NREL ATB and observed costs of procured resources is significant, HECO should propose an adjustment to the resource cost forecast and present to STWG for feedback prior to finalization. HSEO's alternative fuel study compared recently completed PV projects in Hawaiʻi to continental U.S. prices and found that a Hawaii cost multiplier of 2.154 was appropriate for scaling capacity expansion technologies. HECO could use this approach if recent procurement data is unavailable.

Regarding how energy efficiency should be treated in the planning analysis, the respondent shared it should be supply-side resource option. Hawaiian Electric should use both approaches for EE. The sales forecast layer is essential, and the selection of EE supply bundles would provide useful information about the relative value of EE. The respondent shared their recommendations for Hawaiian Electric to incorporate emerging technologies for both supply and demand:

- Continue prioritizing commercial ready technologies as they can be fully defined in models like RESOLVE and PLEXOS
- Continue using resources as proxies for the grid services they provide
- Incorporate uncertainty via a high resource cost scenario
- Avoid conducting comprehensive modeling analyses on technologies that are not likely to be commercially available for the next decade, reserving more detailed analysis for those with near-term viability
- Leverage the Innovation Pilot Process for emerging technologies that are nascent, higher risk, or not yet commercially viable
- Monitor findings and outcomes from the two working groups on Geothermal and Nuclear SMRs
- As an aside, one emerging technology that hasn't been discussed much is dynamic congestion management software. The respondent would be interested to find out the effect it could have on Hawaii's grids and how far it is on the commercialization pathway.
- The respondent also hasn't heard much discussion about balcony solar or whether the legislature will consider it next session.

Meeting 2 – October 23, 2025 – EoT, DER Load Layer and Fuel Price, Resource Cost Forecasts

The input survey received one response.

The respondent reported they somewhat agree that their participation in the IGP STWG is a good use of their time.

The respondent did not respond to the questions regarding assumptions or future working group meetings.

The respondent shared that in terms of near- or long-term issues that Hawaiian Electric should consider in its planning as it decides on the scope for this next cycle of the IGP, they had a quick question about the EV modeling. They would like to understand whether the EV DER plan affects the Department of Transportation's plans for expanding EV access and charging infrastructure across the state. The respondent also asked to what extent Hawaiian Electric is considering the DOT plans within the modeling framework.

Meeting 3 – December 18, 2025 – REZ Criteria and Energy Efficiency Review

The input survey received 11 total responses. Ten (10) respondents reported they represent O'ahu, and one respondent reported they represent Hawaii Island.

Generation Potential

Nine respondents (82%) reported they agree with the way generation potential is being captured (in $/MW). Respondents who did not agree with the way generation potential is being captured reported the following:

- Target a varied resource portfolio. Need to consider energy production profile and load correlation
- The transmission requirements should be a result of the planning. Is this a circular argument? Why not simply in terms of potential MWs that can be accommodated?

Maintenance Costs

All respondents reported they agree with the way maintenance costs are being captured (in rankings of low, medium and high per an SME estimate).

Developer Interest

Eight respondents (73%) reported they agree with the way known developer interest is being captured (in acres of land of interest). Respondents who did not agree with the way known developer interest is being captured reported the following:

- May be more helpful
- Technologies have different footprints, so weighting by area is not a useful measure

Land Availability

Eight respondents (73%) reported they agree with the way land availability is being captured. Respondents who did not agree with the way land availability is being captured reported the following:

- Technologies have different footprints and land use needs

Equity

Seven respondents (64%) reported they agree with the way equity is being captured [in both generation footprint (acres) for fossil fuel/biofuel and in generation capacity (MW) for solar/wind]. Respondents who did not agree with the way equity is being captured reported the following:

- This does not seem related to equity

- Feels a little over simplified
- I see no value in this equity metric. Let the market decide

Environmental Impacts

Six respondents (55%) reported they agree with the way environmental impacts are being captured (in percentage of land requiring permits of high, medium or low difficulty per an SME estimate). Two respondents did not respond, and three reported they did not agree with the way environmental impacts are being captured. Respondents who did not agree reported the following:

- Permit difficulty does not represent environmental impacts
- Also feels a little over simplified
- Permitting difficulty is a poor proxy for impact

Limited Climate Risk Exposure

Eight respondents (73%) reported they agree with the way limited climate risk exposure is being captured (in acres of land with low, medium and high risk of wildfire, floods and tsunamis). One respondent did not respond, and two reported they did not agree with the way limited climate risk exposure is being captured. Respondents who did not agree reported the following:

- Over simplified, particularly fire risk. Certain projects can actually reduce fire risk
- Sea-level rise and coastal erosion should be accounted for, if not already

Other

Respondents reported that the following additional data may help Hawaiian Electric determine which REZ are top priority for development and implementation:

- REZ 8 has the highest renewable potential but lacks transmission. This is a huge barrier for renewable development in O‘ahu.
- The areas with potential for the type of resources desired in the resource portfolio. Need to target a diverse mix (geographic / electrical / resource type) for resilient reliable operation.
- I think at some point we have to realize on O‘ahu only one REZ makes sense, and it will require Dole to build on their pineapple plantation…that’s probably not very practical.
- Community acceptance
- Closeness to existing transmission infrastructure.
- The availability of private land for sale since developers will be attracted there first and then state and federal lands.

Respondents reported that they feel the following are not being considered but should be part of the criteria:

- Support potential for mix of resources to support reliable and resilient grid with adequate energy under range of weather and climate conditions

- Some of this feels a little oversimplified, a yes/no response is not the most helpful.
- You might want to also consider the percentage of agricultural lands by ag rating for each zone, with REZs being less favorable if they have a high proportion of prime ag lands.
- Developers who have purchased land in REZ such as REZ 8. Develop the substation that allows the most access to the greatest # of MW potential at private lands and then public lands.

Energy Efficiency

The input survey received two responses.

Regarding adjusting the EE forecast from the Market Potential Study levels, one respondent noted the need for more information to determine if adjustments were warranted.

In response to whether energy efficiency should be treated as a supply-side resource or embedded in the load forecast, the two respondents had differing opinions. One suggested that energy efficiency should assume a base case and additional energy efficiency as a supply-side resource, while the other suggested EE should be embedded in the load forecast because it's a change in customer-sided use and is likely being offset by other customer load decisions.

14.2 Community Working Group

The Community Working Group (CWG), was formed to better engage and communicate with community groups in this Second Cycle, discussing various topics supporting the development of the next Integrated Grid Plan. Table 14-2 includes a list of meeting dates and links to meeting notes. This information along with supporting documents are available within the Key Stakeholder Documents Library[25].

Table 14-2: List of CWG meetings and material since the filing of the Draft Workplan

Date	Notes
January 13, 2026	CWG Kickoff Presentation
January 27, 2026	REZ Evaluation Criteria Presentation

14.2.1 Summary of Survey Responses

Meeting 1 – January 13, 2026 – Kickoff Meeting

The input survey received five responses.

Respondents reported that weekday mornings, particularly Tuesday or Wednesday mornings between 8 and 11 am HST work best for them to participate in meetings.

[25] Accessible at: https://www.hawaiianelectric.com/clean-energy-hawaii/integrated-grid-planning/stakeholder-and-community-engagement/key-stakeholder-documents

Respondents reported a preference for virtual meetings for accessibility and efficiency. Respondents also reported a preference for using Zoom for online meetings. In-person meetings were noted as valuable, especially for island-specific meetings and topics.

