

**Hawaiian
Electric**

**REQUEST FOR PROPOSALS
FOR
NON-WIRES ALTERNATIVES TO PROVIDE RELIABILITY (BACK-TIE)
SERVICES**

ISLAND OF O‘AHU - EAST KAPOLEI AREA

NOVEMBER 8, 2019

Docket No. 2018-0165

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Introduction and General Information

Hawaiian Electric Company, Inc. (“Hawaiian Electric” or the “Company”) seeks proposals for qualified non-wires alternatives¹ (“NWA”) to provide Reliability (back-tie) Services for the East Kapolei Area Distribution System in accordance with this Request for Proposals (“RFP”).

The Company seeks NWAs to provide Reliability (back-tie) Services in this RFP that can be deployed individually or as a portfolio. The Company intends to contract for these resources, as described in Section 3.8, through the following contracts: (1) Grid Services Purchase Agreement (“GSPA”) provided in Appendix K for behind the meter (“BTM”)² resource projects and (2) Scheduled and Contingency Capacity Purchase Agreement (“SCCPA”) provided in Appendix L for in front of the meter (“IFTM”)³ scheduled and contingency capacity projects (GSPA and SCCPA are collectively referred to herein as the “Agreements”). If the Reliability (back-tie) Service solution (“Proposed Solution”) utilizes a technology not applicable to one of the two agreements, then the terms of the most applicable agreement will be modified to address the specific technology and/or component. The final executed version (if any) of all contracts will be submitted for approval by the State of Hawai‘i Public Utilities Commission (“PUC” or “Commission”) in a docketed proceeding.

The Company will evaluate Proposals using the evaluation and selection process described in Chapter 4 of this RFP. The evaluation and selection process will be based on both price and non-price factors that impact the Company, its customers, and communities affected by the Proposed Solution(s). The amount of Reliability (back-tie) Services that the Company may acquire from this RFP depends on, among other things, the quality and cost-effectiveness of bids received in response to this RFP, economic comparison to other RFP responses, updates to the Company’s forecasts, and changes to regulatory or legal requirements.

All requirements necessary to submit a Proposal are stated in this RFP. A description of the technical requirements for Proposers is included in Chapter 2 of this RFP, in the Proposer’s Response Package attached as Appendix B (B1-BTM and/or B2-IFTM) to this RFP, in the Agreements, and in the Electronic Procurement Platform described in Section 3.2 of this RFP.

All capitalized terms used in this RFP shall have the meaning set forth in the glossary of defined terms attached as Appendix A to this RFP. Capitalized terms that are not included in Appendix A shall have the meaning given to them in this RFP.

¹ A non-wires alternative is generally defined as an electricity grid project that uses non-traditional transmission and distribution solutions, such as distributed generation, energy storage, energy efficiency (“EE”), demand response (“DR”), and grid software and controls, to defer or avoid the need for conventional transmission and/or distribution infrastructure investments. See Docket No. 2018-0165, Hawaiian Electric Companies’ Integrated Grid Planning Workplan, filed December 14, 2018, at 21.

² Defined as a service located on the customer side of the meter.

³ Defined as a service located on the utility side of the meter.

1.1 Authority and Purpose of the Request for Proposals

- 1.1.1 This RFP is issued in accordance with the Integrated Grid Planning (“IGP”) Workplan submitted by the Hawaiian Electric Companies on December 14, 2018, as accepted through Order No. 36218 issued on March 14, 2019 in Docket No. 2018-0165 by the PUC.
- 1.1.2 This RFP is a product of the IGP Soft Launch as described in the IGP Workplan. The IGP Soft Launch is intended to demonstrate the sourcing processes and evaluation methods for distribution NWAs. This Soft Launch will help inform development of the full scale IGP planning and sourcing effort beginning in 2020.
- 1.1.3 A generation Solution submitted in response to this RFP must utilize qualified renewable energy resource(s) as defined under the Hawai‘i Renewable Portfolio Standards (“RPS”) law.⁴ By statute, “Renewable Energy” means energy generated or produced using the following sources: (1) wind; (2) the sun; (3) falling water; (4) biogas, including landfill and sewage-based digester gas; (5) geothermal; (6) ocean water, currents, and waves, including ocean thermal energy conversion; (7) biomass, including biomass crops, agricultural and animal residues and wastes, and municipal solid waste and other solid waste; (8) biofuels; and (9) hydrogen produced from renewable energy sources.⁵ In addition to RPS-eligible sources listed above, the list of solutions may include, but are not limited to: stand-alone storage, thermal storage, fuel cell and CHP technologies that are using renewable fuel.

1.2 Scope of the RFP

- 1.2.1 Hawaiian Electric is seeking NWAs that meet the requirements noted in this RFP to cost-effectively defer the distribution investment needed to serve new load growth in the East Kapolei Area. There are two (2) distribution deferral opportunities located in the East Kapolei Area. In total, Hawaiian Electric is seeking to procure a minimum of 21.9 MW.

The deferral opportunities in the East Kapolei Area are:

1. Kapolei 4 Circuit Extension with a Commercial Operations Date (“COD”) of February 1, 2022
2. Ho‘opili Substation with a COD of January 1, 2023

The table below summarizes the distribution investment deferral opportunity and the associated operational and performance requirements. For each one of the deferral opportunities, all of the expected performance and operational requirements need to be met to defer the planned investment.

⁴ RPS requirements in Hawai‘i are codified in Hawai‘i Revised Statutes (“HRS”) §§ 269-91 through 269-95.

⁵ See HRS § 269-91.

Table 1: Summary of Distribution Capacity Service Requirements (Normal Overloads)

Deferral Opportunity	Equipment	MW Peak	Operational Date	Delivery Months	Delivery Hours	Duration (Hr)	Max # of Days
Ho'opili Substation	Kaloi 1 Tsf ⁶	4.7	Jan 2023	Jan - Dec	1PM - 11PM	10	365
	Kaloi 3 Ckt ⁶	0.3	Aug 2023	Aug - Oct	7PM - 9PM	2	69

Table 2: Summary of Reliability (Back-Tie) Service Requirements

Deferral Opportunity	Equipment	MW Peak	Operational Date	Delivery Months	Delivery Hours	Duration (Hr)	Max # of Days
Kapolei 4 Circuit Extension	Kapolei 2 Tsf	3.5	Feb 2022	Jan - Dec	5PM - 11PM	6	365
Ho'opili Substation	Ewa Nui 2 Ckt	5.1	Jan 2023	Jan - Dec	11AM - 12AM	13	365
	Kaloi 1 Tsf ⁶	9.7	Jan 2023	Jan - Dec	6AM - 8AM, 9AM - 12AM	17	365
	Kaloi 3 Ckt ⁶	2.6	Jan 2023	Jan - Dec	5PM - 11PM	6	365
	Kamokila 4 Ckt	1.0	May 2023	Jan - Dec	5PM - 10PM	5	226

1.2.2 Reliability (Back-Tie) Services

Reliability (back-tie) Services are load-modifying or supply services capable of improving local distribution reliability under abnormal conditions. Specifically, these services reduce contingent loading of grid infrastructure to enable operational flexibility to reconfigure the distribution system to restore electric service to customers in a safe and reliable manner.

The Proposed Solution must provide Reliability (back-tie) Service in the distribution system locations described in Chapter 2, throughout the term of the Agreement. The Company does not have a predetermined preference for a particular technology.

⁶ Note that the Distribution Capacity Service need for the Kaloi 1 Transformer and Kaloi 3 Circuit can be met through scheduled delivery of the Reliability (back-tie) Service due to the overlapping performance and operational requirements.

- 1.2.3 For Both BTM and IFTM Proposed Solutions
 - 1.2.3.1 Each Proposed Solution submitted in response to this RFP must be located in the East Kapolei Area.
 - 1.2.3.2 A Proposed Solution(s) that requires system upgrades and the construction of which, in the reasonable judgment of the Company (in consultation with the Independent Observer), creates a significant risk that the COD of the Proposed Solution will not be met will not be considered in this RFP.
 - 1.2.3.3 Each Proposed Solution must meet the requirements of this RFP without having to rely on the completion or implementation of any other Proposed Solution submitted in response to this RFP or any other RFP.
 - 1.2.3.4 Proposers shall pursue all available applicable federal and state tax credits, and Proposed Solution pricing must be set to incorporate the benefit of such available tax credits or to pass the benefit of the tax credits to the Company's customers.
 - 1.2.3.5 Each Proposed Solution submitted in response to this RFP must be capable of meeting the requirements of this RFP without having to rely on a proposed change in law, rule, or regulation.
- 1.2.4 Specific to BTM Proposed Solutions
 - 1.2.4.1 Each BTM Proposed Solution must meet the system integration data exchange requirements in both Exhibit G of the GSPA as well as the Aggregator Handbook, which can be found in Appendix H of this RFP.
- 1.2.5 Specific to IFTM Proposed Solutions
 - 1.2.5.1 Proposers must locate all IFTM Proposed Solution infrastructure within areas of their Site that are outside the 3.2 feet sea level rise exposure area (SLR-XA) as described in the Hawai'i Sea Level Rise Vulnerability and Adaptation Report (2017)⁷ and are not located within a Tsunami Evacuation Zone.⁸

⁷ Hawai'i Climate Change Mitigation and Adaptation Commission. 2017. Hawai'i Sea Level Rise Vulnerability and Adaptation Report. Prepared by Tetra Tech, Inc. and the State of Hawai'i Department of Land and Natural Resources, Office of Conservation and Coastal Lands, under the State of Hawai'i Department of Land and Natural Resources Contract No: 64064. This report is available at: https://climateadaptation.hawaii.gov/wp-content/uploads/2017/12/SLR-Report_Dec2017.pdf

⁸ See Hawai'i Sea Level Rise Viewer at <https://www.pacioos.hawaii.edu/shoreline/slr-hawaii/>, and National Oceanic and Atmospheric Administration (NOAA) interactive map in partnership with the State of Hawai'i at <https://tsunami.coast.noaa.gov/#/>.

- 1.2.5.2 IFTM Proposed Solution(s) must interconnect to the distribution 12kV circuit.
- 1.2.5.3 If selected, Proposers will be solely responsible for the decommissioning of the IFTM Proposed Solution and the restoration of the Site upon the expiration of the SCCPA, as described in Attachment G, Section 7 of the SCCPA.

1.3 Communications Between the Company and Proposers

- 1.3.1 Communications and other procedures under this RFP are governed by the “Code of Conduct Procedures Manual,” (also referred to as the “Procedures Manual”) developed by the Company and attached as Appendix C to this RFP.
- 1.3.2 All pre-Proposal communication with prospective Proposers will be conducted via the Company’s website, Electronic Procurement Platform and/or electronic mail (“Email”) through the address specified in Section 1.4 of this RFP (the “RFP Email Address”). Frequently asked questions submitted by prospective Proposers and the answers to those questions may be posted on the Company website or sent through either email or the Electronic Procurement Platform to registered individuals. The Company reserves the right to respond only to comments and questions it deems are appropriate and relevant to the RFP. Proposers are advised to submit questions no later than fifteen Days before the Proposal Due Date (see RFP Section 3.1 – Table 4: Proposed RFP Schedule). The Company will endeavor to respond to all questions no later than five Days before the Proposal Due Date.
- 1.3.3 After Proposals have been submitted, the Company may contact individual Proposers for purposes of clarifying their Proposal(s).
- 1.3.4 Any confidential information deemed by the Company, in its sole discretion, to be appropriate to share, will only be transmitted to the requesting party after receipt of a fully executed IGP Soft Launch Mutual Confidentiality and Non-Disclosure Agreement (“NDA”). See Appendix E of this RFP.
- 1.3.5 Except as expressly permitted and in the manner prescribed in the Procedures Manual, any unsolicited contact by a Proposer or prospective Proposer with personnel of the Company pertaining to this RFP is prohibited.
- 1.3.6 Any affiliate bid that is submitted will be treated in the same manner as any other proposer bid. Affiliates are governed by the Affiliate Transaction Requirements and are not able to be supported by any employee of the Company concerning this RFP.

1.4 Company Contact for Proposals

The primary contact for this RFP is:

Isaac Kawahara
Energy Contract Manager
Hawaiian Electric Company, Inc.
Renewable Acquisition Division
Central Pacific Plaza Building, Suite 2100
220 South King Street
Honolulu, Hawai’i 96813

RFP Email Address: response@hawaiianelectric.com

1.5 Proposal Submission Requirements

- 1.5.1 All Proposals must be prepared and submitted in accordance with the procedures and format specified in the RFP. Proposers are required to respond to all questions and provide all information requested in the RFP, as applicable, and only via the communication methods specified in the RFP.
- 1.5.2 Detailed requirements regarding the form, submission, organization and information for the Proposal are set forth in Chapter 3 of this RFP and Appendix B (B1-BTM and/or B2-IFTM) to this RFP. Proposers may also submit up to a total of three (3) variations of their Proposal, one variation of which is the base variation of the Proposal. Variations of pricing terms, Proposal size, with/without storage, or grid-charging capabilities can be offered. All variations within a Proposal must be proposed on the same Site and using the same generation technology. All unique information for each variation of a Proposal, no matter how minor such variation is, must be clearly identified and separated by following the instructions in Appendix B Section 3.
- 1.5.3 In submitting a Proposal in response to this RFP, each Proposer certifies that the Proposal has been submitted in good faith and without fraud or collusion with any other unaffiliated person or entity. The Proposer shall acknowledge this in the Response Package submitted with its Proposal. Furthermore, in executing the NDA provided as Appendix E, the Proposer agrees on behalf of its Representatives (as defined in the NDA) that the Company's negotiating positions will not be shared with other Proposers or their respective representatives.

In addition, in submitting a Proposal, a Proposer will be required to provide Company with its legal counsel's written certification in the form attached as Appendix B Attachment 1 certifying in relevant part that irrespective of any proposer's direction, waiver, or request to the contrary, that the attorney will not share a proposer's confidential information associated with such proposer, including, but not limited to, a proposer's or Company's negotiating positions, with third parties unaffiliated with Proposer (by contract or organizational structure), including other proposers responding to the RFP. If legal counsel represents multiple unaffiliated proposers whose Proposals are selected for the Final Award Group, such counsel will also be required to submit a similar certification at the conclusion of Agreement negotiations that he or she has not shared a proposer's confidential information or the Company's confidential information associated with such proposer, including but not limited to, such information as a proposer's or Company's negotiating positions, with third parties unaffiliated with such proposer (by contract or organizational structure), including other proposers responding to the RFP.

- 1.5.4 Proposals must be submitted via the Electronic Procurement Platform by 2:00 pm Hawai'i Standard Time (HST) on the Proposal Due Date shown in RFP Section 3.1 Table 4. No hard copies of the Proposals will be accepted. It is the Proposer's sole responsibility to ensure that complete and accurate information has been submitted on time and within the instructions of this RFP. With this assurance, Company shall be entitled to rely upon the completeness and accuracy of every Proposal. Any errors identified by the Proposer or Company after the Proposal Due Date has passed may jeopardize further consideration and success of the Proposal. If an error or errors are later identified, Company, in consultation with the Independent Observer, may permit the error(s) to be corrected without further revision to the Proposal, or may require Proposer to adhere to terms of the Proposal as submitted without correction. Additionally, and in Company's sole discretion, if such error(s) would materially affect the Priority List or Final Award Group, Company reserves the right, in consultation with the Independent Observer, to remove or disqualify a Proposal upon discovery of the material error(s). The Proposer of such Proposal shall bear the full responsibility for such error(s) and shall have no recourse against Company's decision to address Proposal error(s), including removal or disqualification. The Energy Contract Manager, in consultation with the Independent Observer, will confirm that the Proposals are timestamped by the Proposal Due Date in Section 3.1 Table 4. The Electronic Procurement Platform will cease accepting any submission of late information for this RFP after the Proposal Due Date.
- 1.5.5 To aid the Independent Observer's review process, Proposers are required to submit the entire complete and Proposal package directly to Sedway Consulting separate from, and in addition to, the Proposal package that is submitted to the Company via the PowerAdvocate Website. Proposer must send an electronic copy of all submitted materials on a flash-drive to the Independent Observer for delivery and receipt no later than one business day following the Proposal Due Date in Section 3.1. The flash-drive package must be sent to the address stated in Section 1.9.3.

1.6 Dispute Resolution Process

- 1.6.1 Proposers who challenge or contest any aspect of the RFP process must first attempt to resolve their concerns with the Company and Independent Observer (“Initial Meeting”). The Independent Observer will seek to work cooperatively with the parties to resolve any disputes or pending issues and may offer to mediate the Initial Meeting to resolve disputes prior to such issues being presented to the PUC.
- 1.6.2 Any and all disputes arising out of or relating to the RFP which remain unresolved for a period of twenty (20) Days after the Initial Meeting takes place may, upon the agreement of the Proposer and the Company, be submitted to confidential Mediation in Honolulu, Hawai‘i, pursuant to and in accordance with the Mediation Rules, Procedures, and Protocols of Dispute Prevention Resolution, Inc. (“DPR”) (or its successor) or, in its absence, the American Arbitration Association then in effect (“Mediation”). The Mediation will be administered by DPR. If the parties agree to submit the dispute to Mediation, the Proposer and the Company shall each pay fifty percent (50%) of the cost of the Mediation (i.e., the fees and expenses charged by the mediator and DPR) and shall otherwise each bear their own Mediation costs and attorney’s fees.
- 1.6.3 If settlement of the dispute is not reached within sixty (60) Days after commencement of the Mediation, or if after the Initial Meeting, the parties do not agree to submit any unresolved disputes to Mediation, the Proposer may submit the dispute to the PUC.
- 1.6.4 The PUC will serve as the arbiter of last resort for any disputes relating to this RFP involving Proposers. The PUC will use an informal expedited dispute resolution process to resolve the dispute within thirty (30) Days. There shall be no right to a hearing or appeal from this informal expedited dispute resolution process. The PUC encourages affected parties to seek to work cooperatively to resolve any dispute or pending issue. The Company will conduct informational meetings with the PUC and the Division of Consumer Advocacy of the Department of Commerce and Consumer Affairs of the State of Hawai‘i (“Consumer Advocate”) to keep each apprised of issues that arise between or among the parties.
- 1.6.5 Timely PUC review, approval, consent, or other action is essential to the efficient and effective execution of this RFP process. Accordingly, to expedite PUC action in this RFP process, whenever PUC review, approval, consent, or action is required, the PUC may do so in an informal expedited process.
- 1.6.6 If any Proposer initiates a dispute resolution process for any dispute or claim arising under or relating to this RFP, other than that permitted by Section 1.6 of this RFP (e.g., a court proceeding), then such Proposer shall be responsible for any and all attorneys’ fees and costs that may be incurred by the Company or the PUC in order to resolve such claim.

1.7 No Protest or Appeal

Subject to Section 1.6 of this RFP, no Proposer or other person will have the right to protest or appeal any award of a Proposed Solution made by the Company.

By submitting a Proposal in response to the RFP, the Proposer expressly agrees to the terms and conditions set forth in this RFP.

1.8 Modification or Cancellation of the Solicitation Process

- 1.8.1 Unless otherwise expressly prohibited, the Company may, at any time up to the final execution of an Agreement, as may be applicable, in consultation with the Independent Observer, postpone, withdraw and/or cancel any requirement, term or condition of this RFP, including deferral of the award or negotiation of any Agreement, and/or cancellation of the award all together, all of which will be without any liability to the Company.
- 1.8.2 The Company may modify this RFP or solicit additional Proposals from Proposers after reviewing the initial Proposals, in consultation with the Independent Observer. The Company will follow the same procedure with regard to any potential postponement, withdrawal or cancellation of the RFP or any portion thereof.

1.9 Role of the Independent Observer

- 1.9.1 All phases of the RFP process will be subject to the Independent Observer's oversight, and the Independent Observer will coordinate with PUC staff throughout the RFP process to ensure that the RFP is undertaken in a fair and unbiased manner. In particular, the Company will review and discuss with the IO decisions regarding the evaluation, disqualification, non-selection, and selection of Proposals.
- 1.9.2 The role of the Independent Observer, will include but is not limited to:
- Monitor all steps in RFP process
 - Monitor communications (and communications protocols) with Proposers
 - Monitor adherence to the Company's Code of Conduct
 - Submit comments and recommendations, if any, to the PUC concerning the RFP
 - Review the Company's Proposal evaluation methodology, models, criteria, and assumptions
 - Review the Company's evaluation of Proposals
 - Conduct a direct / parallel Proposal evaluation
 - Advise the Company on its decision-making
 - Participate in dispute resolution as set forth in Section 1.6
 - Monitor contract negotiations with Proposers
 - Report to the PUC on monitoring results during each stage of the RFP
 - Provide an overall assessment of whether the goals of the RFP were achieved
- 1.9.3 The Independent Observer for this RFP is:
Sedway Consulting
Attn: Alan Taylor
821 15th Street
Boulder, Colorado 80302
PH: (303) 581-4172
Alan.Taylor@sedwayconsulting.com.

Chapter 2: Resource Needs and Requirements

The following are requirements that must be met when submitting offers for each specific distribution system need. Hawaiian Electric will accept offers for less than the full need for each requirement in a minimum of 50 kW, 2-hour increments. For any specific deferral opportunity (i.e., Kapolei 4 circuit extension or Ho’opili Substation), Proposers are encouraged, but not required, to submit an offer for all grid needs associated with that specific deferral opportunity. A summary of each need is provided below. Additional information regarding each need can be found in Appendix J – Distribution Needs.

A. Ho’opili Substation Contingency Requirements

Equipment	MVA peak	Delivery Months	Delivery Hours	Hours Duration	Max Days	MVAH
Ewa Nui 2 Ckt	5.4	Jan – Dec	11AM - 12AM	13	365	32.6
Kalo i 1 Tsf	10.6	Jan – Dec	6AM - 8AM, 9AM - 12AM	17	365	68.2
Kalo i 3 Ckt	2.7	Jan – Dec	5PM - 11PM	6	365	8.9
Kamokila 4 Ckt	1.0	Jan – Dec	5PM - 10PM	5	226	3.2

B. Kapolei 4 Circuit Extension

Equipment	MVA peak	Delivery Months	Delivery Hours	Hours Duration	Max Days	MVAH
Kapolei 2 Tsf	3.8	Jan – Dec	5PM - 11PM	6	365	12.4

2.1 Technical Requirements

Below is a summary of the high-level technical requirements of the Reliability (back-tie) Service.

Table 3: Technical Requirements

Technical Requirements All bids	
Purpose	<p>Kapolei 4 Circuit Extension: Reduce loads on a portion of the Kamokila 4 circuit and all of Kapolei 4 circuit during a Contingency Event on the Kamokila 4 circuit.</p> <p>Ho’opili Substation: Reduce loads on affected Ho’opili circuits during a Contingency Event. See Appendix J – Distribution Needs for details.</p>
Term Dates	<p>Kapolei 4 Circuit Extension: Start: No later than February 1, 2022 End: February 28, 2027 For BTM Proposed Solutions, all contracted MW must be available by February 1, 2022 start date.</p> <p>Ho’opili Substation: Start: No later than January 1, 2023 End: December, 31, 2027</p>

	For BTM Proposed Solutions, all contracted MW must be available by January 1, 2023 start date.
Maximum times the service can be called upon per year	See Appendix J, for the “Max # of Days” each Reliability (back-tie) Service need requires. The “Max # of Days” represents the number of days an overload is expected if a Contingency Event persisted each day of the year.
Settlement	See applicable Agreement
Telemetry	IFTM – Tariff Rule No. 14, Paragraph H (“Rule 14H”) telemetry BTM - Rule 14H telemetry if applicable, 5min kW USAGE, online/offline status.
Metering	Payment for performance requires a Revenue Meter.
DER Interconnection Technical Requirements	Rule 14H, Supplemental Review Process Appendix I and F - Distributed Generating Facility Interconnection Standards Technical Requirements
Reporting	Post Event Data - MW, MWh during event, start time and end time. Hourly – Available/Not Available
Event Delivery Options – See Section 3.10	
Delivery Options	Option A: Automatic Delivery w/Manual Controls Option B: Scheduled Delivery w/Manual Controls
Communications Protocol	Option A: Contingency Event (i.e. SCADA or direct transfer trip for automatic contingency activation) Option B: Scheduled Delivery (i.e. local control schedule) Note: For both options, manual controls from Company Control Center by SCADA if 1MW or larger or OpenADR 2.0b otherwise.
Event Start	Option A: solution must reach full output within 12 seconds of the Contingency Event. Option B: solution must reach full output at the Scheduled Delivery start time. During the Scheduled Delivery event, at no time should there be an interruption of the Reliability (back-tie) Service, except and unless, a proportional amount of load is also reduced during the duration of the interruption.
Event Stop	Solution must stop when directed by Company equipment <u>or</u> Scheduled Delivery end time. Ramp rate for return to normal operation must be 2 MW/minute or slower.

2.2 Performance Standards

Proposals must meet the attributes set forth in this RFP and the requirements within the Agreements. This RFP and the Agreements set forth the minimum requirements that all Proposals must satisfy to be eligible for consideration in this RFP. Additional Performance Standards may be required based on the results of the IRS.

Proposed Solutions procured through this RFP should not create additional problems on the distribution system. Any Proposed Solution must not operate in a manner that negatively impacts the system.

- Proposed Solutions for the Ho’opili Substation deferral opportunity shall not increase net loading during delivery hours (including an hour before and after the delivery hours) and between 5am-8am.
- Proposed Solutions for the Kapolei 4 Circuit Extension deferral opportunity shall not increase net loading during delivery hours (including an hour before and after the delivery hours).

The time periods identified are to ensure that no increase in net loading (Facility’s battery energy storage system will not be allowed to charge from the system) occurs during shoulder periods of the grid needs identified and/or during the morning circuit peak.

2.3 Interconnection to the Company System

- 2.3.1 All assets subject to interconnection standards and review as articulated in Rule 14H remain subject to those standards as a precondition for inclusion in this RFP.
- 2.3.2 If in order to achieve anticipated service, an existing interconnected system would be expected to export power in excess of pre-approved export limits, the resource would be subject to a Supplemental Review Process as described in Appendix I.
- 2.3.3 All Proposals must include a description of the Proposer’s plan to transmit power from the Facility to the Company System. The proposed Interconnection Facilities must be compatible with the Company System. In the design, Proposal must adequately consider Company requirements to address impacts on the performance and reliability of the Company System.
- 2.3.3.1 In addition to the Performance Standards, the design of the Interconnection Facilities, including power rating, Point(s) of Interconnection with the Company System, and scheme of interconnection, must meet Company standards. The Company will provide its construction standards and procedures to the Proposer (Engineer, Procure, Construct Specifications for Hawaiian Electric Power Lines and Substations) if requested via the RFP Email Address in [Section 1.5](#) and upon execution of an NDA as specified in [Section 1.3](#) and [Section 1.5](#). These specifications are intended to illustrate the scope of work typically required to administer and perform the design and construction of a Hawaiian Electric substation and power line.
- 2.3.4 The Proposer shall be responsible for all costs required to interconnect to the Company System.
- 2.3.5 Proposers are required to include in their pricing proposal all costs for distribution-level service interconnection for station power.
- 2.3.6 All Proposals will be screened for general readiness to comply with the requirements for interconnection. Proposals selected to the Final Award Group will be subject to further study as required by Rule 14H. The IRS process is further described in [Section 5.1](#) of this RFP. Mitigation measures identified will be incorporated into the terms and conditions of a final executed Agreement.

2.4 Approximate Value of Reliability (back-tie) Service

The estimated value of the Reliability (back-tie) Service is based on deferring the traditional solution for five years (“[Approximate Value](#)”). This is calculated by converting the capital cost of the traditional solution into annual revenue requirements using a levelized deferral rate.

Approximate 5-Year Value:

- Kapolei 4 Circuit Extension: \$2.3M NPV
- Ho’opili Substation: \$4.5M NPV

This Approximate Value is intended to be used as an order of magnitude financial estimate of the NWA opportunity to enable Proposers to develop competitive value propositions and is based on the current planning level estimate for the traditional solution. The Non-Price Evaluation (as set forth in [Section 4.4](#))

will consider additional system benefits provided by the NWA solutions in addition to bid price and the deferral value of the traditional project.

Chapter 3: Instructions to Proposers

3.1 Schedule for the Proposal Process

Table 4 sets forth the proposed schedule for the proposal process (the “RFP Schedule”). The Company reserves the right to revise the RFP Schedule as necessary. Changes to the RFP Schedule prior to the RFP Proposal Due Date will be posted to the RFP website. Changes to the RFP Schedule after the Proposal Due Date will be communicated via email or via the Electronic Procurement Platform to the Proposers.

Table 4: RFP Schedule

Milestone	Schedule Dates
Draft RFP Technical Conference	September 9, 2019
RFP is Issued	November 8, 2019
Prerecorded Webinar Conference	November 15, 2019
Proposal Due Date	January 7, 2020 at 2:00 pm HST
Selection of Final Award Group	March 9, 2020
Contract Negotiations Start	March 16, 2020

3.2 Company RFP Website/Electronic Procurement Platform

3.2.1 The Company has established a website for general information to share with potential Proposers. The website is located at the following link:

www.hawaiianelectric.com/clean-energy-hawaii/integrated-grid-planning

The Company will provide general notices, updates, schedules and other information on the RFP website throughout the process. Proposers should check the website frequently to stay abreast of any new developments. This website will also contain the link to the Electronic Procurement Platform employed by the Company for the receipt of Proposals.

“Sourcing Intelligence” developed by Power Advocate is the Electronic Procurement Platform that the Company has licensed and will utilize for this RFP. Proposers who do not already have an existing account with PowerAdvocate and who intend to submit a Proposal for this RFP will need to register as a “Supplier” with PowerAdvocate.

3.2.2 There are no license fees, costs, or usage fees to Proposers for the use of the Electronic Procurement Platform.

See Appendix D to this RFP for user information on and screenshots of PowerAdvocate’s Sourcing Intelligence procurement platform.

3.3 Prerecorded Webinar Conference

The Company will post a prerecorded webinar (“Proposers’ Conference Webinar”) for prospective Proposers to learn about the provisions and requirements of this RFP on the Company’s RFP website.

Following the Proposers' Conference Webinar, prospective Proposers may submit clarifying questions to the RFP Email Address set forth in Section 1.4 to better understand the Company's RFP process.

The Company will endeavor to address all questions that will be helpful to prospective Proposers via a Q&A section on the RFP website. General responses will be posted to the RFP website. Duplicate questions will not be answered.

Prospective Proposers should review the RFP website's Q&A section prior to submission of their Proposal.

3.4 Preparation of Proposals

- 3.4.1 Each Proposer shall be solely responsible for reviewing the RFP (including all attachments and links) and for thoroughly investigating and informing itself with respect to all matters pertinent to this RFP, the Proposer's Proposal, and Proposer's anticipated performance under the Agreements. It is the Proposer's responsibility to ensure it understands all requirements of the RFP, to seek clarification if the RFP's requirements or Company's request is not clear, and to ask for any confirmation of receipt of submission of information. Under Section 1.5.4, the Proposer is responsible for any errors in its Proposal(s).
- 3.4.2 Proposers shall rely only on official information provided by the Company in this RFP when preparing their Proposal. The Company will rely only on the information included in the Proposals and additional information solicited by the Company to Proposers in the format requested, to evaluate the Proposals received. Evaluation will be based on the stated information in this RFP and on information submitted by Proposers in response to this RFP. Proposal submissions should not reference previous RFP submissions for support. Proposers also should not assume that any previous RFP decisions/preferences will also pertain to this RFP.
- 3.4.3 Each Proposer shall be solely responsible for, and shall bear all of its costs incurred in the preparation of its Proposal and/or its participation in this RFP, including, but not limited to, all costs incurred with respect to the following: (1) review of the RFP documents; (2) meetings with the Company; (3) Site visits; (4) third-party consultant consultation; and (5) investigation and research relating to its Proposal and this RFP. Any such costs associated with the same will not be reimbursed by the Company to any Proposer, including the selected Proposer(s).
- 3.4.4 Each Proposal must contain the full name and business address of the Proposer and must be signed by an authorized officer or an agent⁹ of the Proposer.

⁹ Proposer's officer or agent must be authorized to sign the Proposal. Such authorization must be in writing and may be granted via Proposer's organizational documents (i.e., Articles of Incorporation, Articles of Organization, By-laws, etc.), resolution, or similar documentation.

3.5 Organization of the Proposal

The Proposal must be organized as specified in Appendix B (B1-BTM and/or B2-IFTM) to this RFP. It is the Proposer's responsibility to ensure the information requested in this RFP is submitted and contained within the defined Proposal sections as specified in Appendix B.

3.6 Proposal Limitations

Proposers expressly acknowledge that Proposals are submitted subject to the following limitations:

The RFP does not commit or require the Company to award a contract, pay any costs incurred by a Proposer in the preparation of a Proposal, or procure or contract for products or services of any kind whatsoever. The Company reserves the right, in consultation with the Independent Observer, to accept or reject, in whole or in part, any or all Proposals submitted in response to this RFP, to negotiate with any or all Proposers eligible to be selected for award, or to withdraw or modify this RFP in whole or in part at any time.

- The Company reserves the right, in consultation with the Independent Observer, to request additional information from any or all Proposers relating to their Proposals or to request that Proposers clarify the contents of their Proposals. Proposers who are not responsive to such information requests may be eliminated from further consideration upon consultation with the Independent Observer.
- The Company reserves the right, in consultation with the Independent Observer, to solicit additional Proposals from Proposers after reviewing the initial Proposals. Other than as provided in this RFP, no Proposer will be allowed to alter its Proposal or add new information to a Proposal after the Proposal Due Date.
- All material submitted in response to this RFP will become the sole property of the Company, subject to the terms of the NDA.

3.7 Proposal Compliance and Bases for Disqualification

Proposers may be deemed non-responsive and/or Proposals may not be considered for reasons including, but not limited to, the following:

- Any unsolicited contact by a Proposer or prospective Proposer with personnel of the Company pertaining to this RFP as described in Section 1.3.
- Any illegal or undue attempts by or on behalf of the Proposer or others to influence the Proposal Review process.
- The Proposal does not meet one or more of the Eligibility Requirements specified in Section 4.2.
- The Proposal does not meet one or more of the Threshold Requirements specified in Section 4.3.
- The Proposal is deemed to be unacceptable through a fatal flaws analysis as described in Section 4.4.2.
- The Proposer does not respond to a Company request for additional information to clarify the contents of its Proposal within the timelines specified by the Company.

- The Proposal contains misrepresentations or errors.

3.8 Agreements

If selected for the Final Award Group, upon successful completion of contract negotiations, a Proposer will be required to enter into an Agreement with the Company for the Proposed Solution. The Agreement utilized will depend on the type of technology proposed. For proposed resources that contain components that are not encompassed by the available Agreements, the terms of the Agreement will be modified to address the specific technology and/or component.

3.8.1 For Both BTM and IFTM Proposed Solutions

- As described in Section 2.2, the Performance Standards identified in the applicable Agreement establish the minimum requirements a Proposal must satisfy to be eligible for consideration in this RFP. A Proposed Solution's ability to meet these Performance Standards is a Threshold Requirement under Section 4.3. Note that for IFTM only, Performance Standards is also a Non-Price Related Criteria under Section 4.4.2.2. As such, the Performance Standards included in the Agreements are non-negotiable. Proposers may propose modifications to other sections of the Agreements but are encouraged to accept such terms as written in order to expedite the overall RFP process and potential contract negotiations. As a component of their Proposals, Proposers who elect to propose modifications shall provide a Microsoft Word red-line version of the relevant document identifying specific proposed modifications to the language that the Proposer is agreeable to, as well as a detailed explanation and supporting rationale for each modification.
- General comments, drafting notes and footnotes such as "parties to discuss" are unacceptable and will be considered non-responsive. Proposed modifications to the Agreements will be evaluated as a non-price evaluation criterion as further described in Section 4.4.2 of this RFP. In order to facilitate this process, the Company will make available electronic versions of the Agreements on the RFP website and through the PowerAdvocate platform for the RFP. Any proposed modifications to the Agreements except for Performance Standards will be subject to negotiation between the Company and each member of the Final Award Group. As stated above, since general comments, drafting notes, and footnotes without accompanying specific proposed language modifications are unacceptable and non-responsive, the Company will not negotiate provisions simply marked by such general comments, drafting notes and footnotes.
- The Company has an interest in maintaining consistency for certain provisions of the Agreements, such as the calculation of availability and payment terms. Therefore, for such provisions, the Company will endeavor to negotiate similar and consistent language across the Agreements for the Final Award Group.
- Proposals that do not include specific proposed modifications to the applicable Agreements will be deemed to have accepted such applicable Agreement in its entirety.

3.8.2 Specific to BTM Proposed Solutions

The Company intends to contract for an aggregation of BTM customer-sited assets through this RFP using its GSPA, attached as Appendix K.

- In general, under the GSPA, payment to the Supplier contains two parts: Enablement Fees to apply towards fixed costs associated with hardware and installation and Management Fees (\$/MW component) to cover operations and maintenance costs. In return, the Supplier shall guarantee minimum performance and availability metrics to ensure that the Services are available for the Company's delivery.

3.8.3 Specific to IFTM Proposed Solutions

3.8.3.1 The Company intends to contract for IFTM variable renewable deliverable generation projects with a battery energy storage system through this RFP using its SCCPA, attached as Appendix L.

- The SCCPA was created for the sole use for contracting under this IGP Soft Launch RFP only. The SCCPA is for in front of the meter projects that will provide the requested services. The SCCPA provides a fixed monthly payment in exchange for the provision of the contracted service. Liquidated damages will be assessed if the Project fails to provide the contracted services as and when required under the SCCPA.
- If the Proposed Solution utilizes a technology other than photovoltaic ("PV") and/or contains components that are not encompassed by the SCCPA, then the terms of the SCCPA will be modified to address the specific technology and/or component.
- In general, under the SCCPA, payment to the Seller will be in the form of a Lump Sum Payment component to cover the fixed costs of the Proposal. In return, the Seller shall guarantee minimum performance. Company shall not be obligated to pay for any energy generated by the Facility.
- Charging maximum for the storage component of a Facility will be as specified based on the 8760 projected hourly annual energy production profile provided in Proposer's response to the RFP. Liquidated damages will be assessed for excessive charging of the storage component of a Facility beyond the monthly charging maximum specified in the SCCPA.

3.9 Pricing Requirements

The Pricing Requirements will depend on the technology proposed.

3.9.1 For both BTM and IFTM Proposed Solutions

- Proposers must submit pricing for the Proposal as set forth in Attachment B and responsible for understanding the terms of the applicable Agreement.
- Pricing cannot be contingent upon other factors (e.g., changes to state or federal tax policy). This includes approval of other Company procurements.
- Escalation in pricing over the terms of the Agreement is prohibited.

- Pricing information must only be identified within specified sections of the Proposal instructed by this RFP's Appendix B (B1-BTM and/or B2-IFTM) Proposer's Response Package (i.e., Proposal pricing information must be contained within defined Proposal sections of the Proposal submission). Pricing information contained anywhere else in a Proposal will not be considered during the evaluation process.

3.9.2 Specific to BTM Proposed Solutions

Proposers may specify the desire to rely on the Company to provide marketing/recruitment support; however, it is anticipated that in doing so, the Supplier under the terms of the GSPA would then seek a lower assignment of Enablement and/or Management Fees to off-set the request for direct Company marketing support.

The Proposer's Response Package must include the following pricing components:

- **Management Fee:** Represented as a \$/kW/service/month amount, this fee reflects the Proposer's effective bid for managing each kW of the services being offered. This fee should ramp as the collective enablement ramps and the Proposer is managing more kW per service.
- **Enablement Fee:** The Enablement Fee represents a \$/capability (kW) to accommodate, in whole or in part, the enablement of customer assets for delivering Reliability (back-tie) Services. This fee allocation is set at a maximum of ten (10) times the monthly Management Fee on a \$ per kW, per services basis. Bids containing a price for enablement that exceed the specified limit will be disqualified.
- **Incentive Adder¹⁰:** As set forth in Exhibit K of the GSPA, the Company has published minimum incentives on a \$ per kW basis for each of the services to be procured. The Proposer may opt to offer additional incentives to participating customers, which will in turn be paid by the Company via the customer bill. The Incentive Adder will be added to the Proposer's total contract costs in the determination cost effective bids.

3.9.3 Specific to IFTM Proposed Solutions

- **Lump Sum Payment (\$/year):** Payment amount for full deliverability of the Facility. Payment will be made in monthly increments.

3.10 Proposal Description

Proposer must furnish the following as described and/or provided as part of Attachment B.

3.10.1 For both BTM and IFTM Resources

- State if Proposed Solution is a BTM or IFTM resource.
- Each Proposer must also agree to provide Proposal financial information, including a proposed finance structure information specified in Appendix B1 (BTM) or B2 (IFTM).

¹⁰ Customer incentives can begin to be administered at the start of enrollment or as late as the COD. If customer incentives are provided for a longer period, the total NPV of the contract (See Section xx) increases, but if customers do not receive incentives at the start of enrollment, the customer may be less likely to enroll.

Such information will be used to evaluate Threshold Requirements and non-price criteria (e.g., Financial Viability of Proposer, Financial Strength and Financing Plan, State of Project Development and Schedule) set forth in Section 4.3 and Section 4.4.2 of this RFP. Upon selection, the Final Award Group may be requested to provide further detailed cost information if requested by the PUC or the Consumer Advocate as part of the Agreement approval process. If requested, such information would be provided to the PUC, Consumer Advocate and Company pursuant to a protective order in the docket.