Respondents reported they would like to see the following meeting features in CWG meetings:

- Guest speakers
- Open discussion
- Speaker panels
- Formal presentations
- Q&A
- Interactive activities, especially for in-person meetings

Respondents reported they would like to cover the following topics during future CWG meetings:

- Community engagement approaches, especially for underserved or hard to reach groups
- Climate resilience and sea level rise implications for the energy system
- Distributed Energy Resources (DER)
- Microgrids and other community resources
- Battery Energy Storage Systems (BESS)
- Geothermal advocacy and pathways
- Energy wheeling
- Power Purchase Agreements (PPA) and processes

Meeting 2 – January 26, 2026 – REZ Criteria Review and Weighting Meeting

The input survey received seven respondents from CWG participants and two observers. The summary below includes the feedback only from CWG participants.

Respondents weighted each of the three priorities. Community and environment was rated the highest at 38%, followed by resiliency and climate at 33%, and cost effectiveness and efficiency at 29%.

Within the cost effectiveness and efficiency priority, respondents placed the highest weights on generation potential and maintenance.

Within the community and environment priority, respondents generally placed equal weight between equity and environmental impacts. Respondents suggested that this priority be renamed to equity and environment rather than community and environment to better reflect its intention. Additionally, respondents noted that difficulty of permitting did not necessarily capture the level of environmental impact.

Within the resiliency and climate priority, respondents prioritized fire risk, then flood risk, followed by tsunami risk.

There were mixed responses on switching from using average characteristics across all projects to using a “first project” approach. The project team explored what the different approach would change in the four prioritized REZ, and it did not change the four that ranked highest, only their order.

Overall, respondents cautioned Hawaiian Electric to avoid agricultural lands and sensitive cultural resources, respect community sentiment and proximity to residences and schools, consider emergency access and evacuation routes, and recognize variation from parcel to parcel. Respondents also encouraged Hawaiian Electric to consider county and state lands for REZ, and to explore how microgrids and agrivoltaics can be incorporated into the program.

14.3 Technical Advisory Panel

The Technical Advisory Panel, also referred to as the TAP, has continued its work since the First Cycle, discussing various technical topics including the evaluation of the Stage 3 RFP and aspects of grid reliability. Table 14-3 includes a list of dates with links to meeting summaries and technical reports. This information along with additional presentations are available within the Key Stakeholder Documents Library[26].

Table 14-3: List of TAP meetings and material since the acceptance of the First Cycle IGP Report

Date	Notes
August 8, 2024	General Presentation TAP Feedback – Dynamic UFLS Study
March 10, 2025	General Presentation TAP Feedback – Dynamic UFLS Study Update

[26] Accessible at: https://www.hawaiianelectric.com/clean-energy-hawaii/integrated-grid-planning/stakeholder-and-community-engagement/key-stakeholder-documents

15 Appendix B: Initial Inputs and Assumptions

The inputs and assumptions to be used in this IGP cycle will be provided in multiple workbooks. This appendix covers some of the main inputs used in the planning analysis. Table 15-1 lists the inputs that are covered in the workbooks that accompany this workplan.

Table 15-1: List of inputs and workbook locations.

Workbook Title	Description
Inputs Workbook 1	Thermal Generator Properties Thermal Generator Costs Variable Generator Properties Energy Storage Properties Maintenance Outage Rates Planned Maintenance Schedule Forced Outage Rates Reliability Parameter Regulating Reserve Requirement Regulating Reserve Coefficients EIA Fuel Price – Base Forecast EIA Fuel Price – High Forecast Planned Resources – PPA Costs IGP Resource Cost – High Forecast GHG
Inputs Workbook 2	Unitized Renewable Profiles Historical Unitized Renewable Profiles
Inputs Workbook 3	EV Saturation EoT Sales Forecasts Base Unmanaged EoT High Unmanaged EoT Low Unmanaged EoT EE Sales Forecasts Base EE High EE Low EE

15.1 Load Forecasts

The load forecast is one of the many assumptions that the resource planners use in their models to stress test the various plans under varying conditions. Multiple scenarios and sensitivities are under development to plan around uncertainties surrounding adoption of behind-the-meter technologies, which ultimately drive the load forecast and peak demand.

Forecasts are under development for the five islands beginning with the development of the energy forecast (i.e., sales forecast) by rate class (residential, small, medium, and large commercial and street lighting) and by layer (underlying sales forecast and adjusting layers – energy efficiency, distributed energy resources, and electrification of transportation).

The underlying sales forecast is driven by the economy, weather, electricity price, and known adjustments to large customer loads and is informed by historical data, structural changes, and historical and future disruptions. The impacts of energy efficiency (EE), distributed energy resources (DER), primarily photovoltaic systems with and without storage (i.e., batteries), and electrification of transportation (EoT) are layered onto the underlying sales outlook to develop the sales forecast at the customer level.

Forecasts of underlying sales and distributed energy resources are under development and are planned to be provided in a supplemental filing by the end of July 2026.

15.1.1 Energy Efficiency

Table 15-2 shown below are the assumptions used to produce the low, base, and high Energy Efficiency forecast. The EE layer in the First Cycle was based on the July 2020 State of Hawaii Market Potential Study (2020 MPS) prepared by Applied Energy Group (AEG). The EE layer for the second IGP cycle uses the same basis and methodology as the First Cycle with adjustments described below:

- The first year of the forecast period is 2026. As a result, the forecast uses incremental projections from the 2020 MPS incremental projections for 2026-2040.
- Achieved programmatic energy efficiency measures reported by Hawaii Energy for 2019‑2024 were lower than the 2020 MPS Business-as-Usual (BAU) projections for those years. As a result, the low and base programmatic EE forecasts have been adjusted downward by 50% and 25% of BAU, respectively.

Table 15-2: Energy efficiency forecast assumptions.

IGP Scenario	Programmatic	Codes & Standards (C&S)
Low	MPS: BAU reduced by 50%	MPS: C&S
Base	MPS: BAU reduced by 25%	MPS: C&S
High	MPS: Achievable High	MPS: C&S

15.1.2 Electrification of Transportation

Table 15-3 shown below are the assumptions used to produce the low, base, and high Electrification of Transportation forecast. The EoT layer consists of impacts from charging of light duty electric vehicles (LDEV), medium and heavy duty electric vehicles (MHDEV), and electric buses. The Companies partnered with the National Laboratory of the Rockies (NLR, formerly National Renewable Energy Laboratory) to develop the EoT forecast using NLR's dynamic input-driven TEMPO™ model. The NLR methodology and proposed forecasts were presented at the October 23, 2025 Stakeholder Technical Working Group meeting[27]. Hourly net system load forecasts for unmanaged charging represent hourly system-level load from LDEV and MHDEV charging without future expansion or addition of managed charging programs. EoT hourly load forecasts with adjustments to reflect impacts of future managed charging programs on charging behavior are under development.

Table 15-3: Electrification of transportation forecast assumptions.

IGP Scenario	NLR Scenario
Low	50% of NLR Base Scenario
Base	NLR Base + 100% State MHDEV Fleet
High	NLR High Scenario

15.1.3 Distributed Energy Resources

The distributed energy resources (DER) layer includes impacts of behind the meter PV and battery energy storage systems as well as known projects for other technologies (e.g., wind). This forecast layer estimates new additions of DER capacity in each month by island, rate class and program, and projects the resulting monthly sales impact and hourly load impact from these additions. Table 15-4 shown below are the assumptions used to produce the low, base, and high DER forecast.

The forecast methodology is consistent with the methodology used in the First Cycle. Updated assumptions were presented at the October 23, 2025 Stakeholder Technical Working Group meeting. The forecasts are under development and will be provided in a supplemental filing in July 2026.

[27] Accessible at: https://www.hawaiianelectric.com/a/15800

Table 15-4: DER forecast assumptions.