- The Proposer agrees that no material changes or additions to the Facility from what is submitted in its Proposal will be made without the Proposer first having obtained prior written consent from the Company. Evaluation of all Proposals in this RFP is based on the information submitted in each Proposal on the Proposal Due Date. If any Proposer requests any Proposal information to be changed after that date, the Company, in consultation with the Independent Observer, and in consideration of whether the evaluation is affected, will determine whether the change is permitted.
- Proposers must agree to provide Reliability (tie-back) Service in accordance with the technical requirements set forth in Table 3.
- Proposers must select which Event Delivery Option the Proposed Solution will be providing in Attachment B1 Attachment c Questionnaire (BTM) or Appx B2, Section 2 (IFTM). Table 3 provides the requirements for each option.
 - Option A, Automatic Delivery: Company equipment identifies a Contingency Event from either a (1) protective relay trip signal from each circuit breaker that triggers the need for the Reliability (back-tie) Service, or (2) loss of voltage reading from the appropriate Transformer 12kV bus that triggers the need for the Reliability (back-tie) Service, or (3) manual controls to turn on/off delivery during the delivery times and facility shutdown from Company Control Center. The Proposed Solution must reach full output within 12 seconds of the Contingency Event or manual controls. Proposer shall develop and explain the process to receive Contingency Event start/end alert from Company equipment.
 - Option B, Scheduled Delivery: Proposer's solution must reach full output by the stated delivery hours start and end time with manual controls to turn off the delivery or shutdown facility from Company Control Center. During the Scheduled Delivery event, at no time should there be an interruption of the Reliability (back-tie) Service, except and unless, a proportional amount of load is also reduced during the duration of the interruption. For instance, if the Reliability (back-tie) Service is located on a circuit that will be transferred to another circuit in the event of a Contingency Event and is depended on to prevent an overload on the circuit it is being transferred to, and that Proposed Solution is an inverter-based solution, the anti-islanding feature will prevent that resource from immediately re-connecting to the grid to provide that service for 5 minutes. That interruption will not be allowed unless a proportional

amount of load is also reduced from being served by the grid until the inverter-based resource is restored to full output.¹¹

3.10.2 Specific to BTM Proposed Solutions

- At minimum, provide projected 24-hour energy profiles for a typical weekend and weekday in each month (an annual 8760 hour profile is preferred) in Excel or CSV format which include availability of resource, and PV production, storage charge/discharge, and load without modifications. The resource must be available for the hours proposed in this RFP. If Solution is offered in a separate Company program/tariff/procurement, the 24hr energy profile must reflect that commitment and its impacts on the availability for this solicitation; conversely, if a claim of full resource availability is made as a commitment in response to this solicitation, then that commitment should have been/must be reflected in the projected availability for other program/tariff/procurement commitments.
- Proposals must include information on data exchange to allow the Company's Information Assurance Team to assess the risks in areas such as secure data transfer, data protection and encryption. See Information Assurance Worksheet (Appendix G).
- Proposals must include a model Participant Services Agreement to be used for this RFP. The Participant Services Agreement shall be reviewed by the Company to establish such agreement's alignment with Company guidelines.
- Proposals must provide all information pertaining to the acquisition and enablement of participants as specified in Appendix B-1 to this RFP.

3.10.3 Specific to IFTM Proposed Solutions

- Proposals shall provide projected hourly annual energy production profile of the Facility (8760 hours/year).¹²
- Proposals that include a generation component are required to provide a Daily Energy Potential RFP Projection. The Daily Energy Potential RFP Projection represents the estimated percentage of days in a year the Proposed Solution will generate enough renewable energy to meet the distribution reliability (back-tie) need as stated in Chapter 2 defined by the Event Delivery Option selected by the Proposer in accordance with Section 3.10.1, with a probability of exceedance of 95% over a five-year period. The DEP RFP Projection should take into account any losses associated with storing the energy generated in order to provide the required capacity at the time identified by the option. The DEP RFP Projection will be used in the RFP evaluation process and therefore Proposers will be held to their provided value.

¹¹ The Company may consider modification of the 5-minute reconnection setting.

¹² The projected hourly annual energy production profile is the projected output from the generating facility without curtailment and before any energy is directed to an energy storage facility, if one will be provided.

- Proposers must provide all information pertaining to the design, development, and construction of the Interconnection Facilities as specified in Appendix B-2 to this RFP.

3.11 Solution Eligibility Requirement

New solutions, in whole or “added on” to an existing system, are eligible for this RFP. Existing solutions are eligible as long as the resource is available to provide for the existing program/tariff and for the purpose of this RFP. The same resource cannot be double counted or paid more than once for the services it already provides to the grid and already accounted for in the load and DER forecasts. Proposal price must stand alone and cannot rely on payment from other program/tariff/procurements. Re-purposing an existing solution to provide the Reliability (back-tie) Service may adversely affect the grid need. The solution could be a combination of renewable resources, energy efficiency, distributed energy resources (PV, PV + Storage, thermostats, water heaters) and the control thereof and/or pricing options (rates). **Proposals must describe all scenarios that involve events that occur at the same time, and how the resource will respond.** Company Control Center is reliant on all resources and must be confident it will perform perfectly. For example, if a Reliability (back-tie) event occurs five minutes before a Load Reduction event, performance can be 100% for the Reliability (back-tie) system, but 0% for Load Reduction, if the resource cannot reduce more load. But, if the same event ends after ten minutes, Load Reduction can receive a performance score above 0% if the resource can deliver as expected. If the solution is incrementally participating in another program, solicitation or tariff, the Proposal must describe how the solution will perform differently as required and specified in Section 2.1. For example, the Proposal could state it is adding, for the sole use of this procurement, (1) solar panels to a solar project, or (2) utilizing batteries that capture solar energy made available and not currently being utilized under an existing agreement with the Company. Utility scale generation projects currently under contract, including those under feed-in tariff¹³, are not eligible for incremental addition for this procurement. Energy efficiency¹⁴ participants cannot receive a rebate if they receive incentives by participation in this solicitation.

¹³ More information about the program can be found on Company’s FIT website:

<https://www.hawaiianelectric.com/clean-energy-hawaii/selling-power-to-the-utility/feed-in-tariff>

¹⁴ Rebate program information can be found on Hawaii Energy’s website: <https://hawaiienergy.com/>

3.12 Confidentiality

- 3.12.1 Each prospective Proposer must submit an executed NDA in the form attached as Appendix E to this RFP by the Proposal Due Date specified in RFP Section 3.1 – Table 4. The form of the NDA is not negotiable. Information designated as confidential by the Company will be provided on a limited basis, and only those prospective Proposers who have submitted an executed NDA will be considered. Proposers must clearly identify all confidential information in their Proposals. However, Proposers should take care to designate as confidential only those portions of their Proposals that genuinely warrant confidential treatment. The Company discourages the practice of marking each and every page of a Proposal as confidential. The Company will make reasonable efforts to protect any such information that is clearly marked as confidential. Consistent with the terms of the NDA, the Company reserves the right to share any information, even if marked confidential, to its agents, contractors, or the Independent Observer for the purpose of evaluating the Proposal and facilitating potential contract negotiations.
- 3.12.2 Proposers, in submitting any Proposal(s) to Company in response to this RFP, certify that such Proposer has not shared its Proposal(s), or any part thereof, with any other Proposer of a Proposal(s) responsive to this RFP.
- 3.12.3 The Company will request that the PUC issue a Protective Order to protect confidential information provided by Proposers to the Company and to be filed in a proceeding before the PUC. A copy of the Protective Order, once issued by the PUC, will be provided to Proposers. Proposers should be aware that the Company may be required to share certain confidential information contained in Proposals with the PUC, the Consumer Advocate, and the parties to any docket instituted by the PUC, provided that recipients of confidential information have first agreed in writing to abide by the terms of the Protective Order. Notwithstanding the foregoing, no Proposer will be provided with Proposals from any other Proposer, nor will Proposers be provided with any other information contained in such Proposals or provided by or with respect to any other Proposer.

3.13 Credit Requirements for Agreements

- Proposers with whom the Company concludes contract negotiations must post an irrevocable standby letter of credit (for IFTM only – in the form of Development Period Security and Operating Period Security) from a bank chartered in the United States as required and set forth in Article 14 of the SCCPA and Article 21 of the GSPA.
- The letter of credit amount (for IFTM only – in the form of Development Period Security and Operating Period Security) set forth in the applicable Agreement is a minimum requirement. Proposers shall not propose an amount lower than that set forth in the applicable Agreement.
- Proposers may be required to provide an irrevocable standby letter of credit in favor of the Company from a bank chartered in the United States in lieu of the required source code escrow in an amount and as required and set forth in the applicable Agreement.

- (IFTM Only) Each Proposer shall be required to provide a satisfactory irrevocable standby letter of credit in favor of the Company from a bank chartered in the United States to guarantee Proposer's payment of interconnection costs for all Company-Owned Interconnection Facilities in excess of the Total Estimated Interconnection Costs and/or all relocation costs in excess of Total Estimated Relocation Costs that are payable to Company as required and set forth in Attachment G to the SCCPA.

Chapter 4: Evaluation Process and Evaluation Criteria

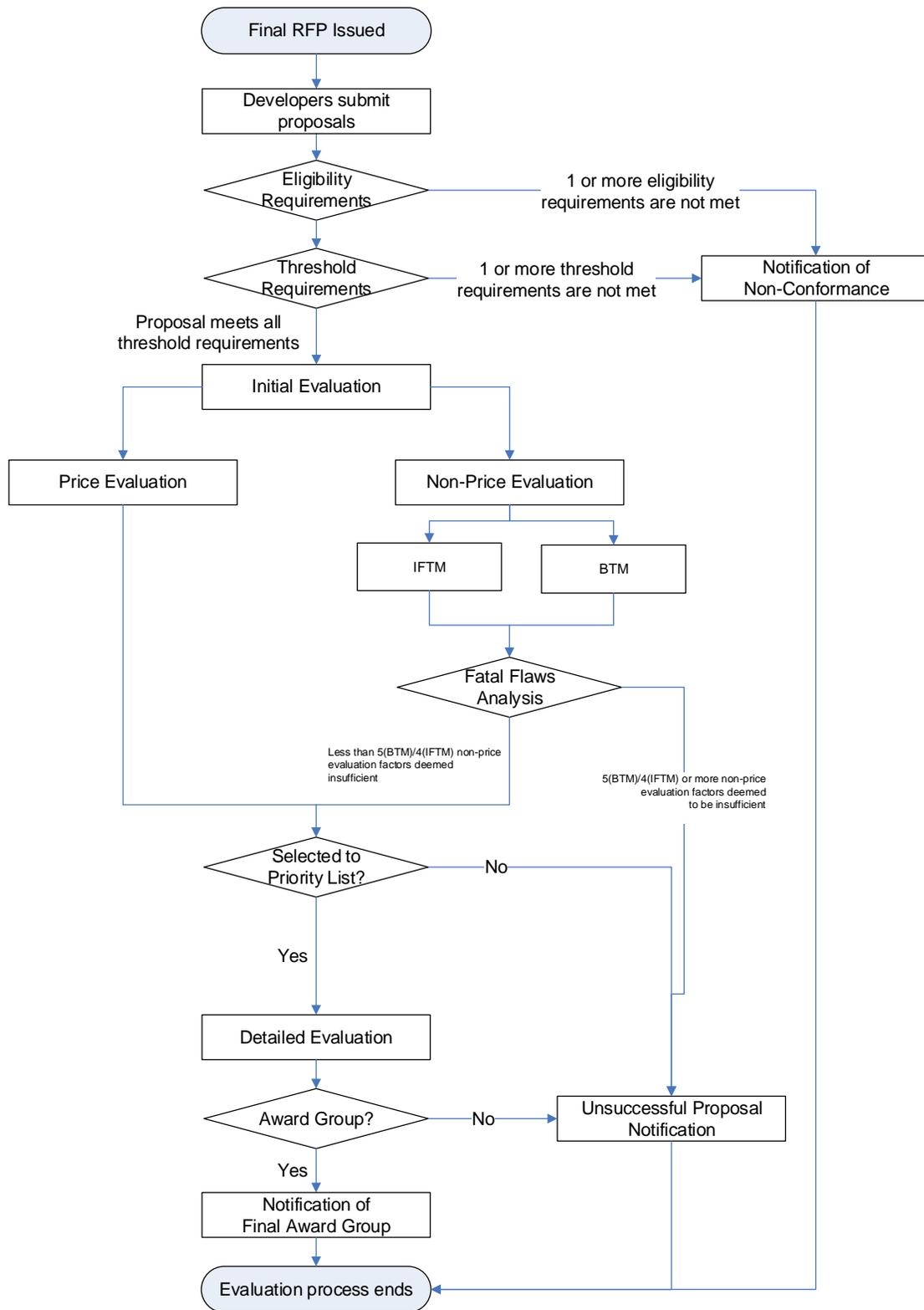
4.1 Proposal Evaluation and Selection Process

The Company will employ a multi-step evaluation process. Once the Proposals are received, the Proposals will be subject to a consistent and defined review, evaluation, and selection process. This Chapter provides a description of each step of the process, along with the requirements of Proposers at each step. Figure 1 sets forth the flowchart for the proposal evaluation and selection process.

Upon receipt of the Proposals, the Company will ensure that the Proposals meet the Eligibility Requirements, and if so, will review the Proposals to ensure that the Threshold Requirements have been met. The Company, in coordination with the Independent Observer, will determine if a Proposer is allowed to cure any aspect of its Proposal or whether the Proposal would be eliminated based on failure to meet either Eligibility or Threshold Requirements.¹⁵ If a Proposer is provided the opportunity to cure any aspect of its Proposal, the Proposer shall be given three (3) business days to cure from the date of notification to cure. Proposals that have successfully met the Eligibility and Threshold Requirements will then enter a two-phase process for Proposal evaluation, which includes the Initial Evaluation resulting in the development of a Priority List, and then a Detailed Evaluation process to arrive at a Final Award Group.

¹⁵ As a general rule, if a Proposer does not include a requested document, inadvertently excludes minor information or provides inconsistencies in its information, it may be given a chance to cure such deficiency. If a Proposer fails to provide material required information in its Proposal and providing the Proposer an opportunity to cure is deemed by the Company, in consultation with the Independent Observer, as an unfair advantage to such Proposer, the Proposal could be classified as non-conforming and eliminated for failure to meet Eligibility Requirements.

Figure 1: Evaluation Workflow



4.2 Eligibility Requirements Assessment

Upon receipt of the Proposals, each Proposal will be reviewed to ensure that it meets the following Eligibility Requirements.

- Proposal including required uploaded files must be received on time via the PowerAdvocate Platform.
- Copy of Proposal must be received by the Independent Observer within two business days of the Proposal Due Date.
- Proposal must not contain material omissions.
- Proposal must be signed and certified by an officer or other authorized person of the Proposer.
- Proposers must fully execute the agreements or other documents required pursuant to this RFP.
- Proposer must provide a certificate of good standing from the State of Hawai'i Department of Commerce and Consumer Affairs.
- Proposer must provide federal and state tax clearance certificates for the Proposer.
- Proposal must not be contingent upon changes to existing county, state, or federal laws or regulations.
- The Proposed Solution must conform to the technical requirements as stated in [Section 2.1](#) and in the applicable Agreement.
- The Proposal must have a COD commensurate with the need being addressed.
- (IFTM Only) Proposed Solution infrastructure and Point of Interconnection must be located outside the 3.2 feet sea level rise exposure area (SLR-XA) as described in the Hawai'i Sea Level Rise Vulnerability and Adaptation Report (2017), and are not located within a Tsunami Evacuation Zone while being situated in East Kapolei.

4.3 Threshold Requirement Assessment

Proposals that meet all the Eligibility Requirements will then be evaluated to determine compliance with the Threshold Requirements, which have been designed to screen out Proposals that are insufficiently developed, lack demonstrated technology, or will impose unacceptable execution risk for the Company. Proposers are responsible to provide explanations and supporting information demonstrating how and why they believe the Proposal meets each of the Threshold Requirements. Proposals that fail to provide this information or meet a Threshold Requirement will be eliminated from further consideration upon concurrence with the Independent Observer. The Threshold Requirements for this RFP are the following:

- **Performance Standards:** The Proposed Solution must be able to meet the performance attributes identified in the RFP, the Performance Standards identified in the applicable Agreement and the technical requirements identified in Appendix I of Rule 14H. Proposals should include sufficient documentation to support the stated claim that the service offering will be able to meet the Performance Standards. The Proposal should include information required to make such a determination in an organized manner to ensure this evaluation can be completed within the evaluation review period.

- **Proven Technology:** This criterion is intended as a check to ensure that the technology proposed is viable and can reasonably be relied upon to meet the objectives of this RFP. This includes the reliability of the Solution to deliver services under two or more other Company tariff/program/ procurements simultaneously (if applicable). The Company will only consider Proposals utilizing technologies that have successfully reached commercial operations in commercial applications at the scale being proposed. Proposals should include any supporting information for the Company to assess the commercial and financial maturity of the technology being proposed.
- **Viability of Proposer’s Financial Plan:** Proposers must provide a basic financial plan for the Project with details on the sources of debt and equity, capital structure, etc. Evidence must be provided of general support for project financing.
- **Credit/Collateral Requirements:** Proposers shall agree to post a Letter of Credit as described in Section 3.13 of this RFP.
- **Financial Compliance:** The proposed Project must not cause the Company to be subject to consolidation, as set forth in Financial Accounting Standards Board (“FASB”) Accounting Standards Codification Topic 810, Consolidation (“ASC 810”), as issued and amended from time to time by FASB. Proposers are required to state to the best of their knowledge, with supporting information to allow the Company to verify such conclusion, that the Proposal will not result in the Seller under the Agreement being a “Variable Interest Entity” and result in the Company being the primary beneficiary of the Seller that would trigger consolidation of the Seller’s finances on to the Company’s financial statements under FASB ASC 810. The Company will perform a preliminary consolidation assessment based on the Proposals received. The Company reserves the right to allow a Proposal to proceed through the evaluation process through selection of the Priority List and work with the Proposer on this issue prior to or during Agreement negotiations.
- **Experience of the Proposer:** The Proposer, its affiliated companies, partners, and/or contractors and consultants on the Proposer’s team must have experience in the delivery of Reliability (tie-back) Services through at least (1) project that is similar in size, scope, technology, and structure to the services being proposed by Proposer. The Company will consider a Proposer to have reasonably met this Threshold Requirement if the Proposer can provide sufficient information in its Proposal’s RFP Appendix B demonstrating that at least one member of the Proposer’s team, whose experience is being identified to meet this threshold criterion, has a firm commitment to provide services to the Proposer related to the Proposed Solution.
 - (IFTM Only) In addition to the above, at least one team member must have experience in financing, designing, constructing, interconnecting, owning, operating, and maintaining at least one (1) project similar to the Proposed Solution.
- **(IFTM Only) Community Outreach:** Gaining community support is an important part of a Project’s viability and success. A comprehensive community outreach and communications plan (“Community Outreach Plan”) is an essential roadmap that guides a developer as it works with various communities and stakeholders to gain their support for a Project. Proposers must include a Community Outreach Plan that describes the Proposer’s commitment to work with the neighboring community and stakeholders and to provide them timely Project information during

all phases of the Project. The Community Outreach Plan shall include but not be limited to the following information: Project description, community scoping (including stakeholders and community concerns), Project benefits, government approvals, development process (including Project schedule), and a comprehensive communications plan.

Proposers need to also be mindful of the Projects' potential impacts to historical and cultural resources. At a minimum, Proposers should identify: (1) any valued cultural, historical, or natural resources in the area in questions, including the extent to which traditional and customary native Hawaiian rights are exercised in the area; (2) the extent to which those resources – including traditional and customary native Hawaiian rights – will be affected or impaired by the proposed action; and (3) the feasible action, if any, to be taken to reasonably protect native Hawaiian rights if they are found to exist. Also, at a minimum, Proposers should have already contracted with a consultant with expertise in this field to begin a cultural impact assessment for the Project.

- **(IFTM Only) Site Control:** The Proposal must demonstrate that the Proposer has Site Control for all real property required for the successful implementation of a specific Proposal at a Site, including any Interconnection Facilities for which the Proposer is responsible. The need for a firm commitment is necessary to ensure that Proposals are indeed realistic and can be relied upon as the Company moves through the remainder of the RFP process. In addition, developmental requirements and restrictions such as zoning of the Site and the status of easements must be identified and will be considered in determining whether the Proposal meets the Site Control threshold. To meet this Site Control requirement, Proposers must do one of the following:
 - Provide documentation confirming (1) that the Proposer has an existing legally enforceable right to use and control the Site, either in fee simple or under leasehold for a term at least equal to the term of the SCCPA ("Site Control") as specified in the Proposer's Proposal (taking into account the timelines set forth in this RFP for selection, negotiation, and execution of a SCCPA and PUC approval), and (2) the applicable zoning for the Site and that such zoning does not prohibit the development of the Site consistent with the Proposal; or
 - Provide documentation confirming, at a minimum: (1) that the Proposer has an executed binding letter of intent, memorandum of understanding, option agreement, or similar document with the land owner (a "binding commitment") which sets forth the general terms of a transaction that would grant the Proposer the required Site Control, and (2) the applicable zoning for the Site and that such zoning does not prohibit the development of the Site consistent with the Proposal. The binding commitment does not need to be exclusive to the Proposer at the time the Proposal is submitted and may be contingent upon selection of the Proposal to the Final Award Group. If multiple Projects are provided a binding commitment for the same Site, the documents granting the binding commitments must not prevent the Company from choosing the Proposal that otherwise would have been selected.

- Government/Public Lands Only: The above two bullet points may not be feasible where government or publicly-owned lands are part of the Site or are required for the successful implementation of the Proposal. In such a case, at a minimum, the Proposer must provide a credible and viable plan, including evidence of any steps taken to date, to secure all necessary Site Control for the Proposal, including but not limited to evidence of sufficient progress toward approval by the government agency or other body vested with the authority to grant such approval (as demonstrated by records of the agency). The Proposer will still be required, however, to demonstrate Site Control as required in the SCCPA should the Proposal be selected to the Final Award Group.

4.4 Initial Evaluation – Price and Non-Price Analysis

Proposals that meet both the Eligibility and Threshold Requirements are eligible Proposals which will then be subject to a price and non-price assessment. Two teams have been established to undertake the bid evaluation process: Price Evaluation Team and Non-Price Evaluation Team. The results of the price and non-price analysis will be a relative ranking and scoring of all eligible Proposals. Price-related criteria will account for fifty percent (50%) of the total score and non-price-related criteria will account for fifty percent (50%) of the total score. The non-price criteria and methodology for applying the criteria are explained in [Section 4.4.2](#) of this RFP.