Input	Low Lower uptake scenario	Base Uptake based on Smart Renewable Energy with inclusion of certain BYOD riders	High Policy-driven: 400+ MW by 2030 Economic model 2031-forward
Cost Projections	NREL ATB 2024 - Conservative Cost	NREL ATB 2024 - Conservative Cost	2031-forward: NREL ATB 2024 Advanced Cost
Federal Tax Credits	None	None	2031-forward: None
State Tax Credits	None	35%	2031-forward: 35%
Program Export Compensation	Smart Renewable Energy	Smart Renewable Energy	2031-forward: Retail
System Size	Based on recent historical	Based on recent historical	Based on recent historical
BYOD	BYOD+: Same as Base BYOD Dispatch: None	BYOD+: Based on current trend. Ends in 2035. BYOD Dispatch: Begins in 2035.	BYOD+ and BYOD Dispatch: Participation similar to Battery Bonus
Addressable Residential Market	Single Family/2-4 Unit Multi- Family/Owner Occupied/Consumption Threshold	Single Family/2-4 Unit Multi- Family/Owner Occupied/Consumption Threshold	Base + 25%
Addressable Commercial Market	Public or Private Owned/<6 stories/Consumption Thresholds	Public or Private Owned/<6 stories/Consumption Thresholds	Base + 25%
Add-Ons Market Pool	None	NMP adoption continues at historical pace	Sch-R NEM with usage sufficient for 3 kW NMP
BESS Minimum Reserve Capacity	Same as Base	Seek Feedback from Stakeholders	Same as Base

15.1.4 Underlying Load

The methodologies for developing the underlying sales forecasts are consistent with those used to develop the underlying sales forecasts in the First Cycle. Differences in the type and specifications of the models may differ from the First Cycle due to re-specification of the models to include additional historical data from 2019 – 2025. The underlying sales forecasts will be informed by the 2nd Quarter 2026 economic forecasts from the University of Hawaiʻi Economic Research Organization (UHERO) and will be provided in a supplemental filing in July 2026.

15.2 Fuel Price Forecasts

The cost of producing electricity is dependent upon, in part, the cost of fuels utilized to generate power. Hawaiian Electric uses the following fuel types:

- Low Sulfur Fuel Oil (LSFO): A residual fuel oil similar to No. 6 fuel oil that contains less than 5,000 parts per million of sulfur; about 0.5% sulfur content.
- No. 2 Diesel Oil
- Ultra-Low Sulfur Diesel (ULSD)
- Naphtha
- High Sulfur Fuel Oil (HSFO): Also called Industrial Fuel Oil (IFO), HSFO contains less than 2% sulfur
- Biodiesel

Hawaiian Electric's 2025 forecast was based on the Brent forecast provided by the Energy Information Administration ("EIA") Annual Energy Outlook ("AEO") and is provided in Workbook 1.

15.3 Thermal Unit Portfolio and Characteristics

Hawaiian Electric's thermal generating unit capacity is provided by a mix of utility-owned generation and independent power producers (IPPs). Key inputs to characterize the operation of the utility-owned generation include the minimum and maximum capacity, operating fuel, heat rate coefficients, planned maintenance outages, forced outage rates, and maintenance outage rates. These inputs, as well as other generator characteristics, are provided in Workbook 1.

Assumed Start/End Date

For resources that have PPAs but are currently not operational, the expected Commercial Operation Date (COD) is provided. For potential future resources that can be selected by RESOLVE, the earliest COD we are assuming is provided.

For existing resources, Hawaiian Electric may make certain planning assumptions on the retirement or removal from service of existing units to determine resulting grid needs. To the extent that these assumptions are not being driven by hard requirements such as environmental compliance, these are assumptions made just for planning purposes and should not be perceived as firm commitments to retire units. Firm commitments to retiring a generating unit need to be flexible and contingent upon the successful procurement and commercial operation of new resources.

Minimum and Maximum Capacity

The minimum and maximum capacity of a generating unit define its dispatchable range. For potential future resources that can be selected by RESOLVE, the information provided represents the maximum and minimum size of a single resource and not the full resource potential.

Operating fuel

Operating fuel of a generating unit is the fuel assumed to be used by the generator.

Heat Rate Coefficients

The heat rate coefficients define the heat input function $y = cx^2 + bx + a$, where y is the amount of fuel consumed to produce at the megawatt level, x, for one hour.

Maintenance Outages and Forced Outages

Maintenance outages can be defined as discrete occurrences with a start date and duration or can be defined as a percentage of the year that the unit will be out of service on maintenance based on historical data. Forced outages are unexpected and unplanned generating unit outages and are defined as a percentage of the year that the unit may experience a forced outage based on historical data.

In the 2024 IGP Action Plan Annual Update, Hawaiian Electric continued to refine its probabilistic resource adequacy methodology by incorporating the modeling of partial outages based on 2022-2023 outage data. This was an improvement from prior modeling where partial outages were represented by equivalent full unit outages. By directly modeling partial outages, the model can more accurately represent actual outages as they have occurred in the past.

In this IGP cycle, we will expand on what was done in the 2024 IGP Action Plan Annual Update by also including 2024 outage data. Maintenance outage rates will be based on historical maintenance outage events from years 2022-2024 and include both full maintenance outages and derated maintenance outages. Similarly, forced outage rates will be based on historical forced outage events from years 2022-2024 and include both full forced outages and derated forced outages.

15.4 Renewable, Storage, and Grid Services Portfolio

In addition to the thermal generating units, Hawaiian Electric has a diverse range of Utility-scale variable renewable resources including wind, solar, and hydro in its portfolio. Several upcoming projects will also add storage to the resource mix, paired with solar or as a standalone resource. Workbook 1 presents the Utility-scale Renewable, Storage, and Grid Service resources that are assumed to be online in the RESOLVE and PLEXOS models and are either existing resources that are currently online or have had an application submitted for approval. The inputs are similar to the inputs provided above for the thermal units. These resources are in addition to distributed resources which are included in the load forecast.

Workbook 2 provides the unitized hourly profile for each variable renewable generator. The unitized hourly profile multiplied by the maximum capacity results in the hourly available energy. Workbook 2 also provides the historical profile from years 2015-2019. For existing wind resources, the historical data was from actual historical measurements. For new wind resources, the historical data was from the NLR Wind Resource Database (WRDB). For solar resources, the historical data was from NLR National Solar Radiation Database (NSRDB).

15.5 Regulating Reserves

The supply and demand for electricity is constantly fluctuating throughout the day. As a result, Hawaiian Electric needs a portfolio with enough reserve capacity to minimize the risk of supply and demand imbalances. The methodology used to determine the regulating reserve requirement is the same as what was used in the First Cycle and will be presented again in further detail in the Grid Needs Assessment. The equation used to calculate the hourly required reserve capacity and the coefficients used in the calculation are provided in Workbook 1.

15.6 Greenhouse Gas Emissions

The total Project Greenhouse ("GHG") Lifecycle emissions ("emissions") are estimated using the GHG Emissions Analysis approach ("Analysis") that is standard for most projects submitted by Hawaiian Electric to the Commission. This approach addresses the Project's Upstream, Construction, Operations, and Downstream Stages, as shown in Figure 15-1 and Figure 15-2.

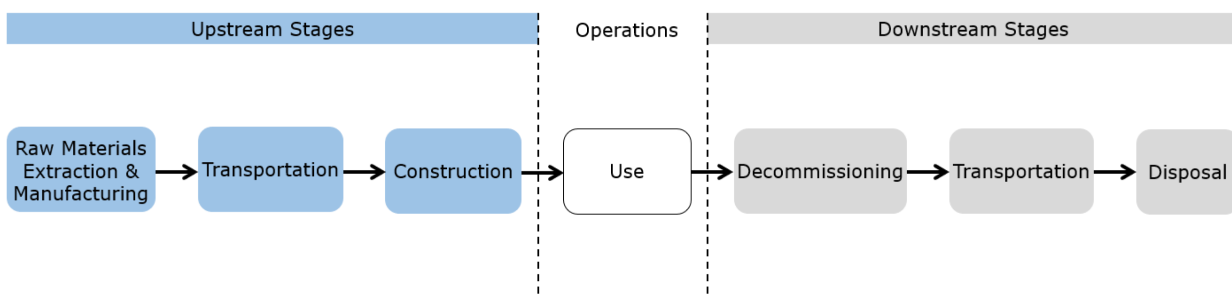

Figure 15-1: Stages for consideration in general GHG lifecycle emissions estimation.