The Company will employ a closed-bidding process for this solicitation where the price and non-price evaluation models to be used will not be provided to Proposers. However, the Company will provide the Independent Observer with all necessary information to allow the Independent Observer to understand the evaluation models and to enable the Independent Observer to observe the entire analysis to ensure a fair process. The evaluation models will be finalized prior to the receipt of Proposals and filed confidentially in the IGP docket for review by the PUC and Consumer Advocate.

4.4.1 Initial Evaluation of the Price Related Criteria

For the Initial Evaluation price analysis, eligible Proposals will be grouped by the specific need they are intending to address, Kapolei 4 Circuit Extension or Ho’opili Substation.

To defer the need for Kapolei Circuit the following needs will need to be addressed:

- Kapolei 4 Circuit Extension

To defer the need of the Ho’opili Substation the following four circuit needs will need to be addressed:

- Need A: Ewa Nui 2 Circuit (Loss of Kaloi 1 Transformer – Kaloi 1 & 2 Circuits)
- Need B: Kaloi 1 Transformer – Kaloi 1 & 2 Circuits (Loss of Kaloi 3 Circuit)
- Need C: Kaloi 3 Circuit (Loss of Kaloi 1 Circuit)
- Need D: Kamokila 4 Circuit (Loss of Kaloi 2 Circuit)

Depending on the resource type, the solutions that will be serving the need will be grouped into the three different solutions types:

- Type 1: Demand based solution

- Type 2: Inverter based solutions (to mitigate 5-minute reconnection issue)
- Type 3: All other inverter based solutions

The solutions for each need will be ranked by a Normalized Net Present Value (“NNPV”) cost for each solution type. There will be 12 separate rankings covering the range of needs and solutions for Ho’opili Substation and 3 separate rankings covering the range of needs and solutions for Kapolei 4 Circuit. Below is the example illustration of the rankings for both Ho’opili Substation and Kapolei 4 Circuit.

Solution Type	Circuit Needs for Ho’opili Substation			
Demand based	Need A	Need B	Need C	Need D
Inverter based	Need A	Need B	Need C	Need D
All other inverter based	Need A	Need B	Need C	Need D

Solution Type	Circuit Needs for Kapolei 4
Demand based	Kapolei 4 circuit extension
Inverter based	Kapolei 4 circuit extension
All other inverter based	Kapolei 4 circuit extension

The Company will use the costs provided in the Proposal to create a NNPV per kW to rank the Proposals in the Initial Evaluation. For IFTM Proposed Solutions, the NNPV will utilize the Lump Sum Payment (\$/year) and the Offer Size (MW). For BTM Proposed Solutions, NNPV will utilize the Management Fee (\$/kW/month), Enablement Fee (\$/kW), Incentive Adder (\$/kW/month), Incentive (\$/kW/month),¹⁶ and Offer Size (MW). The NNPV will be brought to the same year dollars as the COD year. The eligible Proposals for each evaluation category will be ranked by NNPV.

4.4.2 Initial Evaluation of the Non-Price Related Criteria

The non-price evaluation will be separated into two categories: (1) Specific to BTM Proposed Solutions and (2) Specific to IFTM Proposed Solutions. Each category will be evaluated based on its own evaluation criteria.

All non-price criteria will be scored on a scale of 1 (poor) to 5 (highly preferable). The minimum standard level for each non-price criterion is defined below. The total non-price criteria score will be the sum of the scores for each of the individual non-price criteria. The Company will then award non-price evaluation points in accordance with the relative ranking of scores within each evaluation category. The Proposal in each evaluation category with the highest total non-price score will receive 500 points, and all other Proposals will receive points equal to the Proposal’s score divided by the top score, multiplied by 500.

¹⁶ BTM Aggregators can start their contract at the time they start their enrollment to receive Enablement and Management Fees or wait for the COD to receive fees. The participants can receive incentives at the start of enablement or wait for the COD. The NNPV will increase if the contract has a longer period.

During the non-price criteria evaluation, a fatal flaws analysis will also be conducted such that any Proposal that is deemed not to meet the minimum standards level¹⁷ (for BTM Proposed Solutions, five (5) or more non-price criteria; and for IFTM Proposed Solutions, four (4) or more non-price criteria) will be disqualified given that the Proposal has failed to meet a majority of non-price factors that are indicative as to the general feasibility and operational viability of a Proposed Solution.

4.4.2.1 Specific to BTM Resources

For the non-price analysis, each Proposal will be evaluated on each of the seven (7) non-price criteria categories set forth below to assess their merit in the general areas of Proposed Solution development feasibility and operational viability. These are presented below with their corresponding weights.

- Experience and Qualifications (15%)
- Financial Strength and Financing Plan (10%)
- GSPA Contract Exceptions (10%)
- Participants Acquisition Strategy (30%)
- Participant Service Agreement (5%)
- Conformance with Hawaiian Electric's Code of Conduct Standards (15%)
- Conformance with Information Assurance Policies (15%)

The non-price criteria are:

- **Experience and Qualifications** – Proposer with a demonstrated ability to construct and deliver grid services to support an electric grid can reasonably be expected to be able to successfully supply Reliability (back-tie) Services to the Company with a higher level of confidence than those without any prior experience. This includes the reliability of the Solution to deliver services on two or more other Company tariff/program/ procurements simultaneously, if applicable. Therefore, proposals will be evaluated based on the experience of the Proposer in recruiting, enrolling, enabling and aggregating customer assets (similar to those being proposed) and managing these assets so as to successfully deliver Reliability (back-tie) Services. At a minimum, the Proposer and its team should have experience with delivering (including aggregating, financing, interconnecting and managing) at least one project of a similar size and technology to the one being proposed. Additional preference will be given to Proposers with experience in successfully delivering services to multiple utilities in a manner that is similar to the one being proposed and/or that have prior experience delivering such services in Hawai'i.
- **Financial Strength and Financing Plan** – This criterion addresses the comprehensiveness and reasonableness of the financial plan for the Reliability (back-tie) Services delivery commitment. A complete financial plan addresses the following issues: Project ownership, capital cost and capital structure, sources of debt and equity, and evidence that credit-worthy entities are interested in financing the Project. The financial strength of Proposers or their credit support providers will be considered, including their credit ratings. At a minimum, the Proposal should include a basic financial plan for the plan covering the sources of debt and equity, capital

¹⁷ A score of 3 is the “meets minimum standards” level that a Proposal must achieve in at least five (5) criteria.

structure, etc. and provide evidence of general support for the Project financing. The financing participants are expected to be reasonably strong financially. Proposers and their sources of capital that have investment grade credit ratings from a reputable credit rating agency (S&P, Moody's, Fitch) will also be given preference.

- **GSPA Contract Exceptions** – Proposers are encouraged to accept the contract terms identified in the GSPA in their entirety in order to expedite the overall RFP process and potential contract negotiations. Proposers who accept the agreements without proposed modifications will receive a higher score and will be the only proposals that can achieve the highest scoring for this non-price evaluation. Technology-specific or operating characteristic-required modifications, with adequate explanation as to the necessity of such modifications, will not jeopardize a Project's ability to achieve the highest score. Proposers who elect to propose modifications to the agreements shall provide a Microsoft Word red-line version of the applicable document identifying specific proposed modifications to the agreement language, as well as a detailed explanation and supporting rationale for each modification. General comments without proposed alternate language, drafting notes without explanation or alternate language, footnotes such as "parties to discuss," or a reservation of rights to make additional modifications to the agreements at a later time are unacceptable, will be considered unresponsive, and will result in a lower score. The Company and Independent Observer will evaluate the impact that the proposed modifications will have on the overall risk assessment associated with the evaluation of each Proposal.
- **Participants Acquisition Strategy** – In tandem with the bid size, the Company will be extremely attentive to the customer recruitment strategy. The Company will assess this in terms of the credibility of the approach and seek to determine how much knowledge or experience the Proposer has with the Hawai'i market. The Company sees customer or participant acquisition as one of the largest areas of uncertainty or risk in the delivery process and will seek compelling and well-thought-out participant recruitment and enrollment strategies. A failed enablement will result in economic impacts to Suppliers and leave the system short on projected resources. A plan that utilizes local installers, technicians or contractors will be rated more favorably than those that do not have a similar consideration.
- **Participant Service Agreement** – The Company has specified that while the Proposer must develop a Participant Service Agreement for engagements directly with customers, the Company would need to review the form of agreement for completeness relative to the Company guidelines.
- **Conformance with Hawaiian Electric's Code of Conduct Standards** – The Company has specified that a Proposer must conform to, at a minimum, the Company Code of Conduct. This is of particular importance given that Suppliers will be interactive with customers, typically on customer premises and otherwise indirectly acting as a certified partner with the Company. As such, the Company will be interested in reviewing the Proposers' Code of Conduct standards to ensure adequate conformity to Company standards.
- **Conformance with Information Assurance Policies** – Customer data will be exchanged as part of the enrollment and enablement process. Furthermore, Supplier event performance data and

Company System data will also be shared across Supplier-Company Systems. As a result, conformity to Company's Information Assurance standards is a key part of this engagement, especially in areas such as secure data transfer, data protection and encryption.

Specific to IFTM Proposed Solutions

For the non-price analysis, each Proposal will be evaluated on each of the eight (8) non-price criteria categories set forth below to assess their merit in the general areas of Proposal development feasibility and operational viability. These are presented below, with their corresponding weights.

- Community Engagement and Cultural Resource Impacts (20%)
- State of Project Development and Schedule (20%)
- Performance Standards (20%)
- Environmental Compliance and Permitting Plan (10%)
- Experience and Qualifications (10%)
- Financial Strength and Financing Plan (10%)
- SCCPA or ESPPA Contract Exceptions (10%)

The non-price criteria are:

- **Community Engagement and Cultural Resource Impacts:** Gaining community support is an important part of a Project's viability and success. An effective Community Outreach Plan will call for early meaningful communications with stakeholders and will reflect a deep understanding and respect for the community's desire for information to enable them to make informed decisions about future projects in their communities. Therefore, Proposals will be evaluated on the quality of the Community Outreach Plan to inform the Project's impacted communities. Proposers need to also be mindful of the Project's potential impacts to historical and cultural resources. Proposers should at least identify (1) valued cultural, historical, or natural resources in the area in question, including the extent to which traditional and customary native Hawaiian rights are exercised in the area; (2) the extent to which those resources – including traditional and customary native Hawaiian rights – will be affected or impaired by the proposed action; and (3) the feasible action, if any, to be taken to reasonably protect native Hawaiian rights if they are found to exist.

At a minimum, Proposals should include a Community Outreach Plan that describes the Proposer's commitment to work with the neighboring community and stakeholders and to provide timely Project information during Project development, construction and operation. The Community Outreach Plan shall include, but not be limited to the following:

- 1) Project description. A thorough description including a map of the location of the Project. This information will help the community understand the impact that the Project may have on the community.
- 2) Community scoping. Identify stakeholders (individuals, community leaders, organizations), community issues and concerns, and community sentiment.
- 3) Project benefits. An explanation of the need for the Project. This will help the community to understand how the Project might benefit their community.

- 4) Government approvals. Required government permits and approvals, public hearings and other opportunities for public comment. This information will help the community to understand the level of public scrutiny and participation that might occur for the Project and the opportunities to provide public comments.
- 5) Development process. A Project schedule that identifies key milestones will facilitate the community's understanding of the development process.
- 6) Communications Plan. A communications plan including a detailed community outreach schedule that will keep the affected communities and stakeholders informed about the Project's outreach efforts during early Project development period through construction and operations.

Preference will be given to Proposers who have already identified established contacts to work with the local community, have used community input to incorporate changes to the final design of the Project and mitigate community concerns, have proposed a community benefits package (including details of the community recipients and benefits package), or have community consultants as part of the Project team doing business in Hawai'i that have successfully worked with communities in Hawai'i on the development of two or more energy projects or projects with similar community issues. These criteria are aligned with the Companies' community engagement expectation whereby all developers will be required to engage in community outreach prior to signing a SCCPA with the Companies. This process is also outlined in RFP [Section 5.3](#).

Also, at a minimum, Proposers should have already contracted with a consultant with expertise in such field to begin a cultural impact assessment for the Project. Preference will be given to Proposals that are further along in the assessment process and are able to provide a mitigation/action plan or are able to provide a date for when a mitigation/action plan will be available that addresses any identified cultural resource issues.

- **State of Project Development and Schedule:** Proposed Solutions that are further along in development generally have lower project execution risk and a greater probability of being able to be successfully placed into service prior to the COD. At a minimum, Proposals should demonstrate how they plan to capture any ITC safe harbor and reach their COD specified, including identification of risks and schedule assumptions. Schedules must identify the IRS completion date and PUC approval dates assumed. Proposals should also demonstrate, via a detailed critical path schedule, that there is a high likelihood that the Proposed Solution will be able to reach commercial operations as specified. Proposals shall include a Gantt chart that clearly illustrates the overall schedule and demonstrates achievement of any ITC safe harbor, if applicable, and commercial operations by their specified COD. The Gantt chart shall include task durations and dependencies, identify tasks that will be fast tracked, and identifies slack time and contingencies. This criterion will also look at the high-level project costs set forth in the Proposal including costs for equipment, construction, engineering, Seller-Owned Interconnection Facilities, Company-Owned Interconnection Facilities, land, annual O&M, the reasonableness of such costs, and the assumptions used for such costs. Project costs that do

not appear reasonable for a project of the size proposed may result in a lower ranking for this criterion if the Company reasonably determines that the cost information is unrealistic based on prior experience in the market which may result in a risk that the Proposed Solution can be built on time and for the price proposed by the Proposer. The Company reserves the right to discuss any cost and financial information with a Proposer to ensure the information provided is accurate and correct.

- **Performance Standards:** The proposed Facility must be able to meet the performance attributes identified in this RFP and the Performance Standards identified in the SCCPA. The Company will review the Proposal information received, including design documents and operating procedures materials provided in the Proposal, and evaluate whether the Proposed Solution as designed is able to meet the Performance Standards identified in the SCCPA and in this RFP. At a minimum, in addition to meeting the Performance Standards, the Proposals should include sufficient documentation, provided in an organized manner, to support the stated claim that the Proposed Solution will be able to meet the Performance Standards. The Proposal should include information required to make such a determination in an organized manner to ensure this evaluation can be completed on a timely basis. Preference will be given to Proposals that provide detailed technical and design information showing how each standard can be met by the Proposed Solution.
- **Environmental Compliance and Permitting Plan:** This criterion relates to the potential (short- and long-term) environmental impacts associated with each project, the quality of the plan offered by the Proposer to mitigate and manage any environmental impacts (including any pre-existing environmental conditions), and the plan of Proposers to remain in environmental compliance over the term of the applicable Agreement. These impacts are reflected on a technology-specific basis. Completing any necessary environmental review and obtaining the required permitting in a timely manner is also important and Proposals will be evaluated on their plan to identify, apply for, and secure the required permits for the Proposed Solution, any permitting activity that has been completed to date, including having initial discussions with U.S. Fish and Wildlife and the State of Hawai'i Department of Land and Natural Resources' Division of Forestry and Wildlife, to the extent applicable, prior to submitting a Proposal, and the degree of certainty offered by the Proposer in securing the necessary permits.

At a minimum, Proposed Solutions should be expected to have minimal environmental impact for most areas and Proposals should provide a comprehensive plan to mitigate the identified potential or actual significant environmental impacts to remain in environmental compliance. The proposed mitigation plans should be included in the Proposed Solution timeline. Preference will be given to Proposals that provide a more detailed plan as well as those that have proactively taken steps to mitigate potential environmental impacts.

Also, this criterion requires that, at a minimum, Proposers should have identified, and disclosed in their Proposal, all major permits, approvals, appurtenances and entitlements (including applicable access, rights of way and/or easements) (collectively, the "permits") required and have a preliminary plan for securing such permits. Preference will be given to Proposals that are

able to provide a greater degree of certainty that its plan to secure the required permits is realistic and achievable or have already received all or a majority of the required permits. The Proposer should disclose all identified (a) discretionary permits required, i.e., those requiring public or contested case hearings and/or review and discretionary approval by an appropriate government agency and (b) ministerial conditions without discretionary approval conditions. In all cases, the Proposer must provide a credible and viable plan to secure all necessary and appropriate permits necessary for the Project. For example, if the Project is located within an agricultural district, the Proposer shall provide evidence of Proposer's verification with the appropriate government agency that the Project complies with HRS Section 205-2 and Section 205-4.5, relating to solar energy facilities placed on agricultural land, provided, however that where a special use permit (under Section 205-6), exemption (under Section 205-6), or amendment to land use district boundary lines (under Section 205-4) is required to secure such compliance, Proposer shall identify the need for such permit, exemption or amendment and provide a list of required prerequisites and/or conditions and a realistic timeline necessary to obtain such permit, exemption or amendment satisfactory for Proposer to still meet its designated COD.

- **Experience and Qualifications:** Proposals will be evaluated based on the experience of the Proposer in financing, designing, constructing, interconnecting, owning, operating, and maintaining projects (including all components of the project) of similar size, scope and technology. At a minimum, Proposals must show via the table format specified in RFP Appendix B2 Section 2.13 that at least one (1) team member has specific experience in each of the following categories: financing, designing, constructing, interconnecting, owning, operating, and maintaining at least one electricity generation project including all components of the project similar to the Proposed Solution being proposed. Preference will be given to Proposers with experience in successfully developing multiple projects that are similar to the one being proposed and/or that have prior experience successfully developing and interconnecting a utility scale project to the Company's System.
- **Financial Strength and Financing Plan:** This criterion addresses the comprehensiveness and reasonableness of the financial plan for the Proposed Solution as well as assesses the financial strength and capability of the Proposer to develop the Proposed Solution. A complete financial plan addresses the following issues: Proposed Solution ownership, capital cost and capital structure, sources of debt and equity, and evidence that credit-worthy entities are interested in financing the Proposed Solution. The financial strength of Proposers or their credit support providers will be considered, including their credit ratings. The financing participants are expected to be reasonably strong financially. Developers and their sources of capital that have investment grade credit ratings from a reputable credit rating agency (S&P, Moody's, Fitch) will also be given preference, with those that have higher credit ratings ranked higher.
- **Contract Proposed Modifications:** Proposers are encouraged to accept the contract terms identified in the SCCPA in their entirety in order to expedite the overall RFP process and potential contract negotiations. Proposers who accept the agreements without proposed modifications will receive a higher score and will be the only proposals that can achieve the

highest scoring for this non-price evaluation. Technology-specific or operating characteristic-required modifications, with adequate explanation as to the necessity of such modifications, will not jeopardize a Project's ability to achieve the highest score. Proposers who elect to propose modifications to the agreements shall provide a Microsoft Word red-line version of the applicable document identifying specific proposed modifications to the agreement language, as well as a detailed explanation and supporting rationale for each modification. General comments without proposed alternate language, drafting notes without explanation or alternate language, footnotes such as "parties to discuss," or a reservation of rights to make additional modifications to the agreements at a later time are unacceptable, will be considered unresponsive, and will result in a lower score. The Company and Independent Observer will evaluate the impact that the proposed modifications will have on the overall risk assessment associated with the evaluation of each Proposal.

4.5 Selection of a Priority List

At the conclusion of both the price and non-price analysis, a total score will be calculated for each Proposal using the 50% price-related criteria and 50% non-price-related criteria weighting outlined above. The price and non-price analysis, and the summation of both price and non-price scores described above, will result in a ranking of Proposals within each evaluation category.

The Company will select a Priority List from the highest-scoring Proposals. The Company's objective for the Priority List selection process is to identify and select Proposals from the evaluation categories that are low cost and viable Proposed Solutions, as defined by the price and non-price weights at this stage in the process, that can be grouped in combinations to meet the Reliability (back-tie) Services targets. The Company will develop the Priority List in consultation with the Independent Observer. Selection to the Priority List does not assure an eligible Proposed Solution's inclusion in the selection of the Final Award Group.

4.6 Detailed Evaluation

The Company intends to use a production simulation computer model to perform the Detailed Evaluation. The Detailed Evaluation will seek to determine a portfolio of non-wire alternatives that is lower cost than the Company traditional wired solution. It will be based on the total net cost to the Company of integrating the combination of Priority List Proposals onto the Company's System which includes:

1. The cost to deliver the combination of Proposed Solutions; and
2. The cost of Imputed Debt, if applicable.

The Detailed Evaluation will be done for both Kapolei 4 Circuit Extension and Ho'opili Substation. The Detailed Evaluation will be structured to account for the "two-fer" value of solutions on Kaloi 1, Kaloi 2, or Kaloi 3 circuits to defer Ho'opili Substation. Because Need B (see Section 4.4 above) accounts for the same two circuits that affect Need A, Need C, and Need D, a Type 1 or Type 2 solution that can mitigate the 5-minute reconnection issue on Kaloi 1 or Kaloi 2 circuits can potentially reduce the needs at Need A, Need C, and Need D. Similarly, Need C accounts for the same circuit that affects Need B so a Type 1

(see Section 4.4 above) or Type 2 solution on Kaloi 3 circuit can potentially reduce Need B. Below is the illustration of the detailed evaluation process.