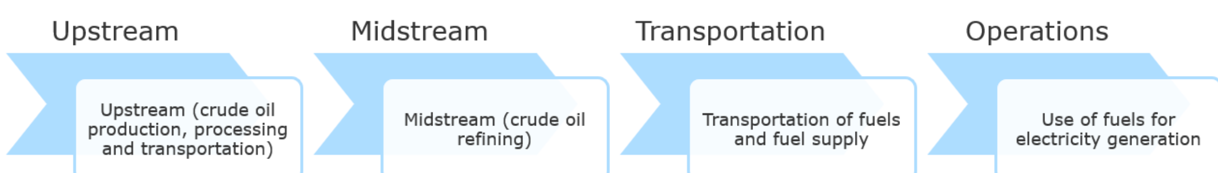

Figure 15-2: Stages for consideration in GHG lifecycle emissions calculation for fuel.

Greenhouse gas lifecycle analyses rely on a consistent set of assumptions and input data to estimate GHG emissions across all stages of a product or fuel's life.

Since many of the specifics including equipment, fuel source, and generation station location, are unknown during the early stages of the IGP process before specific projects are selected through the RFP process, Hawaiian Electric relies on emissions factors found in the published literature, default emissions factors, or previously conducted analyses for low sulfur fuel oil ("LSFO"), diesel, ultra-low sulfur diesel ("ULSD"), naphtha, intermediate fuel oil ("IFO"), biodiesel, biomass (agriculture and forest products), geothermal energy, and liquid natural gas ("LNG"), to reasonably present emissions estimates from these resources for stages prior to the selection of projects during the RFP process.

When each project application is filed with the Commission, the GHG analysis specific to each project that requires an analysis is refined and tailored to the project and site-specific inputs and assumptions.

For existing generation facilities, GHG lifecycle emissions are estimated from the emissions generated by facility operations, primarily from the upstream, midstream, transport, and combustion of the fuel used in the facilities.

The fuel's upstream GHG emissions include the extraction, production, and transportation of crude oil/stock to refineries, where it would be refined into fuels. The fuel's Midstream GHG Emissions include the refining of crude oil/stock into the fuels required by the Companies. For Hawaiian Electric's own existing facilities, burning existing fuel types, the analysis also includes the additional Transportation emissions using an "inventory approach" in which direct GHG emissions from transportation are calculated based on the location of electric generation facility- and Hawaiʻi-specific data. This includes transportation of crude oil/stock in addition to the upstream Transportation emissions accounted for in the Upstream stage, to account for transportation from Par/Pacific Biodiesel refinery or the storage at Hawaiian Electric's Barber's Point Tank Farm ("BPTF") to specific Company plants. The Operations stage of GHG Emissions are assumed to equal the direct generation (i.e., combustion) emissions and are calculated based on the combustion emissions of the fuel that would be consumed at the Companies' system facilities.

15.6.1 Emission Factors for Fuels

Emissions factors are provided in Workbook 1. The analysis proposed represents reasonable estimates for the early stages of the IGP where specific and accurate information are currently unavailable. Therefore, Hawaiian Electric will rely upon the above referenced literature and other well-established and published literature to present the best available GHG lifecycle emissions estimate at this time.

When each project application is filed in front of the Commission, the GHG analysis specific to each project that requires an analysis will be refined and tailored to the project and site-specific inputs and assumptions.

15.6.1.1 Fossil Fuels (LSFO, Diesel, ULSD, IFO, Naphtha)

For fossil fuel, the majority of the GHG emissions will be generated from the combustion of the fuel itself, which will be calculated based on emissions factors found in 40 CFR Part 98[28]. To estimate GHG emissions from the upstream lifecycle stages of the fuel, Hawaiian Electric will reference the analysis that was previously submitted with the GHG lifecycle analysis for PAR Fuel contract in Docket No. 2022-0014.

[28] Accessible at: https://www.ecfr.gov/current/title-40/chapter-I/subchapter-C/part-98

15.6.1.2 Natural Gas

Hawaiian Electric looked at GHG Lifecycle Emissions Factors for Natural Gas fired Generating Unit based on published studies by National Renewable Energy Laboratory ("NREL")[29] median of the harmonized[30] values. In the lifecycle assessment harmonization study referenced above, NREL reviewed and harmonized life cycle assessments of electricity generation technologies to reduce uncertainty around estimates for environmental impacts and increase the value of these assessments to the policy making and research communities.[31]

15.6.1.3 Biomass

Biomass (agricultural and forest residues) emissions factor is taken from the median values of lifecycle phases also published by NREL.[32] This emissions factor excludes emissions from combustion of the biomass. In this study NREL specifies biomass resources as agricultural and forest residues[33].

Further, to complete the lifecycle, the emissions from the combustion stage of the biomass (agricultural and forest residues) are calculated from the default emission factors in 40 CFR Part 98 Subpart C Table C-1 and Table C-2

15.6.1.4 Biodiesel

The combustion portion of biodiesel is estimated based on 40 CFR Part 98 emissions factors while the upstream portion of the fuel is estimated based on Argonne National Laboratory's Greenhouse gases, Regulated Emissions, and Energy use in Transportation Model ("GREET"). These sources were utilized to conduct the GHG lifecycle analysis for Hawaiian Electric's Biodiesel fuel contract, submitted as part of Docket No. 2025-0217.

15.6.1.5 Geothermal

Geothermal emissions factor is taken from the median values of lifecycle phases as published by NREL.[34]

15.7 Resource Cost Forecasts

The resource cost forecasts were transparently derived from a base technology capital cost forecast that was adjusted for:

- ***Future technology trends throughout the planning period;***
- ***Location-specific capital and O&M cost adjustments for Hawai'i; and***

[29] Accessible at: https://www.nrel.gov/analysis/life-cycle-assessment

[30] Harmonization refers to an analytical procedure used to align, standardize, and reconcile conflicting or highly variable results from different, independent studies

[31] NREL. Accessible at: https://www.nlr.gov/analysis/life-cycle-assessment

[32] NREL. September 2021. Life Cycle Greenhouse Gas Emissions from Electricity Generation: Update. Accessible at: https://docs.nrel.gov/docs/fy21osti/80580.pdf

[33] NREL. 2012. Renewable Electricity Futures Study. Volume 1 of 4. Accessible at: https://docs.nrel.gov/docs/fy12osti/52409-1.pdf

[34] NREL. September 2021. Life Cycle Greenhouse Gas Emissions from Electricity Generation: Update. Accessible at: https://docs.nrel.gov/docs/fy21osti/80580.pdf

- ***Applicable State tax incentives***

Figure 15-3 is a summary of the resource forecasts in nominal dollars and can be found in Workbook 1. In the near-term, there are price declines after accounting for the investment tax credit schedules for the State investment tax credits. Over the longer term the resources costs generally increase over time. As noted in the NLR ATB, all technologies include electrical infrastructure and interconnection costs for internal and control connections, onsite electrical equipment e.g. switchyard, power electronics and transmission substation upgrades. Grid connection costs are excluded.[35] Similarly, all technologies also include site costs for access roads, buildings for operation and maintenance, fencing, land acquisition, and site preparation in the capital expenditures as well as land lease payments in the fixed costs for O&M[35].