Category	Need A Loss of Kaloi 1 + Kaloi 2 circuits	Need B Loss of Kaloi 3 circuit	Need C Loss of Kaloi 1 Circuit	Need D Loss of Kaloi 2 Circuit
Type 1. Demand based solutions Type 2. Inverter based solutions	Step 3. Evaluate type 1 and type 2 solutions for Need A and Need D	Step 1. Evaluate type 1 and type 2 solutions for Need B	Step 2. Evaluate type 1 and type 2 solutions for Need C	Step 3. Evaluate type 1 and type 2 solutions for Need A and Need D
Type 3. All other inverter based solutions	Step 4. Evaluate type 3 solutions for Need A, Need B, Need C, and Need D			

First, Type 1 and Type 2 solutions for Need B will be evaluated. Next, Type 1 and Type 2 solutions for need C will be evaluated after accounting for any qualified solutions that address Need B on Kaloi 1 circuit. If Need B was not fully met by Type 1 and Type 2 solutions in step 1, Need B will be assessed again to include any qualified solutions that address need C on Kaloi 3 circuit. Next, Type 1 and Type 2 solutions for Need A and Need D will be evaluated after accounting for the qualified solutions that address Need B on Kaloi 2 circuits. Lastly, Type 3 solutions for Need A, Need B, Need C and Need D will be evaluated.

As noted, the Company will take into account the cost of rebalancing its capital structure resulting from any debt or Imputed Debt impacts associated with each combination of Priority List Proposals (including any costs to be incurred by the Company, as described above, that are necessary in implementing the combination of Proposals). The Company proposes to use the Imputed Debt methodology published by S&P that is applicable to the combination of Priority List Proposals being evaluated. S&P views long-term Agreement(s) as creating fixed, debt-like financial obligations that represent substitutes for debt-financed capital investments in generation capacity. By adjusting financial measures to incorporate Agreement-fixed obligations, greater comparability of utilities that finance and build generation capacity and those that purchase capacity to satisfy new load are achieved.

During the Detailed Evaluation and before the Proposals advance to the Final Award Group, the Company will perform load flow analyses to determine if certain Proposal combinations introduce distribution circuit constraints that will factor into the selection process. Proposals selected must not have any additional constraints imposed based on the load flow analysis to advance to the Final Award Group. However, the Company reserves the right, in consultation with the Independent Observer, to allow minor modifications to a Proposal to avoid such additional constraints. If such modification resulted in a modification of the Proposed Solution, the pricing proposed would also need to be revised. Under no circumstances would a Proposer be allowed to increase their price as a result of such minor modification.

The Company may assess additional combinations of Proposals if requested by the Independent Observer and if the time and capability exist to perform such analyses.

4.7 Selection of the Final Award Group

Based on the results of the Detailed Evaluation and review of the results with the Independent Observer, including the load flow analysis and review of circuits, and review of other factors, the Company will select a Final Award Group from which to begin contract negotiations. All Proposers will be notified at this stage of the evaluation process whether their Proposal is included in the Final Award Group. Proposal evaluation results and rankings will not be disclosed to the Proposers.

Selection to the Final Award Group and/or entering into contract negotiations does not guarantee execution of an Agreement.

Further, if at any time during the evaluation or negotiation process it is discovered that a Proposal contains incorrect or misrepresented information that have a material effect on any of the evaluation processes, including selection of the Priority List or the Final Award Group, the Company reserves the right, at any time prior to submission of the Agreement to the PUC, in consultation with the Independent Observer, to disqualify the Proposer from the RFP. If discovery of the incorrect or misrepresented information is made after the Company has filed its PUC application for approval of the Agreement with the Proposer, the Company will disclose the incorrect or misrepresented information to the PUC for evaluation and decision as to whether such Proposer should be disqualified.

Following any removal of a proposal from the Final Award Group, either by disqualification noted immediately above, or via any other removal or withdrawal of a proposal, including failure to reach agreement on the Agreement, the Company, taking into consideration the timing of such removal and the current status of the Company's needs under the RFP, in consultation with the Independent Observer, will review the Priority List to determine (1) if another proposal should be added to the Final Award Group; (2) the Company traditional wired solution should be pursued; or (3) if the remaining proposals in the Final Award Group should remain unchanged.

Order No. 36536 "directs the Companies to work with the [Independent Observers] to increase bid transparency within the RFP process, while maintaining an appropriate level of confidentiality regarding bids and bidders." The Companies agree that it is desirable for the RFP process to be as transparent as possible while maintaining the confidentiality of Proposer and Proposal information. The type and quantity of information that can be disclosed will not be known until the Companies and the Independent Observer have a better understanding of the number and types of proposals received and whether such information can be easily anonymized. The Companies will work with the Independent Observers to determine an appropriate level of disclosure after Proposals are received.

Chapter 5: Post Evaluation Process

5.1 Interconnection Requirements Study (IRS) Process

Appendix III of Rule 14H shall determine the need for an IRS. If determined necessary, a complete package of IRS Data Request worksheets, Project single line diagram(s), models for equipment and

controls, list(s) to clearly identify the components and respective files (for inverters and power plant controller), and complete documentation with instructions, shall be requested once the Final Award Group is announced. See Section 2.11.1 of Appendix B2. PSSE Generic models, PSSE User models, and ASPEN models shall be configured to represent all of the functional equipment with settings in place to comply with the Company's performance requirements. These must be checked for functionality by the Proposers or its vendors and consultants prior to submission to the Company. Similar and fully accurate PSCAD models shall be submitted in a condition that complies with the PSCAD modeling guidelines provided by the Company. Overlaid validation plots of PSSE Generic models, PSSE User models, and PSCAD models shall be submitted as described in the IRS Data Request worksheets to ensure compatible responses from each model. Complete data packages shall be submitted 15 Days following announcement of the Final Award Group.

After proposals are submitted, the Company will inspect the data packages for general completeness. For any incomplete submissions, a list of missing or non-functional items will be provided. Proposers will be given 15 Days to resolve data and modeling deficiencies. The Company, in consultation with the Independent Observer, may withdraw Proposed Solutions if their submission requirements are deemed incomplete for the lack of requested models and validation plots. Proposals that are complete will be able to move to an IRS.

Upon notification of the Final Award Group, the Company will provide a draft IRS Agreement for each selected Project with a statement of required deposit for individual and prorated work as part of an IRS Scope for a System Impact Study that will involve (a) technical model checkout for each Project, (b) any considerations that are specific to a particular Project and location, and (c) system impact analyses of the Projects as a group. Interconnection cost and schedule, including cost of any required system upgrades, will be determined in a subsequent Facilities Study.

The technical model checkouts will be conducted first. Upon identification of any functional problems or deficiencies, corrective action shall be taken immediately and on an interactive basis so that the problems or deficiencies can be resolved within 15 Days, including re-submission of data and updated models, or the Project shall be deemed withdrawn. At the discretion of the Company and provided that there is a demonstration of good faith action to minimize delay that would affect the schedule for IRS analyses, a second round of model checkout and problem solving may proceed. Thereafter, any notice that a Project is deemed withdrawn for lack of completeness shall be final. Subject to consultation with the Independent Observer, failure to provide all requested material within the time(s) specified, or changes to the data provided after the due date(s), shall result in elimination from the Final Award Group.

Proposers shall be responsible for the cost of the IRS under separate agreements for the System Impact Study and the Facilities Study. The overall IRS will provide information including, but not limited to, an estimated cost and schedule for the required Interconnection Facilities for a particular Proposed Solution and any required mitigation measures. Proposers will be responsible for the actual final costs of all Seller-Owned Interconnection Facilities and Company-Owned Interconnection Facilities. Upon reviewing the results of the IRS Technical Review process, if required, pursuant to Rule 14H, Appendix III,

Proposers will have the opportunity to declare the Agreement null and void in the event that the estimated interconnection costs and schedule for the Proposed Solution are higher than what was estimated in the Proposal.

5.2 Contract Negotiation Process

Within five (5) business days of being notified by the Company of its intent to enter into contract negotiations, Proposers selected for the Final Award Group will be required to indicate, in writing to the Company's primary contact for this RFP, whether they intend to proceed with their Proposals.

Proposers who elect to remain in the Final Award Group will be required to keep their Proposal valid through the award period. Contract negotiations will take place in parallel with the IRS process, if required. The Company's goal is to complete contract negotiations and submit executed Agreement(s) for PUC approval within six (6) months of notification of intent to enter contract negotiations. The IRS may not be completed at such time. The Company intends to execute and file the Agreement(s) with the PUC for approval and later amend the Agreement(s) to include the results of the IRS.

5.3 Community Outreach and Engagement (IFTM only)

The public meeting and comment solicitation process described in this Section and Section 29.21 of the SCCPA (Community Outreach Plan) do not represent the only community outreach and engagement activities that can or should be performed by a Proposer. Within 30 Days of the start of contract negotiations, Proposers shall have provided the Company with an updated comprehensive Community Outreach Plan to work with and inform neighboring communities and stakeholders and to provide them timely information during all phases of the Project. The Community Outreach Plan shall include but not be limited to the following information: Project description, Project stakeholders, community concerns and Proposer's efforts to address such concerns, Project benefits, government approvals, Project schedule, and a comprehensive communications plan. Upon selection to the Final Award Group, a Proposer's Community Outreach Plan shall be a public document available to the public on the Proposer's website and upon request. The Proposer shall also provide the Company with links to their Project website and Community Outreach Plan, which the Company will post on the Company's website. Prior to the execution date of the SCCPA, Proposers shall also host a public meeting in the community where the proposed Project is to be located for community and neighborhood groups in and around the vicinity of the Project Site that provided the neighboring community, stakeholders and the general public with: (i) a reasonable opportunity to learn about the proposed Project; (ii) an opportunity to engage in a dialogue about concerns, mitigation measures, and potential community benefits of the proposed Project; and (iii) information concerning the process and/or intent for the public's input and engagement, including advising attendees that they will have thirty (30) calendar days from the date of said public meeting to submit written comments to Company and/or Proposer for inclusion in the Company's submission to the PUC of its application for a satisfactory PUC Approval Order. The Proposer shall collect all public comments, and then provide the Company copies of all comments received in their original, unedited form, along with copies of all comments with personal information redacted and ready for filing. If a SCCPA is executed by the Proposer and the Company, the Company may submit any and all public comments (presented in its original, unedited form) as part of its PUC application for this Project. Proposers shall notify the public at least three weeks in advance of the meeting. The Company

shall be informed of the meeting. The Company will provide Proposers with detailed instructions regarding the community meeting requirement after the selection of the Final Award Group. (For example, notice will be published in county or regional newspapers/media, as well as media with statewide distribution. The Proposer will be directed to notify certain individuals and organizations. The Proposer will be provided templates to use for the public meeting notices, agenda, and presentation.) Proposers must also comply with any other requirement set forth in the SCCPA relating to Community Outreach.

Following the submission of the PUC application for the Project, and prior to the date when the Parties' statements of position are to be filed in the docketed PUC proceeding for the Project, the Proposer shall provide another opportunity for the public to comment on the proposed Project. The Proposer's statement of position filed in the docket associated with the Project will contain an attachment including those comments.

The Proposer shall be responsible for community outreach and engagement for the Project, and that the public meeting and comment solicitation process described in this section do not represent the only community outreach and engagement activities that can or should be performed.

5.4 Greenhouse Gas Emissions Analysis (IFTM only)

Proposers whose Proposal(s) are selected for the Final Award Group shall cooperate with and promptly provide to the Company and/or the Company's consultant(s) upon request all information necessary, in the Company's sole and exclusive discretion, for such consultant to prepare a greenhouse gas ("GHG") emissions analysis and report in support of a PUC application for approval of the Agreement for the Project (the "GHG Review"). Proposers shall be responsible for the full cost of the GHG Review associated with their Project under a separate agreement between the Proposer and the Company. The GHG Review is anticipated to address whether the GHG emissions that would result from approval of the Agreement and subsequent to addition of the Project to the Company's system are greater than the GHG emissions that would result from the operations of the Company's system without the addition of the Project, whether the cost for the Proposed Solution under the Agreement is reasonable in light of the potential for GHG emissions, and whether the terms of the Agreement are prudent and in the public interest in light of its potential hidden and long-term consequences.

5.5 PUC Approval of Agreement

Any signed Agreement(s) resulting from this RFP is subject to PUC approval as described in the SCCPA, including Article 12 and Section 29.20 thereof or Article 16 of the GSPA.

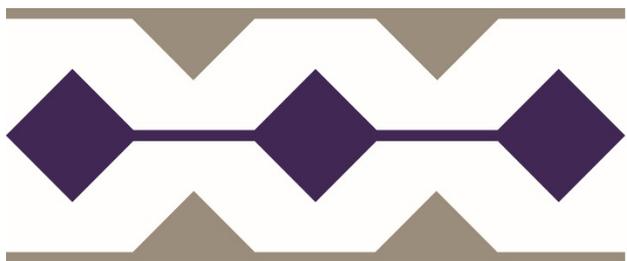
REQUEST FOR PROPOSALS
FOR
NON-WIRES ALTERNATIVES TO PROVIDE RELIABILITY (BACK-TIE)
SERVICES

ISLAND OF O‘AHU – EAST KAPOLEI AREA

November 8, 2019

Docket No. 2018-0165

Appendix A – Definitions



**Hawaiian
Electric**

“Affiliate” means any person or entity that possesses an “affiliated interest” in a utility as defined by section 269-19.5, Hawaii Revised Statutes (“HRS”), including a utility’s parent holding company but excluding a utility’s subsidiary or parent which is also a regulated utility.

“Allowed Capacity” has the meaning set forth in the SCCPA.

“Automatic Delivery” is an event where equipment identifies a Contingency Event on the system or distribution circuit, which automatically triggers the activation of Reliability (back-tie) Service resources.

“Behind the Meter” or “BTM” means a service located on the customer side of the meter.

“Code of Conduct” means the code of conduct created specifically for the IGP Soft Launch RFP.

“Code of Conduct Procedures Manual” or “Procedures Manual” means the manual which was put in place to address and to safeguard against preferential treatment or preferential access to information in a Hawaiian Electric RFP process. The Procedures Manual is attached as Appendix C to this RFP.

“Commercial Operations” has the meaning set forth in the SCCPA.

“Commercial Operations Date” or “COD” means the date on which a Facility first achieves Commercial Operations.

“Community Outreach Plan” is a community outreach and communication plan described in Sections 4.3, 4.4.2.1, and 5.3 of this RFP.

“Company” means Hawaiian Electric Company, Inc., a Hawai‘i corporation.

“Company Control Center” is our Company controlled system dispatch center.

“Company-Owned Interconnection Facilities” has the meaning set forth in the SCCPA.

“Consumer Advocate” means the Division of Consumer Advocacy of the Department of Commerce and Consumer Affairs of the State of Hawai‘i.

“Day” means a calendar day, unless the term “business day” is used, which means calendar day excluding weekends and federal and State of Hawai‘i holidays.

“Development Period Security” has the meaning set forth in Article 14 of the SCCPA.

“Electronic Procurement Platform” means the third-party web-based sourcing platform that will be used for the intake of Proposals and associated electronic information, storage and handling of Proposer information, and communication.

“Eligibility Requirements” has the meaning set forth in Section 4.2 of this RFP.

“Evaluation Team” means agents of the Company who evaluate Proposals.

“Event Delivery Option” has the meaning set forth in Section 3.10.1 in this RFP.

“Facility” has the meaning set forth in the SCCPA.

“Final Award Group” means the group of Proposers selected by the Company from the Short List, with which the Company will begin contract negotiations, based on the results of the Company’s detailed evaluation.

“GSPA” means the Grid Services Purchase Agreement attached as Appendix K to this RFP.

“Hawaiian Electric” means Hawaiian Electric Company, Inc., a Hawai‘i corporation.

“Hawaiian Electric Companies” or “Companies” means Hawaiian Electric Company, Inc. and its subsidiaries, Hawaii Electric Light Company, Inc. and Maui Electric Company, Limited.

“Hawaiian Electric System” or “System” means the electric system owned and operated by Hawaiian Electric on the island of O‘ahu (including any non-utility owned facilities) consisting of power plants, transmission and distribution lines, and related equipment for the production and delivery of electric power to the public.

“HRS” means the Hawai‘i Revised Statutes as of the date of this Request for Proposals.

“Imputed Debt” means adjustments to the debt amounts reported on financial statements prepared under generally accepted accounting principles (“GAAP”). Certain obligations do not meet the GAAP criteria of “debt” but have debt-like characteristics; therefore, credit rating agencies “impute debt and interest” in evaluating the financial ratios of a company.

“Incentive Adder” has the meaning set forth in Exhibit K of the GSPA.

“Independent Observer” has the meaning set forth in Section 1.9 of this RFP.

“In-Front of the Meter” or “IFTM” means a service located on the utility side of the meter.

“Initial Evaluation” has the meaning set forth in Section 4.4 of this RFP.

“Interconnection Facilities” means the equipment and devices required to permit a Facility to operate in parallel with, and deliver electric energy to, the Company System (in accordance with applicable provisions of the Commission’s General Order No. 7, Company tariffs, operational practices, interconnection requirements studies, and planning criteria), such as, but not limited to, transmission and distribution lines, transformers, switches, and circuit breakers. Interconnection Facilities includes Company-Owned Interconnection Facilities and Seller-Owned Interconnection Facilities.

“Interconnection Requirements Study” or “IRS” means a study, performed in accordance with the terms of the IRS Letter Agreement), to assess, among other things, (1) the system requirements and equipment requirements to interconnect the Facility with the Company

System, (2) the Performance Standards of the Facility, and (3) an estimate of interconnection costs and project schedule for interconnection of the Facility.

“Lump Sum Payment” has the meaning set forth in the SCCPA. It may also be referred to as a monthly Lump Sum Payment to reflect the portion of the payment made each month.

“Management Fee” refers to the price of Supplier for the monthly management of customer devices for the delivery of grid services. Management fees are set of a \$/kW/service/island basis.

“Mediation” means the confidential mediation conducted in Honolulu, Hawai‘i, pursuant to and in accordance with the Mediation Rules, Procedures, and Protocols of Dispute Prevention Resolution, Inc. (or its successor) or, in its absence, the American Arbitration Association then in effect.

“MW” means megawatt.

“MWh” means megawatt hour.

“NDA” means the IGP Soft Launch Mutual Confidentiality and Non-Disclosure Agreement attached to this RFP as Appendix E.

“Non-Wires Alternative” or “NWA” is generally defined as an electricity grid project that uses non-traditional transmission and distribution solutions, such as distributed generation, energy storage, energy efficiency, demand response, and grid software and controls, to defer or avoid the need for conventional transmission and/or distribution infrastructure investments.

“Non-Price Evaluation Team” means Employees and consultants of the Company who evaluate the Proposal non-price related criteria as set forth in Section 4.4 of this RFP. Non-Price Evaluation Team members will not include any Shared Resources and will be solely made up of Company RFP Team Members.

“Normalized Net Present Value” or “NNPV” has the meaning set forth in Section 4.4.1 of this RFP.

“O&M” means operation and maintenance.

“Operating Period Security” has the meaning set forth in Article 14 of the SCCPA.

“Participant Service Agreement” has the meaning set forth in Section 2.10 of Appendix B of the GSPA.

“Performance Standards” means the various performance standards for the operation of the Facility to the Company as set forth in Section 3 of Appendix B, as such standards may be revised from time to time pursuant to Article 23 of the SCCPA, and as described in Chapter 2 of this RFP.

“Point of Interconnection” has the meaning set forth in the SCCPA.

“Price Evaluation Team” means Employees and consultants of the Company who evaluate the Proposal price related criteria as set forth in Section 4.4 of this RFP. Price Evaluation Team members will not include any Shared Resources and will be solely made up of Company RFP Team Members.

“Priority List” means the group of Proposals selected by Hawaiian Electric as described in Section 4.5 of this RFP.

“Project” means a Facility proposed to Hawaiian Electric by a Proposer pursuant to this RFP.

“Proposal” means a proposal submitted to Hawaiian Electric by a Proposer pursuant to this RFP.

“Proposal Due Date” means the date stated in RFP Schedule - Row 3 of this RFP.

“Proposed Solution” has the meaning set forth in the Introduction and General Information section of this RFP.

“Proposer” means a person or entity that submits a Proposal to Hawaiian Electric pursuant to this RFP.

“PUC” means the State of Hawai‘i Public Utilities Commission.

“Reliability (back-tie) Services” means load modifying or supply services capable of improving local distribution reliability under abnormal conditions.

“Renewable Portfolio Standards” or “RPS” means the Hawai‘i law that mandates that the Company and its subsidiaries generate or purchase certain amounts of their net electricity sales over time from qualified renewable resources. The RPS requirements in Hawai‘i are currently codified in HRS §§ 269-91 through 269-95.

“Request for Proposals” or “RFP” means a request for Proposals issued pursuant to a competitive bidding process authorized, reviewed, and approved by the PUC.

“RFP Schedule” means the schedule set forth in Table 4, Section 3.1 of this RFP.

“SCCPA” means the Scheduled and Contingency Capacity Purchase Agreement attached as Appendix L to this RFP.

“Scheduled Delivery” are events that can be activated daily or scheduled by Company Control Center to proactively reduce the chance of overload on Distribution circuits.

“Seller” means the entity that the Company is contracting with, as set forth in the SCCPA.

“Seller-Owned Interconnection Facilities” has the meaning set forth in the SCCPA.

“Site” means the parcel of real property on which the Facility, or any portion thereof, will be constructed and located, together with any Land Rights reasonably necessary for the construction, ownership, operation and maintenance of the Facility.

“Site Control” has the meaning set forth in Section 4.3 of this RFP.

“Supplemental Review Process” means the prescribed process by which a Supplier may receive approval for export allowances beyond the pre-approved limits, for the delivery of grid services. The Supplemental Review Process is explained in Appendix I of this RFP.

“Supplier” means the entity that the Company is contracting with, as set forth in the GSPA, for the delivery of grid services.

“Threshold Requirements” has the meaning set forth in Section 4.3 of this RFP.