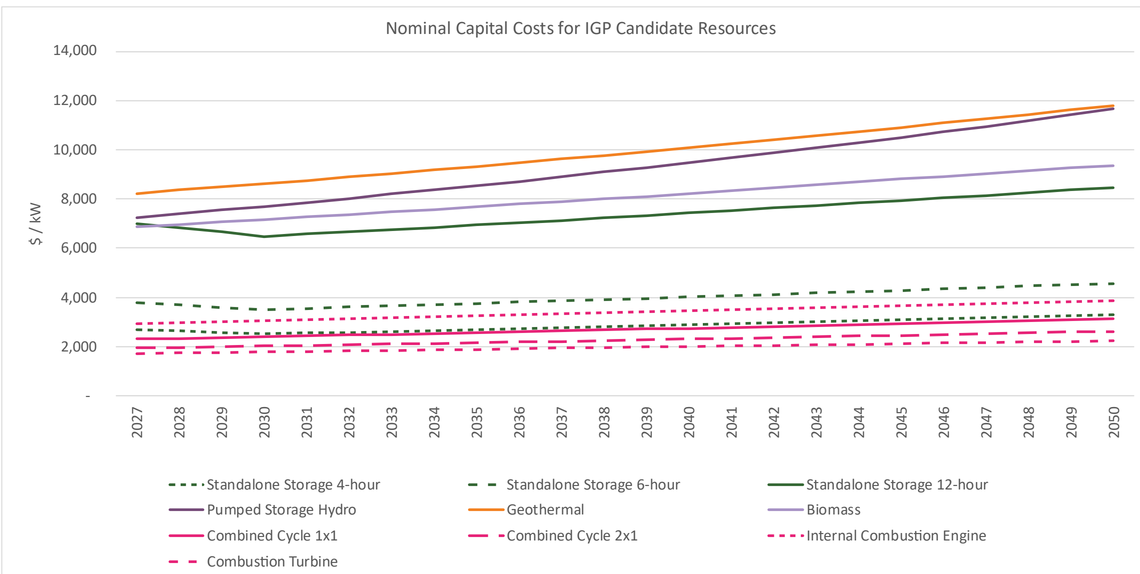

Figure 15-3: Capital costs for IGP candidate resources.

15.7.1 Resource Cost by Technology

Resource cost assumptions were based on publicly available datasets as shown in Table 15-5. Resource costs based on NLR datasets were updated to the latest Annual Technology Baseline published in 2024. Floating Offshore Wind, Distributed Wind, and Pumped Storage Hydro have been added to the ATB since the 2021 IGP I&A.

NLR's ATB provides resource costs under three different technology innovation scenarios: Conservative, Moderate, and Advanced. These scenarios are defined by the level of public and private R&D funding. The IGP resource costs assume the Conservative scenario with decreased R&D funding, little innovation in the currently available technology, and overall higher resource costs. The Moderate scenario assumes the current

35 Accessible at: https://atb.nrel.gov/electricity/2024/definitions#capitalexpenditures

level of R&D funding and the level of innovation continues. The Advanced scenario sees lower resource costs driven by increased public and private R&D funding.

Along with the new data, assumptions on tax credits were updated to incorporate changes made by the One Big Beautiful Bill.

Table 15-5: Resource cost data sources.

Source	Technology
National Laboratory of the Rockies (NLR) [36]	Grid-Scale Photovoltaics Community-Scale Photovoltaics Residential Photovoltaics Onshore Wind Offshore Wind Distributed Wind Geothermal Biomass Combustion Turbine Combined Cycle Grid-Scale Storage Community-Scale Storage Residential Storage Pumped Storage Hydro
Hawaiian Electric[37]	Internal Combustion Engine

15.7.1.1 Photovoltaics (PV)

For Photovoltaics (PV), three different classes were forecasted: Grid-Scale PV, Community-Scale PV, and Residential PV. Each class used a similar process to develop the cost forecast.

Data Source

The source data for capital and fixed operations and maintenance (O&M) costs was provided by the 2024 NLR ATB. For Grid-Scale PV, the capital costs provided were in Real 2022 dollars $/kWac and the O&M costs provided were in Real 2022 dollars $/kWac-year. For Community-Scale and Residential PV, the capital costs provided were in Real 2022 dollars $/kWdc and the O&M costs provided were in Real 2022 dollars $/kWdc-year. The future trend for the capital and fixed O&M cost was derived from the 2024 NLR ATB projections. The Real 2022 dollars were converted to nominal dollars by applying an escalation factor of 2.1%.

Location Adjustment

[36] National Renewable Energy Laboratory 2024 Annual Technology Baseline, 2024 ATB Data, Accessible at: https://atb.nrel.gov/electricity/2024/data

[37] ICE costs are based on the Schofield Generating Station provided in Docket No. 2017-0213, in response to the Consumer Advocate's information request number 19.

A location adjustment factor was applied to convert both capital costs ($/kW) and O&M costs ($/kW-year) to Hawaiʻi costs. A 63% location adjustment factor for capital[38] was provided by the U.S. Energy Information Administration (EIA)[39] for Grid-Scale PV and a 62% location adjustment factor for Commercial and Residential PV. An 18.5% location adjustment factor for fixed O&M costs was provided by the RSMeans City Cost Index.[40] Location-specific interconnection costs were not included in the estimate.

DC to AC Conversion

Capital costs for Commercial and Residential PV were converted from $/kWdc to $/kWac. For Commercial and Residential PV, a DC to AC conversion factor of 1.23 and 1.21 was used, respectively. These conversion factors were based on assumptions provided by NLR.

Investment Tax Credit Adjustment

A 35% State ITC[41] is assumed for Commercial and Residential PV.

15.7.1.2 Onshore Wind

Data Source

The source data for capital and fixed O&M costs for Onshore Wind was provided by the 2024 NLR ATB. The capital costs were in Real 2022 dollars $/kW. The fixed O&M costs were in Real 2022 $/kW-year. The future trend for the capital and O&M costs was derived from the 2024 NLR ATB projections. The Real 2022 dollars were converted to nominal dollars by applying an escalation factor of 2.1%.

Location Adjustment

The capital costs were converted to Hawaiʻi costs using a 35% factor from EIA for wind technology. The O&M costs were converted to Hawaiʻi costs using an 18.5% RSMeans factor. Location-specific interconnection costs were not included in the estimate.

Investment Tax Credit Adjustment

A 20% State ITC[42] is assumed for Onshore Wind.

15.7.1.3 Offshore Wind – Floating

Data Source

In the First Cycle, NLR determined that the deep water surrounding O'ahu means Floating Offshore Wind is needed.[43] The source data for capital and fixed O&M costs for Floating Offshore Wind was provided by the

[38] A location cost variation percentage from the EIA Capital Cost Estimates for Utility Scale Electricity Generating Plants.
[39] Accessible at: https://www.eia.gov/analysis/studies/powerplants/capitalcost/pdf/capcost_assumption.pdf
[40] RSMeans Building Construction Cost Data (BCCD) is a reference book for estimating construction costs in the U.S. and Canada.
[41] Accessible at: https://tax.hawaii.gov/geninfo/renewable
[42] Accessible at: https://tax.hawaii.gov/geninfo/renewable
[43] Accessible at: https://docs.nlr.gov/docs/fy22osti/80808.pdf

2024 NLR ATB. The capital costs were in Real 2022 dollars $/kW. The fixed O&M costs were in Real 2022 $/kW-year. The future trend for the capital and O&M costs was derived from the 2024 NLR ATB projections. The Real 2022 dollars were converted to nominal dollars by applying an escalation factor of 2.1%.

Location Adjustment

The capital costs were converted to Hawaiʻi costs using a 35% factor from EIA for wind technology. The O&M costs were converted to Hawaiʻi costs using an 18.5% RSMeans factor. Location-specific interconnection costs were not included in the estimate.