Any capitalized term not defined in this RFP has the meaning set forth in the GSPA and/or SCCPA.

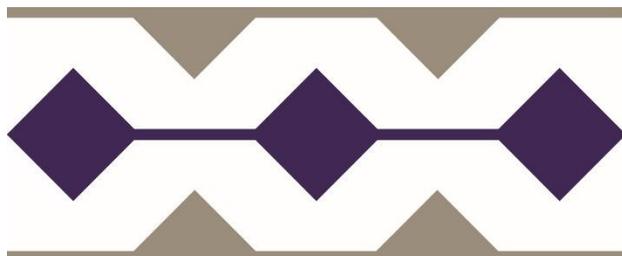
REQUEST FOR PROPOSALS
FOR
NON-WIRES ALTERNATIVES TO PROVIDE RELIABILITY (BACK-TIE)
SERVICES

ISLAND OF O‘AHU - EAST KAPOLEI AREA

NOVEMBER 8, 2019

Docket No. 2018-0165

*Appendix B1 – BTM Proposer’s Response
Package*



**Hawaiian
Electric**

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List of Appendices

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1. GENERAL INSTRUCTIONS TO PROPOSERS

The Company has elected to use the services of PowerAdvocate®, a third-party electronic platform provider. Sourcing Intelligence®, developed by PowerAdvocate® is the Electronic Procurement Platform that the Company has licensed and will utilize for the RFP process. All Proposals and all relevant information must be submitted via the Electronic Procurement Platform, in the manner described in this RFP.

Proposers must adhere to the response structure and file naming conventions identified in this Appendix for the Proposer’s response package.

Proposers must provide a response for every item. If input/submission items in the RFP are not applicable to a specific Proposer, Proposal or Proposal variation, Proposers must clearly mark such items as “N/A” (Not Applicable) and provide a brief explanation.

Proposers must clearly identify all confidential information in their Proposals, as described in more detail in Section 3.12 Confidentiality of the RFP.

All information (including attachments) must be provided in English. All financial information must be provided in U.S. Dollars and using U.S. credit ratings, or Proposers must provide a basis for translation.

It is the Proposer’s sole responsibility to notify the Company of any conflicting requirements, ambiguities, omission of information, or the need for clarification prior to submitting a Proposal.

The RFP will be conducted as a “Sealed Bid” event within Sourcing Intelligence, meaning the Company will not be able to see or access any of the Proposer’s submitted information until after the event closes.

1.1 ELECTRONIC PROCUREMENT PLATFORM

To access the RFP event, the Proposer must register as a “Supplier”¹ on Sourcing Intelligence (Electronic Procurement Platform). One Proposal may be submitted with each Supplier registration. Minor variations, as defined in Section 1.5 of this RFP may be submitted along with the Proposal under the same registration.

If a Proposer is already registered on Sourcing Intelligence, the Proposer may use their current login information to submit their first Proposal. Minor variations of a Proposal will be submitted together with the base variation Proposal, following the instructions outlined in this Appendix. If the Proposer chooses to submit more than one Proposal, the Proposer must register as a new “Supplier” on Sourcing Intelligence for each additional Proposal.

Each registration will require a unique username, unique e-mail address, and unique Company name. Proposers that require multiple registrations to submit multiple Proposals should use the Company name field to represent the Company name and Proposal number (ex: CompanyNameP1). Proposers may use shorthand or clear abbreviations. Proposers are asked to refer to their chosen unique company name throughout when referring to it in text responses.

¹ The language in Appendix B sometimes refers to “Grid Services Contract Managers” as “Bid Event Coordinator” and to “Proposers” as “Suppliers” (Bid Event Coordinator and Supplier are terms used by PowerAdvocate).

Proposers can register for an account on Sourcing Intelligence by clicking on the “Registration” button (located in the top right corner of the webpage) on the PowerAdvocate website at the following address:

www.poweradvocate.com

The Proposer’s use of the Electronic Procurement Platform is governed by PowerAdvocate’s Terms of Use. By registering as a “Supplier” on the Electronic Procurement Platform, the Proposer acknowledges that the Proposer has read these Terms of Use and accepts and agrees that, each time the Proposer uses the Electronic Procurement Platform, the Proposer will be bound by the Terms of Use then accessible through the link(s) on the PowerAdvocate login page.

Once a Proposer has successfully registered as a “Supplier” with PowerAdvocate, the Proposer shall request access to the subject RFP event from the Company Contact via e-mail through the RFP e-mail address set forth in Section 1.4 of the RFP. The e-mail request must list the Company Name field under which the Proposer has registered with PowerAdvocate. If the Proposer plans to submit multiple Proposals and has registered multiple accounts in accordance with the instructions above, the e-mail request must contain the Company Name field for each account that will be used to submit the Proposals. After the Energy Contract Manager has added the Proposer to the event, the Proposer will receive an invitation to the RFP event at the registered e-mail account, and the Proposer will see the bid event on their dashboard upon logging into Sourcing Intelligence. Once the RFP event opens, the Proposer may begin submitting their Proposal(s).

After registering and prior to the opening of the RFP, Proposers are encouraged to familiarize themselves with the Electronic Procurement Platform, including tabs, the dashboard, the messaging feature, the Sourcing Intelligence Quick Start for Suppliers, etc. Proposers should note that they will not be able to access any bid documents until the event officially opens.

Proposers may contact PowerAdvocate Support for help with registration or modification of registration if desired. Support is available from 8 AM to 8 PM Eastern Time (2 AM to 2 PM Hawai’i Standard Time when daylight savings is in effect) Monday to Friday, except for Holidays posted on the PowerAdvocate website, both by phone (857-453-5800) and by e-mail (support@poweradvocate.com).

Contact information for PowerAdvocate Support can also be found on the bottom border of the PowerAdvocate website: www.poweradvocate.com

Once the RFP event is opened and Proposers have registered, Proposers will have online access to general notices, RFP-related documents, and other communications via the Electronic Procurement Platform.

1.2 PROPOSAL SUBMISSION PROCEDURES

An Email notification will be sent to all prospective Proposers via the messaging feature in the Electronic Procurement Platform when the event has been opened to receive Proposals.

After logging onto the Electronic Procurement Platform, the RFP will be visible on the Proposer’s dashboard with several tabs, including the following:

- “1. Download Documents:” Documents stored under this tab are provided for the Proposer’s use and information. All documents can be downloaded and/or printed, as required.

- “2. Upload Documents:” Proposal submission documents requested in Appendix B must be uploaded using this tab.
- “3. Commercial Data:” This tab is NOT USED for this event.
- “4. Technical Data:” This tab is NOT USED for this event.
- “5. Pricing Data:” This tab is NOT USED for this event.

Step-by-step instructions for submitting a complete Proposal are provided below:

1. Proposers must upload their Proposal files to submit a complete Proposal. These tasks may be completed in any order, but all must be completed before the Proposal Due Date.
2. Submit (upload) one consolidated PDF representing your Proposal via the “2. Upload Documents” tab. That Proposal PDF must abide by the format specified in this Appendix B. An MSWord.docx template that outlines the format of this document is available under the “1. Download Documents” tab for the Proposer’s use. **Response information must be provided in the order, format and manner specified in this Appendix B and must clearly identify and reference the Appendix B section number that the information relates to.**
 - a. Proposers shall use a filename denoting: CompanyName_Proposal#.pdf.
3. Proposal information that cannot be easily consolidated into the PDF file as described in Step 2 (such as large-scale drawing files) or files that must remain in native file format (such as computer models and spreadsheets) shall be uploaded separately but must be referenced from within the main Proposal PDF file. Such additional files must follow the naming convention below:
 - a. File names must include, in order, Company Name, Proposal number (if more than one Proposal being submitted per Proposer), Variation (if any variations are being submitted), Appendix B section number, and a file descriptor, as shown in the example file name below:
 AceEnergyP1V2_2.5_ContractCapability.xlsx
 Proposers may use abbreviations if they are clear and easy to follow.
4. Upload files using the "**2. Upload Documents**" tab on the Electronic Procurement Platform.
 - a. For all documents identify the "Document Type" as “Technical Information.” (Do not identify any documents as “Commercial and Administrative” or “Pricing.”)
 - b. "Reference ID" may be left blank.
 - c. Select "Choose File..." Navigate to and choose the corresponding file from your computer. Select "Open" and then "Submit Document."

There is no limit to the number or size of files that can be uploaded. Multiple files may be grouped into a .zip archive for upload. When successfully uploaded, documents will appear under the "Bid Submissions" section on the bottom of the tab's page, organized within the “Technical Information” Document Type. Repeat steps a, b and c, as required for each file upload.

If a file with the same name is uploaded twice, the Platform will automatically append a unique numerical extension to the Document Name. To delete a file that has been previously uploaded, click on the “X” button in the “Actions” column for the file to be deleted. Do not upload any files prior to the issuance of the Final RFP.

5. The Company will not be responsible for technical problems that interfere with the upload or download of Proposal information. Support is available to answer technical questions about PowerAdvocate’s Sourcing Intelligence from 8 AM to 8 PM Eastern Time (2 AM to 2 PM Hawai’i Standard Time when daylight savings is in effect) Monday to Friday, except for Holidays posted on the PowerAdvocate website, both by phone (857-453-5800) and by e-mail (support@poweradvocate.com).
6. Proposers are strongly encouraged to start early and avoid waiting until the last minute to submit the required information. Proposers are allowed to add, modify, and/or delete documents that have been previously submitted any time prior to the event close deadline.
7. All questions or concerns regarding the RFP, may be submitted to the Company Contact via the Power Advocate Messaging tab. Per RFP Section 1.9.2, the Independent Observer will monitor messages within the bid event.

1.3 PROPOSAL COMPLETION AND CONFIRMATION PROCEDURES

To confirm the submission of all proposal files, in the “Status” tab on the Electronic Procurement Platform, confirm that the “Total Uploaded Files” is the number of expected files to be included in the submission by checking it against your list of submitted files.

Example “Status” tab view:

Your Bid Intention: Bidding		
Total Uploaded Files:	18	Last Upload: 02/08/18
Saved Commercial Datasheets:	1 of 1	Last Saved: 02/08/18
Saved Technical Datasheets:	0 of 0	
Saved Pricing Datasheets:	0 of 0	

2.0 PROPOSAL PDF

2.1 REQUIRED FORMS ACCOMPANYING PROPOSAL PDF

The following forms must accompany each proposal, must be attached to the Proposal PDF, and uploaded via the “2. Upload Documents” tab:

- **Cover Letter** signed by a representative for the Proposer **authorizing the submission** of the Proposal
- Fully executed **Mutual Confidentiality and Non-Disclosure Agreement** (Appendix E to the RFP, may be downloaded from the “1. Download Documents” tab in the Electronic Procurement Platform)

- **Federal and State tax clearance certificates** for the Proposer (a Certificate of Vendor Compliance for the Proposer may be provided in lieu of Federal and State tax clearance certificates)
- Certification of Counsel of Proposer, if applicable. (See Appendix B Attachment 1.)
- Sample Participant Services Agreement
- Code of Conduct (Appendix C)
- Pricing Sheet (Appendix B1 Attachment a)
- Requirements Summary Worksheet (Appendix B1 Attachment b)
- Questionnaire Summary Worksheet (Appendix B1 Attachment c)
- Information Assurance Worksheet (Appendix G)

2.2 PROPOSAL SUMMARY/CONTACT INFORMATION

2.2.1 Provide a **primary point of contact** for the Proposal being submitted:

- Name
- Title
- Mailing Address
- Phone Number
- Email Address

2.2.2 **Executive Summary of Proposal.** Include an executive summary that briefly and concisely conveys what the Proposer sees as the most important messages of its proposal, the factors of differentiation relative to other potential Proposals, and the critical points that the Company should consider in their evaluation. Please explain how your approach will benefit the Community and/or Company from both a short term and a long-term perspective.

2.2.3 **Pricing summary.** Pricing should be based on contract length. Contracts can start before or on the COD and end on the Term End date (See RFP Table 3). Pricing information must be filled out in the Pricing Sheet (Appendix B1 Attachment a). The results of the worksheet should be presented in summary form here. Provide any pricing information only in those table sections – do not embed pricing information in any other portion of the Proposal PDF. Should any conflict arise between the information provided in the Pricing Sheet or this Proposal PDF, this Proposal PDF shall take precedence.

2.2.4 Provide a **high-level overview of the proposed Contract Capability**, including at a minimum the following information²:

Projected hourly energy profiles for a typical day in each month in excel or csv format (Rows should be month (Jan-Dec) and columns should be hour in day (1-24)). If BTM, aggregator will provide these profiles for each customer class (typical residential or commercial customer) and the aggregate of all resources.

- Annual MW targets by service by location
 - 24-hour availability of resource (this should match Hourly Capacity Option)
 - 24hr load without modifications

² While this RFP procures the management of grid services for up to 5 years, and the enablement of incremental Contract Capability through the first 3 years of the contract period, Proposers are not obligated to commit to enablement for the full three year incremental enablement period.

- (PV Only) 24-hour PV profile
 - (Storage Only) 24-hour charge/ discharge or on/off profile
- Number of projected customers (incremental by year by service by location – See Appendix B1 Attachment a)
- Customer segment(s) targeted (See Appendix B1 Attachment a)
- Technology(ies) to be deployed
- Which DER program will customer enroll or is already enrolled in? If both, what is anticipated % portion by DER program.

2.3 IMPLEMENTATION PLAN

The Proposer should include a detailed plan for implementing customer resources necessary to acquire and deliver grid services to the Company. When preparing the Implementation Plan, Proposers should refer to the Requirements Summary (Appendix B1 Attachment b). Information captured in the worksheet or presented in the GSPA and other informational appendices does not have to be repeated in the Implementation Plan, but rather the Plan should capture the manner and timing in which Proposers will implement the requirements and perform maintenance operations in Hawai‘i. The detailed Implementation Plan should address, at a minimum the following sub-sections:

2.3.1 DR Service (Phase and Roles)

In this section, the Proposers shall discuss how it or its subcontractors will meet each of the phases and roles specified below.

1. Customer Acquisition

Customer Recruitment and Enrollment: Proposer shall perform tasks related to recruiting customers, including marketing and advertising, and execution of program Participant Services Agreement. Agreements shall exist between the customer and the Proposer. Proposer should articulate if and how entities with local ties will be performing the customer recruitment and enrollment. If Proposer choose to do so, Proposer could offer minimal marketing and rely on the Company to provide marketing support as required. *Technical Coordination & Customer Enablement:* Proposers shall perform tasks related to scheduling customer visits for audits and/or installation and testing.

The Proposer’s Implementation Plan must include a Customer Acquisition Plan that clearly identifies the customer classes to be targeted for recruitment and specifies their marketing strategy. The Implementation Plan must highlight the Proposer capabilities and experience in marketing customer-side programs to utility customers. Proposers must provide the methodology used to project the number of customers and Contract Capability that can be recruited and enrolled in customer-side programs. The Plan must also identify the tasks required before the recruitment process begins, including a timeline.

2. Technology Solution

Technology Provider: Respondent shall provide the customer-sited device, VEN and VTN:

- Customer-sited Device - The device, which is connected to the VEN on the customer side of the meter, is the equipment that ultimately provides the response that results in a grid service,
- VEN - Virtual End Node, also known as a gateway. The VEN is a device that allows communication between the customer-sited devices and the Proposer's VTN, which will participate during a DR event by connecting to a Utility's VTN.
- VTN - Virtual Top Node, also known as a head-end. The VTN signals customers VEN to start and end event participation. VTN can also send price signals to VEN's. In this instance, there are two VTNs: a Proposer's VTN and the Company's VTN.

The Company has specified technical design principles for the architecture. These are identified in the GSPA attached as Appendix L. The Proposer's technology solution must adhere to those principles and requirements. They include:

- **Cyber Security**
- **Scalable Solution**
- **Leverage Industry Protocols**
- **Interoperability**

The Company has adopted OpenADR 2.0b as the standard protocol for communications among the Company VTN and Supplier VTN and/or VENs. Proposers are encouraged, but not required, to provide Open ADR 2.0b certified VENs, but must have OpenADR 2.0b certification if the head-end (Proposer VTN) will be interacting with the Company VTN. To the extent that OpenADR 2.0b certified systems are not proposed, any additional costs the Companies may incur to integrate alternative systems may affect the competitiveness of Respondent's proposal and as specified in the GSPA, require additional integration measures in event of default.

If Proposer's resource is incrementally participating in another program/tariff/solicitation (or currently otherwise proposing to do so), the Proposal must describe how the resource will be able to successfully satisfy the commitments made for all services. This is expected to include a description of how the Solution will be logically managed and operated to achieve stated commitments without violating the reliability need associated with this distribution-level grid services.

The Proposer's Implementation Plan should clearly explain the technical solutions to be employed by the Proposer. The Company reserves the right to require a field demonstration of technical solutions proposed by Proposers if they are unproven technologies. For example, if Reliability (back-tie) service is being proposed, the Implementation Plan must explain how the Customer will receive the Contingency Event (i.e. SCADA or direct transfer trip for automatic contingency activation) signal for automatic dispatch and react within the allotted 12 seconds.

The Plan should also explain how the Proposer's systems are logistically operated including staffing levels, server locations, communications requirements and the availability of secure communications networks. The Proposer should place particular emphasis on explaining how the technologies will perform and be operated in a remote island environment.

In the Plan, the Proposer should clearly identify the responsibilities of the Company, if any, necessary to implement the technical solution, including required integration with the Company's back office systems.

3. Field Services

- *Installation of Customer-sited Devices:* All efforts associated with the installation of or retrofitting of a customer-sited device such that the device is enabled and can perform to an event signal from the Proposer's VEN or VTN. Proposer should articulate if and how entities with local ties will be performing the installation or retrofit.
- *Commission VEN:* Respondent shall perform tasks related to purchasing VEN, installing VEN, connecting VEN with VTN, and verifying VTN to VEN connection and resource response during test events. Proposer should articulate if and how entities with local ties will be performing the VEN commissioning.
- *Operation of VTN:* Operations performed by a VTN include, but are not limited to, provisioning of VENs, execution of events, contacting participants, tracking participant information, and reporting related to events and participation.

4. Operations and Maintenance

- *Customer Maintenance:* Proposer shall perform tasks related to the customer premise, maintaining customer devices and/or VEN's, addressing customer inquiries and performing baseline calculations for purposes of determining customer performance. Proposer should articulate if and how entities with local ties will be performing the customer maintenance.

Measurement & Verification (M&V) – M&V is the use of meter data to quantify customer performance during a customer event. Meter data is used to measure customer's performance and settlement performance, which in turn can be used for incentive payments. The Company Meter Installation department will replace all Commercial customer revenue meters to interval meters. Residential customers may or may not receive an interval meter from the Company, but Respondents should provide a sub meter or on-board resource telemetry for measurement purposes. The Proposer will be obligated to comply with Advanced Metering Requirements found in Exhibit E of the GSPA.

Settlement – Proposer shall perform tasks related to settlement of compensation for the provision of grid services. Proposer shall submit settlement results to the Companies for delivery of customer incentive. Proposers will be held to the Settlement processes and customer data exchange requirements as specified in Exhibit G and Exhibit K of the GSPA.

The Proposer's Implementation Plan should address its plan for the installation of VENs/gateways and other on and off-premise devices, including personnel requirements, transportation requirements, scheduling practices, customer service level requirements, installation status reporting practices and safety training and practices. The Plan must identify any planned sub-contractors to be used for this work, or if such subcontractors have not yet been identified, then a plan for identifying and retaining sub-contractors.

The Proposer must describe their plan for providing customer service related to customer and/or Company initiated trouble calls, repairs and other field services. Proposers are expected to meet industry standards. The Companies' customer service requirements and specifications are available in the GSPA Exhibit M.

a. Continuity of Business Plan

In lieu of providing Source Code escrow or economic escrow in the place of Source Code, Proposers may choose to provide a Continuity of Business Plan that demonstrates how the enabled devices will be capable of containing the delivery of grid services in accordance with the contractual obligations in the event of a Proposer's default or bankruptcy.

b. Achieving Performance Requirements

The Proposer shall prepare information in the Implementation Plan to clearly depict the overall approach to portfolio design and management such that the Proposer can be reasonably expected to meet the bid and the contractual obligations as set forth in the GSPA. The Proposer may include information about the expected load shapes of the customers and load profiles of associated participating devices, the analysis employed to derive the quantity of services to be committed, the risk adjustments made and applied to the assumptions to minimize exposure to failure to meet obligations, and so forth.

2.4 PRICING

Pricing should be based on contract length. Contracts can start before or on the COD and end on the Term End date (See RFP Table 3). The Proposers shall reflect pricing in the Pricing Sheet ([Appendix B1 Attachment a](#)), which will - upon final award and negotiations - be inserted as Exhibit K of the GSPA. Rather than a single \$/capability (kW) bid amount each month, the cost proposal format shall be broken down into three line items of "Enablement," "Management" and "Added Incentive." The Company will allow the \$/capability (kW) for enablement to be a maximum of ten (10) times the \$/capability (kW)*Month for the management fee. Bids containing a price for enablement of more than the specified limit will be disqualified. The proposal should include all costs (labor costs and/or equipment costs) that will be incurred by the Company and outside the Proposer's pricing.

Pricing proposals should be inclusive of all labor, materials, administrative and non-labor costs, including travel, rent, overheads, licenses, permits, taxes (*including Hawaii General Excise Taxes*), etc. deemed necessary to successfully deliver the proposed grid services, and to otherwise comply with the terms and conditions specified in this RFP.

Pricing should articulate clearly the assumptions the make up the bid such as if the Proposer expects the Companies to assist with the marketing how that impacts the bid, Proposer relying on specific tax provisions to continue during the GSPA contract duration, or any other assumptions that may impact the bid during negotiation.

Specific to pricing bids regarding bundled services. All price must be unbundled from other procurements.

2.5 FINANCIAL

Provide the information identified below for the Company to assess the following financial aspects of its Proposal:

- Financial Viability
- Financial Strength
- Financing Plan

2.5.1 Financial Viability & Financing Plan

The Proposer should offer the Company evidence of financial viability. This can be portrayed through a variety of mechanism, including equity partners, equity financing, or project finance.

2.5.1.1 Who are the equity participants in the Plan (or the equity investors)?

- Provide an organization structure for the Proposer including any general and limited partners and providers of capital that identifies:
- Associated responsibilities from a financial and legal perspective
- Percentage interest of each party

2.5.1.2 **How will the Project be financed?**Address at a minimum:

- The Plan's projected financial structure
- Expected source of debt and equity financing

2.5.1.3 Discuss and/or provide **supporting information on any project financing guarantees.**

2.5.1.4 Describe any **written commitments obtained from the equity participants.**

2.5.1.5 Describe any **conditions precedent to project financing**, and the Proposer's plan to address them, other than execution of the GSPA or any other applicable project agreements and State of Hawaii Public Utilities Commission approval of the Power Purchase Agreement and other agreements.

2.5.1.6 Provide any **additional evidence to demonstrate that the Grid Services Delivery plan is financeable.**

2.5.1.7 Project Financing Experience of the Proposer

Describe **the project financing experience of the Proposer** in securing financing for projects of a similar size and technology as the one being proposed including the following information for any referenced projects:

- Project Name
- Project Technology
- Project Size
- Location
- Starting Date of Project
- Commercial Operations Date
- Duration of Project/contract
- Name(s) of Finance Team Member(s); Time (i.e., years, months) worked on the project and Role/Responsibilities
- Financing Structure
- Major Pricing Terms

2.5.2 Financial Strength

Provide **copies of the Proposer's audited financial statements** (balance sheet, income statement, and statement of cash flows) or equivalent:

- Legal Entity
 - Three (3) most recent fiscal years
 - Quarterly report for the most recent quarter ended
- Parent Company
 - Three (3) most recent fiscal years
 - Quarterly report for the most recent quarter ended

2.5.2.1 Provide the **current credit ratings** for the Proposer (or Parent Company, if not available for Proposer), affiliates, partners, and/or credit support provider:

- Standard & Poor's
- Moody's
- Fitch

2.5.2.3 Describe any **current credit issues** regarding the Proposer or affiliate entities raised by rating agencies, banks, or accounting firms.

2.5.2.4 Provide any **additional evidence that the Proposer has the financial resources and financial strength** to complete and operate the Project as proposed.

2.5.2.5 Provide evidence that the Proposer can provide the required securities.

2.5.2.5.1 Describe the Proposer's **ability (and/or the ability of its credit support provider) and proposed plans to provide the required securities** including:

- Type of security
- Sources of security
- Description of its credit support provider

2.5.2.5.2 Disclosure of Litigation and Disputes

Disclose any **litigation, disputes, and the status of any lawsuits or dispute resolution** related to projects owned or managed by the Proposer or any of its affiliates

2.6 GSPA CONTRACT EXCEPTIONS AND FINANCIAL COMPLIANCE

If Proposers elect to propose modifications to the GSPA, **provide a red-lined MS Word version of the GSPA** indicating specific requested modifications. In general, Proposers are encouraged to accept the contract terms identified in the GSPA where possible in order to expedite the overall RFP process and potential GSPA negotiations. Proposers shall also provide a detailed explanation and supporting rationale for each of the proposed modifications to the GSPA in order to enable the Company to evaluate the impact that the proposed modifications will have on the overall risk assessment. Only redlines received through the response of the RFP will be considered during the negotiation. The Company thus will be better able to assess the bids (including the pricing) in complete picture knowing the full legal position that the Proposers have taken.

The Exhibits of GSPA are deemed to be non-negotiable as they are akin to market participation rules. With multiple Proposer responses expected, the Company would prefer not to manage GSPAs with meaningfully different terms or key components. For example, the Company will not execute GSPA contracts with different

Participation Service Agreement. The Proposer will be expected to populate Exhibit H Contract Capability and Exhibit K Settlement with their proposed information. Furthermore, while these Exhibits are non-negotiable, redlines will be considered if it will add clarification to the requirements.

NOTE: In the event the Proposer does not upload redlines of the applicable form agreements, the Company will assume the terms in such form agreements are agreeable to the Proposer

2.7 INFORMATION ASSURANCE

Respondents must clearly state any exceptions to the specifications and requirements included in the RFP (Appendix G) and the attached GSPA (Appendix K Article 26). Each exception shall be stated separately, identify the reason(s) for the Respondent's exception, and shall propose a clearly stated alternative. The Companies will have the right in their sole judgment and discretion to reject any proposal or evaluate it unfavorably based on exceptions taken by Respondents. The Companies may in their sole discretion disqualify Respondents, even if selected for the short list, if exceptions to the RFP are not explicitly identified in the Respondent's proposal and such unidentified exceptions are discovered after the proposals are received by the Companies and, such unidentified exceptions affect the Respondent's price or ability to deliver the grid services proposed.

2.8 EXPERIENCE AND QUALIFICATIONS

Proposers, its affiliated companies, partners and/or contractors and consultants are required to demonstrate experience and capability to successfully cultivate and deliver the proposed Project. The Company is interested in a team that has demonstrated success in the aggregation and delivery of grid services, including any technology proposed, through the commercial operations stage where such efforts were of a similar scope, technology and structure to the Grid Services Delivery Plan being proposed by the Proposer. The Company is also interested in any local partners or subcontractors the Proposer may or may not work within delivering the grid services.

2.8.1 Provide an **organizational chart** for the Plan that lists the project participants and identifies the management structure and responsibilities.

- For each of the plan participants (including the Proposer, partners, and proposed contractors), provide statements that list the specific experience of the firm in: recruiting, enrolling, enabling, aggregating, forecasting and delivering grid services of similar type, size and technology, and
- Any evidence that the plan participants have worked jointly on other plans.

2.8.2 Identify those **member(s) of the team** the Proposer is submitting to meet the experience Threshold Requirement and demonstrate the member(s) firm commitment to provide services to the Proposer.

2.8.3 Identify those **members of the team with experience and qualifications** including affiliates and their principal personnel who will be involved in the plan contracting deliver grid services. If the Proposer consists of multiple parties, such as joint ventures or partnerships, provide this information for each party, clearly indicating the proposed role of each party, and percentage interests in the partnership.

2.8.4 Provide a **management chart** that lists the key personnel dedicated to this Plan and provide **biographies / resumes** of the key personnel, including position, years of relevant experience, and similar project experience. Provide specifics as they relate to the various elements of the Plan. If applicable, identify architects and engineers or provision to provide same that are licensed to practice in the State of Hawai'i.

2.8.5 Provide a **listing and associated description of all grid service, capacity demand response or DER integration projects** the Proposer has successfully developed or that are currently under development. Describe the Proposer’s role and responsibilities associated with these efforts (lead, owner, investor, etc.). Provide the following information as part of the response:

- Name of the project
- Location
- Service type, size and technology
- Delivery dates
- Contracting entity
- References with contact information: name, address, phone number, and relationship with the Proposer and with the related project.

2.9 STANDARDS OF CONDUCT

The GSPA allows Suppliers to implement its own standard of conduct consistent with the Company’s principally concerning code of conduct. If a Supplier prefers to operate under its own Code of Conduct, it needs to be attached with the proposal submission. If a Supplier omits the submission of their code of conduct, it is assumed they will adhere to the Company’s code of conduct published here:

https://www.hawaiianelectric.com/Prebuilt/contractors/code_of_conduct.pdf.

2.10 PARTICIPANT SERVICE AGREEMENT

This RFP requires the submission of the Suppliers’ Participant Service Agreement (“PSA”) that the Respondent intends to use as a contract with its Participants. If the Respondent intends to use PSA’s with different terms and conditions (e.g. different PSA’s for different end devices), it must include all PSA’s. The PSA’s must comply with Exhibit N of the GSPA in Appendix K.

3.0 MINOR PROPOSAL VARIATIONS

Proposers submitting minor variations to a Proposal must provide **details of each variation in this section**. Include only details and specifications which differ from the Proposal in this section. For any item not listed in this Section 3.0, the Company will assume that the information contained in the Proposal (Appendix B Section 2.0 through 2.10) applies to each minor variation as well. PROPOSAL VARIATION 1 (IF MINOR VARIATION PROPOSED). Identify all items which differ from the primary Proposal. Information must be organized in order of Appendix B and referenced by the corresponding Section Number.

3.1 PROPOSAL VARIATION 2 (AS NECESSARY)

Repeat instructions for Section 3.0, as required for each variation. Identify all items which differ from the primary Proposal. Information must be organized in order of Appendix B and referenced by the corresponding Section Number.

3.2 PROPOSAL VARIATION 3 (AS NECESSARY)

Repeat instructions for Section 3.1, as required for each variation.

**Certification of Counsel for Proposer
Hawaiian Electric Company, Inc.**

Non-Wires Alternatives to Provide Reliability (Back-Tie) Services RFP

Pursuant to Section 1.5.3 of Hawaiian Electric Company, Inc.'s ("Company") Request For Proposals for Non-Wires Alternatives to Provide Reliability (Back-Tie) Services ("RFP"), the Company may require legal counsel who represent multiple unaffiliated proposers to sign a certification that they have not shared confidential information obtained through the representation of one proposer with any other unaffiliated proposer.

Accordingly, by signing below, I hereby acknowledge, agree and certify that:

(1) in connection with the RFP, I represent the following company that has submitted a proposal(s) for the RFP: _____ ("Proposer");

(2) irrespective of any proposer's direction, waiver or request to the contrary, I will not share a proposer's confidential information or the Company's confidential information associated with such proposer, including, but not limited to, a proposer's or Company's negotiating positions, with third parties unaffiliated with Proposer (by contract or organizational structure), including other proposers responding to the RFP;

(3) the Companies may rely on this certification for purposes of the RFP; and

(4) at the conclusion of power purchase agreement negotiations, if any, the Company may require me to sign a certificate certifying that I have not shared a proposer's confidential information or the Company's confidential information associated with such proposer, including, but not limited to, a proposer's or Company's negotiating positions, with third parties unaffiliated with Proposer (by contract or organizational structure), including other proposers responding to the RFP.

Name (print)

Law Firm (if applicable)

Signature

Date

Section 1.5.3 of the RFP provides in relevant part that:

In submitting a Proposal in response to this RFP, each Proposer certifies that the Proposal has been submitted in good faith and without fraud or collusion with any other unaffiliated person or entity. The Proposer shall acknowledge this in the Response Package submitted with its Proposal. Furthermore, in executing the NDA provided as Appendix E, the Proposer agrees on behalf of its Representatives (as defined in the NDA) that the Company's negotiating positions will not be shared with other Proposers or their respective Representatives.

In addition, in submitting a Proposal, a Proposer will be required to provide Company with its legal counsel's written certification in the form attached as Appendix B Attachment 1 certifying in relevant part that irrespective of any proposer's direction, waiver, or request to the contrary, that the attorney will not share a proposer's confidential information associated with such proposer, including, but not limited to, a proposer's or Company's negotiating positions, with third parties unaffiliated with Proposer (by contract or organizational structure), including other proposers responding to the RFP. If legal counsel represents multiple unaffiliated proposers whose Proposals are selected for the Final Award Group, such counsel will also be required to submit a

similar certification at the conclusion of Agreement negotiations that he or she has not shared a proposer's confidential information or the Company's confidential information associated with such proposer, including but not limited to, a proposer's or Company's negotiating positions, with third parties unaffiliated with such proposer (by contract or organizational structure), including other proposers responding to the RFP.

Instructions

1. Populate the bidding price into the "Price" tab. (Fill in green cells as applicable.)
2. Populate the monthly kW into the "Monthly Capacity" tab.
Monthly kW number is the available load at the beginning of the month. (Fill in green cells as applicable.)
Bidder may assume their own monthly growth of contract capability from Contract Year 1 to Contract Year 4.
3. The "Monthly \$" tab worksheet will automatically calculate the management fee, enablement fee, and customer by class segment.
4. The same tabs that calculate the costs will calculate the average of levelized cost over the 5 years for each grid service.
5. The "Summary" tab will summarize the levelized grid service price and various costs by area.

**Hawaiian Electric Companies
RFP FOR NON-WIRES ALTERNATIVES TO PROVIDE RELIABILITY (BACK-TIE) SERVICES**

RFP No.:
Issued:

Attachment b: Requirements Summary Sheet

Requirement Subcategory	Requirement Description	Meets Requirement (Yes/No)	If proposal does not meet the requirement please provide an explanation below.
Fast Frequency Response	Respondent will meet all requirements within GSPA Exhibit A-11 - Reliability (back-tie).		
Capacity	Respondent will meet all requirements within GSPA Exhibit A-12 - Distribution Capacity.		
Advanced Metering	Respondent will meet all requirements within GSPA Exhibit E - Advanced Metering.		
Operational Forecast	Respondent will meet all requirements within GSPA Exhibit F - Operational Forecast.		
Data, Integration, and Testing Requirements	Respondent will meet all requirements within GSPA Exhibit G - Data, Integration, and Testing Requirements.		
Service Level Agreements	Respondent will meet all requirements within GSPA Exhibit I - Service Level Agreements.		
Reporting	Respondent will meet all requirements within GSPA Exhibit J - Reporting.		
Customer Service Agreement Requirements	Respondent will meet all requirements within GSPA Exhibit M - Customer Service Agreement Requirements.		
Participant Service Agreement Requirements	Respondent will meet all requirements within GSPA Exhibit N - Participant Service Agreement Requirements.		

Hawaiian Electric Companies
RFP FOR NON-WIRES ALTERNATIVES TO PROVIDE RELIABILITY (BACK-TIE) SERVICES

RFP No.:

Issued:

Attachment c: Questionnaire Summary Worksheet

Questionnaire Topics	Subtopic	Question	Summary of Respondent's Proposal
Circuits affected	Circuit	What circuit(s) is being affected? If more than one circuit, use the name of circuit to answer the following questions or use "ALL".	
Location of resource	Behind or In Front of the Meter	Is the resource located in front of the meter of behind the meter?	
Payment Date for Enablement	Contract	What date will you start to receive your enablement and maintenance payment? This should match Appendix B1-a: Pricing and should be on or before the "Start" date in Table 3 of the RFP.	
Payment Date for Customer Incentives	Contract	What date will customers start to receive their incentives? This should match Appendix B1-a: Pricing.	
Contract End date	Contract	What date will the contract end? This should match the "End" date in Table 3 of the RFP.	
MW	MW	What is max available?	
Availability	Hours available	Is resource available for the entire "Delivery Hour" period? If not, why not? This should be reflected in the 24hr (8760 preferred) load profile provided described in Section 3.10.2 of RFP.	
\$	Price	What is the maximum total amount of the contract? (Include incentives) How long is the contract?	
Stacking	Other Program enrollment	Are or will you be participating in another Company program? If so, how will the resource react when two events overlap?	
Event Dispatch	Activate resource	How will the resource activate during/before an event? Option A)Contingency Event - SCADA or Direct Transfer Trip for contingency activation. See GSPA Exhibit A-11 Reliability (back-tie) Description and Requirements. Option B)Daily Schedule - OpenADR 2.0b. See GSPA Exhibit A-12 Distribution Capacity Description and Requirements.	
Solution Type	Technology	See Section 4.4.1 of RFP a) Demand based b) Inverter based. See note a below. c) All other interter based.	
Resource(s)	Residential	What type(s) of resource(s) will be utilized for each customer class?	
	Small Business & Commercial		
	Large Commercial and Industrial		

Notes:

a) During the Scheduled Delivery event, at no time should there be an interruption of the Reliability (back-tie) Service, except and unless, a proportional amount of load is also reduced during the duration of the interruption. For instance, if the Reliability (back-tie) Service is located on a circuit that will be transferred to another circuit in the event of a Contingency Event and is depended on to prevent an overload on the circuit it is being transferred to, and that Proposed Solution is an inverter-based solution, the anti-islanding feature will prevent that resource from immediately re-connecting to the grid to provide that service for 5 minutes. That interruption will not be allowed unless a proportional amount of load is also reduced from being served by the grid until the inverter-based resource is restored to full output.

REQUEST FOR PROPOSALS
FOR
NON-WIRES ALTERNATIVES TO PROVIDE RELIABILITY (BACK-TIE)
SERVICES

ISLAND OF O‘AHU - EAST KAPOLEI AREA

NOVEMBER 8, 2019

Docket No. 2018-0165

*Appendix B2 – IFTM: Proposer’s Response
Package / IRS Data Sheet*



**Hawaiian
Electric**

1.0 GENERAL INSTRUCTIONS TO PROPOSERS

The Company has elected to use the services of PowerAdvocate®, a third-party electronic platform provider. Sourcing Intelligence®, developed by PowerAdvocate®, is the Electronic Procurement Platform that the Company has licensed and will utilize for the RFP process. All Proposals and all relevant information must be submitted via the Electronic Procurement Platform, in the manner described in this RFP.

Proposers must adhere to the response structure and file naming conventions identified in this Appendix for the Proposer's response package. Information submitted in the wrong location/section or submitted through communication means not specifically identified by the Company will not be considered by the Company.

Proposers must provide a response for every item. If input/submission items in the RFP are not applicable to a specific Proposer or Proposal variation, Proposers must clearly mark such items as "N/A" (Not Applicable) and provide a brief explanation.

Proposers must clearly identify all confidential information in their Proposals, as described in more detail in Section 3.12 Confidentiality of the RFP.

All information (including attachments) must be provided in English. All financial information must be provided in U.S. Dollars and using U.S. credit ratings.

It is the Proposer's sole responsibility to notify the Company of any conflicting requirements, ambiguities, omission of information, or the need for clarification prior to submitting a Proposal.

The RFP will be conducted as a "Sealed Bid" event within Sourcing Intelligence, meaning the Company will not be able to see or access any of the Proposer's submitted information until after the event closes.

1.1 ELECTRONIC PROCUREMENT PLATFORM

To access the RFP event, the Proposer must register as a "Supplier"¹ on Sourcing Intelligence (Electronic Procurement Platform). One Proposal may be submitted with each Supplier registration. Minor variations, as defined in Section 1.5.2 of this RFP may be submitted along with the Proposal under the same registration.

If a Proposer is already registered on Sourcing Intelligence, the Proposer may use their current login information to submit their first Proposal. Minor variations of a Proposal will be submitted together with the base variation Proposal, following the instructions outlined in this Appendix. If the Proposer chooses to submit more than one Proposal, the Proposer must register as a new "Supplier" on Sourcing Intelligence for each additional Proposal.

Each registration will require a unique username, unique Email address, and unique Company name. Proposers that require multiple registrations to submit multiple Proposals should use the Company name field to represent

¹ The language in Appendix B sometimes refers to "Energy Contract Managers" as "Bid Event Coordinator" and to "Proposers" as "Suppliers" (Bid Event Coordinator and Supplier are terms used by PowerAdvocate).

the Company name and Proposal number (ex: CompanyNameP1).² Proposers may use shorthand or clear abbreviations. Proposers are asked to refer to their chosen unique company name throughout when referring to it in text responses.

Proposers can register for an account on Sourcing Intelligence by clicking on the “Registration” button (located in the top right corner of the webpage) on the PowerAdvocate website at the following address:

www.poweradvocate.com

The Proposer’s use of the Electronic Procurement Platform is governed by PowerAdvocate’s Terms of Use. By registering as a “Supplier” on the Electronic Procurement Platform, the Proposer acknowledges that the Proposer has read these Terms of Use and accepts and agrees that, each time the Proposer uses the Electronic Procurement Platform, the Proposer will be bound by the Terms of Use then accessible through the link(s) on the PowerAdvocate login page.

Once a Proposer has successfully registered as a “Supplier” with PowerAdvocate, the Proposer shall request access to the subject RFP event from the Company Contact via Email through the RFP Email Address set forth in Section 1.4 of the RFP. The Email request must list the Company Name field and username under which the Proposer has registered with PowerAdvocate. If the Proposer plans to submit multiple Proposals and has registered multiple accounts in accordance with the instructions above, the Email request must contain the Company Name field and username for each account that will be used to submit the Proposals. After the Energy Contract Manager has added the Proposer to the event, the Proposer will receive an invitation to the RFP event at the registered Email account, and the Proposer will see the bid event on their dashboard upon logging into Sourcing Intelligence. Once the RFP event opens, the Proposer may begin submitting their Proposal(s).

After registering and prior to the opening of the RFP, Proposers are encouraged to familiarize themselves with the Electronic Procurement Platform, including tabs, the dashboard, the messaging feature, the Sourcing Intelligence Quick Start for Suppliers, etc. Proposers should note that they will not be able to access any bid documents until the event officially opens.

Proposers may contact PowerAdvocate Support for help with registration or modification of registration if desired. Support is available from 8 AM to 8 PM Eastern Time (2 AM to 2 PM Hawai‘i Standard Time when daylight savings is in effect) Monday to Friday, except for Holidays posted on the PowerAdvocate website, both by phone (857-453-5800) and by Email (support@poweradvocate.com).