Investment Tax Credit Adjustment

A 20% State ITC[42] is assumed for Offshore Wind.

15.7.1.4 Distributed Wind

Data Source

The source data for capital and fixed O&M costs for Distributed Wind was provided by the 2024 NLR ATB. The capital costs were in Real 2022 dollars $/kW. The fixed O&M costs were in Real 2022 $/kW-year. The future trend for the capital and O&M costs was derived from the 2024 NLR ATB ATB projections. The Real 2022 dollars were converted to nominal dollars by applying an escalation factor of 2.1%.

Location Adjustment

The capital costs were converted to Hawaiʻi costs using a 35% factor from EIA for wind technology. The O&M costs were converted to Hawaiʻi costs using an 18.5% RSMeans factor. Location-specific interconnection costs were not included in the estimate.

Investment Tax Credit Adjustment

A 20% State ITC[42] is assumed for Distributed Wind.

15.7.1.5 Geothermal

Data Source

The source data for the Geothermal capital, fixed and variable O&M were provided by the 2024 NLR ATB for Geothermal geo-hydro binary technology. The capital costs, O&M costs and fuel costs in ATB were given in Real 2022 dollars and converted to nominal dollars by applying an escalation factor of 2.1%.

Location Adjustment

A 20% EIA factor for Geothermal technology was used to convert capital costs to Hawaiʻi costs. Fixed O&M and variable O&M costs used an 18.5% RSMeans factor. Location-specific interconnection costs were not included in the estimate.

Investment Tax Credit Adjustment

There are no tax credits assumed for Geothermal.

15.7.1.6 Biomass

Data Source

The source data for Biomass capital, fixed O&M, and variable O&M costs, as well as, Biomass fuel sources were provided by the 2024 NLR ATB for dedicated biomass technology. The capital costs, O&M costs, and fuel costs were given in Real 2022 dollars. The Real 2022 costs were converted to nominal dollars by applying an escalation factor of 2.1%.

Location Adjustment

Nominal capital, O&M, and fuel costs for Biomass were converted to Hawaiʻi costs. The capital costs were converted using a 46% EIA factor. The O&M and fuel costs were converted to Hawaii using an 18.5% RSMeans factor. Location-specific interconnection costs were not included in the estimate.

15.7.1.7 Combustion Turbine and Combined Cycle with Synchronous Condenser Function

Data Source

The source data for Combustion Turbine (CT) and Combined Cycle (CC) capital, fixed O&M, and variable O&M costs were provided by the 2024 NLR ATB forecast. The capital costs, O&M costs, and fuel costs were given in Real 2022 dollars. The Real 2022 costs were converted to nominal dollars by applying an escalation factor of 2.1%.

Location Adjustment

A 45% EIA factor for CT and CC technology was used to convert the capital costs to Hawaiʻi costs and an 18.5% RSMeans factor was used to convert the fixed O&M and variable O&M costs to Hawaiʻi costs. Location-specific interconnection costs were not included in the estimate.

15.7.1.8 Internal Combustion Engine (ICE)

Data Source

The source data to estimate Internal Combustion Engine (ICE) technology was informed by actual costs for the Schofield Generating Station project constructed on Oʻahu. The cost estimates were escalated from 2017 dollars by applying an escalation factor of 2.1%. The future cost trend was estimated using the cost trend for gas CT technology discussed above due to limited information on a future ICE capital cost trend.

15.7.1.9 Battery Energy Storage

Data Source

The source data for Grid-Scale, Community-Scale, and Residential Battery Energy Storage Systems (BESS) was provided in the 2024 NLR ATB. Both the Balance of System cost, provided in $/kW, and the Module costs, provided in $/kWh, were provided in Real 2022 dollars. Embedded interconnection cost was removed from the estimate. The Real 2022 costs were converted to nominal dollars by applying an escalation factor of 2.1%.

Location Adjustment

The capital costs for Balance of System and Modules were converted to Hawai'i costs using a 32% EIA factor. Fixed O&M and variable O&M costs were converted to Hawai'i costs using an 18.5% RSMeans factor.

Investment Tax Credit Adjustment

There are no tax credits assumed for Battery Energy Storage, standalone or paired.

15.7.1.10 Pumped Storage Hydro

Data Source

The source data for capital and fixed O&M costs for Pumped Storage Hydro was provided by the 2024 NLR ATB. The capital costs were in Real 2022 dollars $/kW. The fixed O&M costs were in Real 2022 $/kW-year. The future trend for capital and O&M costs was derived from the 2024 NLR ATB projections. The Real 2022 dollars were converted to nominal dollars by applying an escalation factor of 2.1%.

Location Adjustment

A 45% EIA factor for CT technology was used to convert the capital costs to Hawai'i costs and an 18.5% RSMeans factor was used to convert the fixed O&M and variable O&M costs to Hawai'i costs. Location-specific interconnection costs were not included in the estimate.

Investment Tax Credit Adjustment

There are no tax credits assumed for Pumped Storage Hydro.

16 Appendix C: Working Group Charters

16.1 Stakeholder Technical Working Group Charter

The Stakeholder Technical Working Group (STWG) serves as an advisory body for Hawaiian Electric's Integrated Grid Planning (IGP) process. The purpose of the STWG is to share information with customer and stakeholder representatives. The STWG will provide technical feedback to Hawaiian Electric to ensure alignment of the updated IGP with customer and stakeholder interests.

The STWG is one of three formal stakeholder groups in the overall stakeholder engagement process and is essential to the success of the IGP process. Further engagement with communities will occur in addition to the STWG throughout IGP.

Objectives

- **Provide technical input on planning assumptions:** This group will review and discuss load forecasting methods, distributed energy resources (DER) adoption assumptions, electrification scenarios, and key modeling inputs.
- **Review and enhance analytical methodologies:** This group will evaluate Hawaiian Electric's modeling approaches, including distribution system analysis, transmission-distribution coordination, hosting capacity, DER value assessment, and reliability and resilience modeling.
- **Support transparent evaluation of grid needs:** This group will examine results from needs assessments, constraints, and system performance analyses.
- **Explore solutions and portfolios:** This group will provide feedback on candidate portfolios of grid investments, non-wires solutions, DER programs, and operational strategies.

The STWG will:

- Provide advisory input on planning methodologies, assumptions, and analyses.
- Review and discuss technical materials, including data sources, modeling techniques, and draft results.
- Identify barriers and opportunities by raising issues related to data gaps, modeling limitations, and implementation challenges.
- Collaborate constructively, working with the utility and other members to improve shared outcomes and understanding.

The STWG will not:

- Make final decisions on grid investments or regulatory compliance.
- Direct utility operations or resource procurement.
- Replace formal public engagement and comment processes.

Roles and Responsibilities

STWG members will attend meetings, review materials, and provide constructive feedback. The STWG is an advisory group and not a decision-making body.

STWG members are expected to contribute to achieving the meeting goals by sharing ideas, asking questions, and contributing to discussions. Members should respect others' thinking and value everyone's contributions. Meetings will function under Chatham House Rules. Summary notes of meetings will be provided by Hawaiian Electric and shared publicly.

Hawaiian Electric will share information about the planning process and facilitate meetings to ensure inclusive discussion. Hawaiian Electric will share meeting materials and notes, and document input received.

Hawaiian Electric's planning team will provide technical information, respond to recommendations from the STWG, and incorporate feedback as applicable into planning documents.

Meeting materials will be sent to the STWG in advance of each meeting. Only public information will be shared so that participants are free to use materials as desired with their communities. Materials will be shared via the Hawaiian Electric IGP web page and document library.

Composition

The STWG is comprised of representatives from industry peer groups with representatives from internationally recognized utilities, market operators, and research organizations who have demonstrated engineering expertise in methodologies and technologies involving resource, transmission and distribution planning for large-scale and distributed renewable resources.

It is anticipated that representatives will serve on the STWG for the duration of the IGP cycle, which is anticipated to run through 2029-2030.

The STWG participants are composed of the following organizations:

- City and county representatives
- Community delegates from each island
- Consumer advocate
- Hawaii Public Utilities Commission
- Commercial and industrial customers
- Office of State Planning
- Solar developers
- Local and national sustainability advocates

- State of Hawaii Department of Business, Economic Development and Tourism
- U.S. Department of Defense
- Electric vehicle industry experts
- Energy efficiency industry experts
- Energy storage industry experts
- Environmental advocates

Status

The STWG kicked off on August 28, 2025.

Proposed Schedule

The STWG will remain active throughout the IGP cycle. The group is anticipated to meet bi-monthly for 90-minute virtual meetings.

16.2 Community Working Group Charter

The Community Working Group (CWG) serves as an advisory body for Hawaiian Electric's Integrated Grid Planning (IGP) process. The purpose of the CWG is to ensure that community perspectives, values, and priorities are incorporated into grid planning decisions. The CWG will provide input on equity, safety, reliability, affordability, sustainability, and resilience considerations to help shape a grid that meets the needs of all stakeholders.

The CWG is one of three formal stakeholder groups in the overall stakeholder engagement process and is essential to the success of the IGP process. Additional engagement with communities will occur in addition to the CWG throughout IGP.

Objectives

- **Engage community voices:** this group was created to facilitate meaningful participation from diverse communities
- **Inform planning decisions:** this group will provide input and feedback on proposed scenarios, assumptions, and strategies within the IGP process.
- **Promote transparency:** this group will act as a conduit for clear communication between the planning team and the public.
- **Support equity goals:** this group will help identify and recommend approaches that advance equitable access to energy resources and benefits.

The CWG will:

- Review and provide input and feedback on planning assumptions, modeling scenarios, and proposed solutions.
- Advise on community engagement strategies and outreach efforts as appropriate.
- Identify potential social, economic, and environmental impacts of integrated grid planning decisions.
- Recommend ways to integrate community priorities into planning outcomes.

The CWG will not:

- Make final decisions on grid investments or regulatory compliance.
- Serve as a substitute for formal public comment processes.

Roles and Responsibilities

CWG members will attend meetings, review materials, and provide constructive feedback. Members are expected to share information with their respective communities. The CWG is an advisory group and not a decision-making body.

CWG members are expected to contribute to achieving the meeting goals by sharing ideas, asking questions, and contributing to discussions. Members should respect others' thinking and value everyone's contributions. Meetings will function under Chatham House Rules. Summary notes of meetings will be provided by Hawaiian Electric and shared publicly.

Hawaiian Electric will share information about the planning process and facilitate meetings to ensure inclusive discussion. Hawaiian Electric will share meeting materials and notes, and document input received.

Hawaiian Electric's planning team will provide technical information, respond to recommendations from the CWG, and incorporate feedback as applicable into planning documents.

Meeting materials will be sent to the CWG in advance of each meeting. Only public information will be shared so that participants are free to use materials as desired with their communities. Materials will be shared via the Hawaiian Electric IGP web page and document library.

Composition

The CWG is made of representatives from community organizations, local governments, consumer advocates, environmental groups, and other stakeholders.

Representatives should have a demonstrated commitment to equity, diversity of perspectives, and ability to represent community interests.

It is anticipated that representatives will serve on the CWG for the duration of the IGP cycle, which is anticipated to run through 2029-2030.

The CWG is made of both participants and observers. Observers are members of the Stakeholder Technical Working Group (STWG) and are expected to listen to meetings and conversations, but reserve feedback for STWG specific meetings.

The CWG participants are composed of the following organizations:

- Hawaiʻi's Carbon Capture Storage and Utilization (CCSU) Consortium
- Hoʻāhu Energy Cooperative Molokai
- Hui O Hauʻula and Hauʻula Community Association
- Hui Ulu Mea ʻAi
- Lāhainā Strong
- LEI Foundation
- Sustainable Energy Hawaiʻi
- Sustainable Molokaʻi
- Vibrant Hawaiʻi

Status

The CWG will kick off on January 13, 2026.

Proposed Schedule

The CWG will remain active throughout the IGP cycle and may be reconstituted for future planning cycles. The group is anticipated to meet monthly for 1-hour virtual meetings, supplemented by occasional in-person, island-specific meetings. Hawaiian Electric will gather input from CWG to determine meeting frequency and format.

16.3 Technical Advisory Panel Charter

The Technical Advisory Panel (TAP) is a standing independent industry peer group of experts participating voluntarily from internationally recognized utilities, market operators, and research organizations who have demonstrated engineering expertise in IGP related processes, methodologies, and technologies involving resource, transmission and distribution planning for large scale and distributed renewable resources. The TAP will provide independent reviews of Hawaiian Electric's methodologies and processes related to IGP.

The TAP is one of three formal stakeholder groups in the overall stakeholder engagement process and is essential to the success of the IGP process. Further engagement with communities will occur in addition to the TAP throughout IGP.

Objectives

- **Provide independent peer assessment** through objective, evidence-based guidance on the IGP development process, methodologies, tools, and results.
- **Evaluate system needs and possible solutions** through assessing grid needs and providing guidance on the suitability of proposed solutions.
- **Foster balanced discussions** to achieve greater shared understanding of technical issues to address in IGP and ensure alignment with policy goals, industry standards, and stakeholder concerns.

The TAP will:

- Provide relevant knowledge and experience to discuss technical planning related issues and provide guidance on engineering issues and emerging best practices.

The TAP will not:

- Produce any engineering and economic analyses or evaluation of sourcing or procurement
- Make final decisions on grid investments or regulatory compliance

Roles and Responsibilities

TAP members are expected to make contributions towards meeting planning milestones by sharing ideas, asking questions, and contributing to discussions. The TAP is an independent advisory group that may provide feedback on the methods and processes that Hawaiian Electric uses to perform such work.

TAP member participation is strictly voluntary at the discretion and financial support of their organizations for the full duration of the IGP planning cycle and is not being funded by the Companies. In most cases, this also includes their organizations supporting their travel costs.

The Chair, in coordination with Hawaiian Electric, will develop meeting agendas to shape discussions, develop meeting summaries, and disseminate information to the other TAP members, the

Stakeholder Technical Working Group, and the public. The TAP Chair is a member of the Stakeholder Technical Working Group and expected to represent the TAP.

At the request of the TAP members, meetings are limited to TAP members and invited participants. The meetings will follow Chatham House Rules. Members are expected to conduct themselves in a way that is respectful to the thought processes of others and to value everyone's contributions.

The TAP will consist of three sub-groups:

- Distribution Sub-Group: This group will focus on distribution planning criteria, process, methods, tools, and grid services (Non-Wires Alternative framework)
- Transmission Sub-Group: This group will review transmission planning criteria, system security methodology, and renewable energy zone (REZ) analysis.
- Resource Adequacy and Modeling Sub-Group: This group will review resource adequacy process, energy reserve margin (ERM) testing and calibration.

Composition

The TAP consists of invited industry leaders in electric power system planning and technology within the U.S. and abroad. The composition of the TAP will be finalized following confirmation of continued participation from previous members.

Status

Hawaiian Electric is in the process of finalizing TAP member participation and availability. The current target to re-initialize this group is March 2026.

Proposed Schedule

The TAP is anticipated to meet with Hawaiian Electric bi-monthly and will convene independently in alternating months. The TAP may adjust the meetings schedule as needed.

17 Appendix D: First Cycle Timeline

Below is a reflection of key milestones from the First Cycle:

- **Workplan progression:** The workplan for the First Cycle was initially filed in July 2018 and accepted in March 2019. Finalizing the workplan spanned eight months from initial filing to Commission acceptance. As the workplan progressed, periodic updates were provided through July 2021.
- **Working groups:** While the modeling teams prepared the assumptions and further refined the process to be used in the First Cycle, several parallel efforts were underway to develop specific parts of the IGP process. Those efforts included:
    - **Forecast assumptions working group:** This group began meeting in March 2019 to discuss the forecast assumptions for the sales and peak forecast and resource cost forecast. Draft forecasts were shared in the March 2020 meeting. The assumptions were formally documented in the first draft of the inputs and assumptions review point that was completed in September 2020. The working group continued to meet as they worked toward a second draft of the inputs and assumptions review point that incorporated stakeholder feedback, which was completed in March 2021.
    - **Solution evaluation and optimization working group:** This group first met in May 2019 to discuss the development of the grid needs assessment methodology and overall modeling process. Initial modeling results were shared through the working group as a demonstration of how certain process steps would work. The working group continued to meet to develop the first draft of the grid needs assessment methodology, which was completed in March 2021.
    - **Competitive procurement working group:** This group updated the competitive bidding framework (CBF) through working group meetings that began in March 2019 and ended with the filing of the revised CBF filed in February 2021. The parties and Hawaiian Electric filed comments on the revised CBF in May 2021 and the Commission approved the revised framework in June 2022. Following the issuance of the Stage 3 RFP—and after a series of meetings between the Commission, Independent Engineer, and Hawaiian Electric from August 2023 to October 2023—the Commission provided additional feedback on the procurement process in their order accepting the 2023 IGP final report.
    - **Distribution planning working group:** This group began in February 2019. The group discussed distribution needs identified in the Ho'opili and East Kapolei area that were determined to be potential candidates for a non-wires alternative (NWA) solution. An RFP was launched in November 2019 as a demonstration of whether an NWA could be successfully procured to meet these distribution needs, but it did not move forward due to

insufficient response. The working group continued to meet to refine the methodologies for distribution planning and non-wires opportunity evaluation through June 2020. These same methodologies were incorporated into Hawaiian Electric's second review point that was filed in November 2021.

    - **Standardized contract working group:** This group first met in December 2018 to discuss updates to the grid services purchase agreement that is used to contract for demand response and certain grid services. Stakeholders provided feedback on the contract revisions through March 2019, and the revised contract was incorporated into the Stage 2 RFP that was approved in August 2019.
    - **Resilience working group:** This group met from July 2019 through December 2019. The group identified scenarios that would impact grid resilience, capabilities and needs of customers and sectors following an event, and developed recommendations to address resilience needs. The working group's findings were documented in a report that was finalized in June 2020.
    - **Stakeholder technical working group:** This group formed in June 2021 to streamline the working group structure by combining the forecast assumption working group, distribution planning working group, and solution evaluation and optimization working group. Through this working group, Hawaiian Electric continued to refine the early drafts of the first review point on forecast assumptions developed in the forecast assumptions working group and the second review point on grid needs assessment methodology developed in the solution evaluation and optimization working group. After those review points were completed, this working group continued to meet through November 2023 to discuss the modeling results that were published in the draft IGP report and review updates on the resource adequacy workplan.
- **First review point (inputs and assumptions):** Hawaiian Electric filed its first review point to seek approval of its inputs and assumptions in January 2021. The proposed assumptions were modified as a result of extensive stakeholder discussion through working group meetings and in the docket. The Commission approved the inputs and assumptions in March 2022. Finalizing the inputs and assumptions spanned 14 months from initial filing to Commission approval, not including prior work done by the forecast assumptions working group.
- **Second review point (grid needs assessment methodology):** Hawaiian Electric filed its second review point to seek approval of its grids needs assessment (GNA) modeling methodology in November 2021, along with the renewable energy zones (REZ) study that analyzed transmission requirements for initial REZ. Like the first review point, the proposed methodology was also discussed through the working groups and in the proceeding. The Commission approved the modeling methodology in June 2022. Finalizing the modeling methodology spanned seven months from initial filing to Commission approval, not including prior work done by the solution evaluation and optimization working group.
- **GNA for O'ahu, Hawai'i Island and Maui Stage 3 RFPs:** In parallel to finalizing the modeling methodology for the second review point, Hawaiian Electric used the methodology as it was defined at the time to prepare GNAs for O'ahu, Hawai'i Island and Maui. These assessments provided the supporting modeling analyses for the Stage 3 RFP targets for those three islands. Hawaiian Electric filed the assessment for Hawai'i Island in April 2022 and O'ahu and Maui in July 2022. Conducting an

interim GNA to support the Stage 3 RFP diverted time and resources away from the overall IGP process. Instead of requiring interim GNAs, RFPs that occur in the middle of the IGP process could use the most recent IGP Action Plan Annual Update to guide RFP target setting with adjustments for updated planned project timing until a new IGP plan is approved or accepted.

- **Resource adequacy workplan:** Along with approving Hawaiian Electric's modeling methodology, Order No. 38482, issued in June 2022, introduced a new directive for Hawaiian Electric to begin the process of developing an effective load carrying capability (ELCC)-based resource adequacy criteria for use in future rounds of IGP, due in August 2022. In July 2022, Hawaiian Electric filed a motion for reconsideration of this order, given the progress Hawaiian Electric made in revising and adjusting its energy reserve margin (ERM) and hourly dependable capacity (HDC) criteria per the Technical Advisory Panel's (TAP) guidance. In Order No. 38606, issued in September 2022, the Commission denied Hawaiian Electric's motion to scope the resource adequacy workplan to evaluate ELCC and clarified that the workplan should address whether ELCC or other alternatives are appropriate for the next IGP cycle. Following the Commission's order, Hawaiian Electric filed their resource adequacy workplan to evaluate three different capacity planning criteria. In Order No. 38606, the Commission provided feedback on the workplan, stating that Hawaiian Electric's proposed comparison of the three criteria meets the Commission-directed framework for the workplan and that Hawaiian Electric should begin the work to evaluate the criteria before completing the IGP analyses. In April 2024, Hawaiian Electric filed E3's resource adequacy planning methods report based on the workplan.
- **IGP report:** Once the modeling methodology was approved, Hawaiian Electric commenced the planning phase of the process. Initial modeling results were shared with the working groups and TAP in December 2022, and a draft IGP Report was filed in March 2023 to encourage additional feedback from the public. Hawaiian Electric filed a final IGP report in May 2023 that addressed approximately 300 comments and clarifications received on the draft report. Following the approval of the first and second review point, developing the final modeling results and drafting the final report spanned 13 months.
- **DPS Phase 3 modeling report (Distributed Energy Resources):** Using the assumptions and methods developed and approved for use in the First Cycle, Hawaiian Electric developed a set of modeling analyses to inform the appropriate incentives and compensation rates for the next phase of distributed energy resource (DER) programs, which was filed in Docket No. 2019-0323. Draft results were filed in March 2023. Final results were filed in July 2023 after addressing comments on additional cases, assumptions and avoided cost factors from the Commission and docket parties.
- **IGP supplemental report:** Following the filing of the final report, the Commission issued Order No. 40311 in October 2023, which requested that Hawaiian Electric clarify its preferred plans for generation and capacity. Hawaiian Electric subsequently filed its supplemental IGP report in November 2023, and the Commission accepted the 2023 IGP final report in Order No. 40651, issued in March 2024. The Commission's evaluation of the First Cycle from the final report filing to acceptance spanned 10 months.
- **Commission Guidance for IGP second cycle:** After accepting the final report, the Commission issued Order No. 41022 in September 2024 providing guidance for the second IGP cycle.