Contact information for PowerAdvocate Support can also be found on the bottom border of the PowerAdvocate website: www.poweradvocate.com

Once the RFP event is opened, registered Proposers will have online access to general notices, RFP-related documents, and other communications via the Electronic Procurement Platform. Proposers should also monitor the RFP Website throughout the RFP event.

² In this Stage 2 RFP, a Proposer may submit up to three additional variations of their Project using a single registered Supplier account (Company name) which is different than what was required in Stage 1 where separate accounts were required for each variation. RFP Sections 1.8.2 and 1.8.3 describe the variations that can be submitted.

1.2 PROPOSAL SUBMISSION PROCEDURES

An Email notification will be sent to all registered Proposers via the messaging feature in the Electronic Procurement Platform when the event has been opened to receive Proposals.

After logging onto the Electronic Procurement Platform, the RFP will be visible on the Proposer's dashboard with several tabs, including the following:

- “1. Download Documents:” Documents stored under this tab are provided for the Proposer's use and information. All documents can be downloaded and/or printed, as required.
- “2. Upload Documents:” Proposal submission documents requested in Appendix B must be uploaded using this tab.
- “3. Commercial Data:” This tab is NOT USED for this event.
- “4. Technical Data:” This tab is NOT USED for this event.
- “5. Pricing Data:” This tab is NOT USED for this event.

Step-by-step instructions for submitting a complete Proposal are provided below:

1. Proposers must upload their Proposal files, including all required forms and files, to submit a complete Proposal. All files must be uploaded before the Proposal Due Date.
2. Submit (upload) one consolidated PDF representing your Proposal via the “2. Upload Documents” tab. That Proposal PDF must abide by the format specified in this Appendix B. A MSWord.docx template that outlines the format of this document is available under the “1. Download Documents” tab for the Proposer's use. **Response information must be provided in the order, format, and manner specified in this Appendix B and must clearly identify and reference the Appendix B section number that the information relates to.**
 - a. Proposers shall use a filename denoting: CompanyName_Proposal#.pdf.
(example: AceEnergy_P1.pdf)
3. Proposal information that cannot be easily consolidated into the PDF file described in Step 2 (such as large-scale drawing files) or files that must remain in native file format (such as computer models and spreadsheets) shall be **uploaded separately but must be referenced from within the main Proposal PDF file** (e.g., “See AceEnergyP1V2_2.5_SiteControlMap.kmz”). Such additional files must follow the naming convention below:
 - a. File names must include, in order, Company Name, Proposal number (if more than one Proposal being submitted per Proposer), Variation (if any variations are being submitted), Appendix B section number, and a file descriptor, as shown in the example file name below:
AceEnergyP1V2_2.5_SiteControlMap.kmz
Proposers may use abbreviations if they are clear and easy to follow.
4. Upload files using the “2. Upload Documents” tab on the Electronic Procurement Platform.
 - a. For all documents identify the “Document Type” as “Technical Information.” (Do not identify any documents as “Commercial and Administrative” or “Pricing.”)
 - b. “Reference ID” may be left blank.

- c. Select "Choose File..." Navigate to and choose the corresponding file from your computer. Select "Open" and then "Submit Document."

There is no limit to the number or size of files that can be uploaded. Multiple files may be grouped into a .zip archive for upload. (Any zipped files must still adhere to the naming directions in #3 above.) When successfully uploaded, documents will appear under the "Bid Submissions" section on the bottom of the tab's page, organized within the "Technical Information" Document Type. Repeat steps a, b, and c, as required for each file upload.

If a file with the same name is uploaded twice, the Platform will automatically append a unique numerical extension to the Document Name. To delete a file that has been previously uploaded, click on the "X" button in the "Actions" column for the file to be deleted. Do not upload any files prior to the issuance of the Final RFP.

5. The Company will not be responsible for technical problems that interfere with the upload or download of Proposal information. Support is available to answer technical questions about PowerAdvocate's Sourcing Intelligence from 8 AM to 8 PM Eastern Time (2 AM to 2 PM Hawai'i Standard Time when daylight savings is in effect) Monday to Friday, except for Holidays posted on the PowerAdvocate website, both by phone (857-453-5800) and by Email (support@poweradvocate.com).
6. Proposers are strongly encouraged to start early and avoid waiting until the last minute to submit the required information. Proposers are allowed to add, modify, and/or delete documents that have been previously submitted any time prior to the event close deadline.
7. Any questions or concerns regarding the RFP, may be submitted to the Company Contact via the RFP Email address provided in Section 1.6 of the RFP. Per RFP Section 1.9.2, the Independent Observer will monitor messages within the bid event. Proposers are responsible for following instructions and uploading documents in their appropriate locations. Documents uploaded in the wrong tab will not be considered by the Company.

1.3 PROPOSAL COMPLETION AND CONFIRMATION PROCEDURES

To confirm the submission of all proposal files, in the "Status" tab on the Electronic Procurement Platform, confirm that the "Total Uploaded Files" is the number of expected files to be included in the submission by checking it against your list of submitted files.

Example "Status" tab view:

Your Bid Intention: Bidding		
Total Uploaded Files:	18	Last Upload: 02/08/18
Saved Commercial Datasheets:	0 of 0	
Saved Technical Datasheets:	0 of 0	
Saved Pricing Datasheets:	0 of 0	

2.0 PROPOSAL SUMMARY TABLE

Base variation Proposal Summary. If proposal variations are submitted, any changes to the summary information for such variations must be specifically identified in a similar table placed in sections 3.2, 3.3, 3.4, etc. of this Appendix, as applicable.

To be filled out by ALL Projects:

1	Proposer Name (Company Name)	
2	Parent Company/Owner/Sponsor/Business Affiliation/etc	
3	Project Name	
4	Net AC Capacity of the Facility (MW)	
5	Proposed Facility Location in/near what City/Area	
6	TMK(s) of Facility Location (9 digits)³	
7	Point of Interconnection’s Circuit or Substation Name	
8	Proposal Guaranteed Commercial Operations Date (MM/DD/YYYY) Choice between Kapolei 4: 2/1/22 or Ho’opili: 1/1/23	
9	State the Deferral Opportunity of Proposal as seen in Tables 1 and 2 of the RFP.	
10	Will Project be available during the entire “Delivery Hour” period? If no, please explain and state the times the Project will be available.	
11	State Event Dispatch Option as seen in Table 3 and Section 3.10 of the RFP.	
12	The Proposer hereby certifies that the Project meets all performance attributes identified in this RFP and the Performance Standards in the applicable RDG PPA or ESPPASCCPA? (Yes/No)	
13	The Proposer hereby certifies that no single point of failure from the Facility shall result in a decrease in net electrical output greater than 135 MW. (Yes/No)	
14	The Proposer hereby certifies that the Proposal (including its pricing elements) is not contingent upon changes to existing County, State or Federal laws or regulations. (Yes/No)	
15	The Proposer hereby agrees to provide Development Period Security and Operating Period Security as set forth in the SCCPA. (Yes/No)	
16	The Proposer hereby certifies under penalties of perjury that this Proposal has been made in good faith and without collusion or fraud with any other person. As used in this certification, the word “person” shall mean any natural person, business partnership, corporation, union, committee, club, or organization, entity, or group of individuals. (Yes/No)	

IPP or Affiliate proposals:

- that contain a generation component (whether with or without an energy storage component) – complete the summary table items in part A below.
- that are standalone energy storage projects – complete the summary table items in part B below.

³ Island Number (1 digit); Zone Number (1 digit); Section Number (1 digit); Plat Number (3 digits, add leading zeros if less than 3 digits); Parcel Number (3 digits, add leading zeros if less than 3 digits)

A. To be filled out, IF the Project contains a Generation Component (With or Without an Energy Storage Component):

17	Project Generation Technology	
18	Daily Energy Potential RFP Projection	
19	Lump Sum Payment (\$/Year)	
20	Does Project include an Energy Storage Component? (Yes/No)	
If the Project includes an Energy Storage Component:		
21	Project Energy Storage Technology	
22	Energy Storage Capability for the Facility (MW and MWh)	
23	Is the Project capable of claiming the Federal Investment Tax Credit (ITC)? (Yes/No)	

B. To be filled out, IF the Project is for Standalone Energy Storage:

24	Project Energy Storage Technology	
25	Energy Storage Capability for the Facility (MW and MWh)	
26	Lump Sum Payment (\$/Year)	

2.1 REQUIRED FORMS ACCOMPANYING PROPOSAL PDF

The following forms must accompany each proposal, must be attached to the Proposal PDF, and uploaded via the “2. Upload Documents” tab:

- Document signed by a representative for the Proposer **authorizing the submission** of the Proposal
- Fully executed **Mutual Confidentiality and Non-Disclosure Agreement** (Appendix E to the RFP, may be downloaded from the “1. Download Documents” tab in the Electronic Procurement Platform)
- **Certificate of Good Standing** for the Proposer (a Certificate of Vendor Compliance for the Proposer may be provided in lieu of a Certificate of Good Standing)
- **Federal and State tax clearance certificates** for the Proposer (a Certificate of Vendor Compliance for the Proposer may be provided in lieu of Federal and State tax clearance certificates)
- **Certification of Counsel for Proposer**, if applicable. (See Appendix B Attachment 1.)
- Completed applicable **Interconnection Requirement Study Data Request form** for the proposed technology and **project single line diagram(s). Models for equipment and controls, list(s)** identifying components and **respective files** (for inverters and power plant controller), and **complete documentation with instructions** as specified in the Data Request form shall be submitted within the respective timeframes specified in Section 5.1 of the RFP.⁴ (See Section 2.11.1 below)

2.2 PROPOSAL SUMMARY/CONTACT INFORMATION

2.2.1 Provide a **primary point of contact** for the Proposal being submitted:

- Name
- Title
- Mailing Address
- Phone Number
- Email Address

2.2.2 **Executive Summary of Proposal.** The executive summary must include an approach and description of the important elements of the Proposal, including additional descriptions for each minor variation to the Proposal being submitted. Refer to Section 1.5.2 of the RFP for an explanation of minor variations allowed. If variations are proposed, a **table summarizing the differences among the variations shall be included.**

2.2.3 **Pricing information.** Pricing information must be filled out in the Section 2.0 Proposal Summary Table above. If variations are proposed, each variation’s pricing summary must be identified in a similar pricing table in Sections 3.2, 3.3, 3.4, etc. as applicable. Provide any pricing information only in those table sections – do not embed pricing information in any other portion of the Proposal PDF.

⁴ If the Models, lists, respective files and complete documentation are not submitted with the Proposal upload, they shall be submitted via PowerAdvocate’s Messaging as attachments within the respective timeframes specified in Section 5.1 of the RFP.

2.2.4 Provide a **high-level overview of the proposed Facility**, including at a minimum the following information:

- Facility Generation Size (MW_{AC} and MW_{DC})
- Net Maximum Output Capacity of the Facility at the Point(s) of Interconnection (MW_{AC})
- Identified Available Hosting Capacity of the Transmission-level Circuit Facility Interconnecting to (MW_{AC})

For projects that include a generation component:

- Technology Type
- Number of Generators
- Rated Output of each Generator
- Generator Facility Design Characteristics
- Fuel Source for Generation

For stand-alone storage projects or generation projects that include a storage component:

- Technology Type (i.e. lithium ion battery)
- Discharge Duration (hours)
- Storage Capacity (i.e. amount of energy released to fully discharge and amount of energy required to fully charge, in MW and MWh)
- Minimum and Maximum Operational Ranges, such as minimum and maximum required state of charge
- Round Trip Efficiency at rated power measured at the Point of Interconnection (i.e. discharge energy divided by charge energy, expressed as a percentage)
- Round Trip Efficiency using full duty cycle for a fixed duration measured at the Point of Interconnection (%)
- For generation coupled with energy storage, described the Allowed Percentage of Storage Component's charging that can come from the System Grid, if any, and any conditions of charging (when, percentage of annual total energy input, etc.)

2.3 FINANCIAL

Provide the following financial information identified below.

2.3.1 Identification of Equity Participants

2.3.1.1 Who are the **equity participants** in the Project (or the equity partners' other partners)?

2.3.1.2 Provide an **organizational structure** for the Proposer including any general and limited partners and providers of capital that identifies:

- Associated responsibilities from a financial and legal perspective
- Percentage interest of each party

2.3.2 Project Financing

2.3.2.1 **How will the Project be financed** (including construction and term financing)? Address at a minimum:

- The Project’s projected financial structure
 - Expected source of debt and equity financing
- 2.3.2.2 Identify all **estimated development and capital costs** for, at a minimum:
- Equipment
 - Identify the manufacturer and model number for all major equipment
 - Construction
 - Engineering
 - Seller-Owned Interconnection Facilities
 - Company-Owned Interconnection Facilities
 - Land
 - Annual O&M
- 2.3.2.3 Discuss and/or provide **supporting information on any project financing guarantees.**
- 2.3.2.4 Describe any **written commitments obtained from the equity participants.**
- 2.3.2.5 Describe any **conditions precedent to project financing**, and the Proposer’s plan to address them, other than execution of the Power Purchase Agreement or any other applicable project agreements and State of Hawaii Public Utilities Commission approval of the Power Purchase Agreement and other agreements.
- 2.3.2.6 Provide any **additional evidence to demonstrate that the Project is financeable.**
- 2.3.3 Project Financing Experience of the Proposer
Describe **the project financing experience of the Proposer** in securing financing for projects of a similar size (i.e., no less than two-thirds the size) and technology as the one being proposed including the following information for any referenced projects:
- Project Name
 - Project Technology
 - Project Size
 - Location
 - Date of Construction and Permanent Financing
 - Commercial Operations Date
 - Proposer’s Role in Financing of the Project
 - Off-taker
 - Term of the Interconnection Agreement
 - Financing Structure
 - Major Pricing Terms
 - Name(s) of Finance Team Member(s); Time (i.e., years, months) worked on the project and Role/Responsibilities
- 2.3.4 Evidence of the Proposer’s Financial Strength
- 2.3.4.1 Provide **copies of the Proposer’s audited financial statements** (balance sheet, income statement, and statement of cash flows):

- Legal Entity
 - Three (3) most recent fiscal years
 - Quarterly report for the most recent quarter ended
- Parent Company
 - Three (3) most recent fiscal years
 - Quarterly report for the most recent quarter ended

2.3.4.2 Provide the **current credit ratings** for the Proposer (or Parent Company, if not available for Proposer), affiliates, partners, and credit support provider:

- Standard & Poor’s
- Moody’s
- Fitch

2.3.4.3 Describe any **current credit issues** regarding the Proposer or affiliate entities raised by rating agencies, banks, or accounting firms.

2.3.4.4 Provide any **additional evidence that the Proposer has the financial resources and financial strength** to complete and operate the Project as proposed.

2.3.5 Provide evidence that the Proposer can provide the required securities

2.3.5.1 Describe the Proposer’s **ability (and/or the ability of its credit support provider) and proposed plans to provide the required securities** including:

- Irrevocable standby letter of credit
- Sources of security
- Description of its credit support provider

2.3.6 Disclosure of Litigation and Disputes

Disclose any **litigation, disputes, and the status of any lawsuits or dispute resolution** related to projects owned or managed by the Proposer or any of its affiliates

2.4 CONTRACT EXCEPTIONS AND FINANCIAL COMPLIANCE

2.4.1 If Proposers elect to propose modifications to the SCCPA, **provide a Microsoft Word red-line version of the SCCPA** identifying specific proposed modifications to the model language that the Proposer is agreeable to and a detailed explanation and supporting rationale for each modification. General comments, drafting notes and footnotes such as “parties to discuss” are unacceptable and will be considered non-responsive.

Proposers that do not upload redlines of the applicable PPA with their Proposal submission will be deemed to have accepted the SCCPA in its entirety.

2.4.2 State to the best of the Proposer’s knowledge: Will the Project result in **consolidation** of the Developer entity’s finances onto the Company’s financial statements under FASB 810. **Provide supporting information** to allow the Company to verify such conclusion.

2.5 SITE CONTROL

2.5.1 The Proposal must demonstrate that the Proposer has Site Control for all real property required for the successful implementation of a specific Proposal at a Site not controlled by the Company, including any Interconnection Facilities for which the Proposer is responsible. In addition, developmental requirements and restrictions such as zoning of the Site and the status of easements must be identified. **Provide documentation set forth in RFP Section 4.3 to prove Site Control.**

2.5.2 Provide a **map of the Project site** that clearly identifies:

- Location of the parcel on which the site is located
- Tax map key number (9-digit format: Island Number (1 digit), Zone Number (1 digit), Section Number (1 digit), Plat Number (3 digits, add leading zeros if less than 3 digits), Parcel Number (3 digits, add leading zeros if less than 3 digits)
- Site boundaries (if the site does not cover the entire parcel)
- Total acreage of the site
- Point(s) of Interconnection
- Relationship of the site to other local infrastructure

2.5.3 Provide a **site layout plan** which illustrates:

- Proposed location of all equipment
- Proposed location of all facilities on the site, including any proposed line extensions

2.5.4 Describe the **Interconnection route** and include:

- Site sketches of how the facility will be interconnected to the Company's System (above-ground and/or underground)
- Identify the approximate latitude and longitude of the proposed Point of Interconnection, in decimal degrees format, to six (6) decimal places.
- Description of the rationale for the interconnection route

2.5.5 Identify **any rights-of-way or easements** that are required for access to the site or for interconnection route:

- Describe the status of rights-of-way or easement acquisition
- Describe the plan for securing the necessary rights-of-way or easement, including the proposed timeline

2.6 ENVIRONMENTAL REVIEW, PERMITTING PLAN, ENVIRONMENTAL COMPLIANCE/IMPACTS

2.6.1 Describe your **overall land use and environmental permits and approvals strategy** and approach to obtaining successful, positive results from the agencies and authorities having jurisdiction, including:

- Explanation of the conceptual plans for siting
- Studies/assessments
- Permits and approvals
- Gantt format schedule which identifies the sequencing of permit application and approval activities and critical path. (Schedule must be in MM/DD/YY format.)

2.6.2 Discuss the **City Zoning and State Land Use Classification**:

- Identify present and required zoning and the ability to site the proposed Project within those zoning allowances.
- Identify present and required land use classifications and the ability to site the proposed Project within those classifications.
- Provide evidence of proper zoning and land use classifications for selected site and interconnection route.
- If changes in the above are required for the proposed Project, provide a plan and timeline to secure the necessary approvals.

2.6.3 Identify all required discretionary and non-discretionary **land use, environmental and construction permits, and approvals** required for development, financing, construction, and operation of the proposed Project, including but not limited to zoning changes, Environmental Assessments, and/or Environmental Impacts Statements.

Provide a **listing of such permits and approvals** indicating:

- Permit Name
- Federal, State, or Local agencies and authorities having jurisdiction over the issuance
- Status of approval and anticipated timeline for seeking and receiving the required permit and/or license
- Explanation of your basis for the assumed timeline
- Explain any situation where a permit or license for one aspect of the Project may influence the timing or permit of another aspect (e.g. a case where one permit is contingent upon completion of another permit or license), if applicable.
- Explain your plans to secure all permits and approvals required for the Project.

2.6.4 Provide a **preliminary environmental assessment of the site** (including any pre-existing environmental conditions) and potential short- and long-term **impacts** associated with, or resulting from, the proposed Project – including direct, indirect, and cumulative impacts associated with development, construction, operation, and maintenance of the proposed Project in every area identified below. Discuss if alternatives have been or will be considered. The assessment shall also include Proposer’s short- and long-term plans to mitigate such impacts and explanation of the mitigation strategies for, but not limited to, each of the major environmental areas as presented below:

- Natural Environment
 - Air quality
 - Biology (Natural habitats and ecosystems, flora/fauna/vegetation, and animals, especially if threatened or endangered)
 - Climate
 - Soils
 - Topography and geology
- Land Regulation
 - Land Uses, including any land use restrictions and/or pre-existing environmental conditions/contamination
 - Flood and tsunami hazards
 - Noise
 - Roadways and Traffic
 - Utilities
- Socio-Economic Characteristics

- Aesthetic/Visual Resources
- Solid Waste
- Hazardous Materials
- Water Quality
- Public Safety Services (Police, Fire, Emergency Medical Services)
- Recreation
- Potential Cumulative and Secondary Impacts

2.6.5 Provide a **decommissioning plan**, including:

- Developing and implementing program for recycling to the fullest extent possible, or otherwise properly disposing of installed infrastructure, if any, and
- Demonstrating how restoration of the Site to its original ecological condition is guaranteed in the event of default by the Proposer in the applicable Site Control documentation.

2.7 CULTURAL RESOURCE IMPACTS

2.7.1 Provide a **plan to address the below requirements** as they pertain to the Project Site and interconnection route including the status of any consultant/s with expertise in this field that have been identified and/or contracted with, and documentation of any assessments or work that has been planned or performed to date. Identify any cultural, historical or natural resources in the area in question. For any impacts identified to the categories listed below, provide a mitigation strategy and the expected impact on the Project schedule. Detail the potential impacts of the Proposal on cultural resources in the short- and long-term and the Proposer's plan to mitigate such impacts. Proposers must provide as much information as possible to allow the Company to understand the considerations.

- Archaeological Resources
- Cultural Practices and Resources

2.8 COMMUNITY OUTREACH

2.8.1 Provide a **detailed Community Outreach Plan** to work with and inform neighboring communities and stakeholders and to provide them timely information during all phases of the Project. The plan shall address, but not be limited to, the following items:

- Project description
- Community scoping
- Project benefits
- Government approvals
- Development process
 - Identification of communities and other stakeholders that may be affected by the proposed Project:
 - How will they be affected?
 - What mitigation strategies will the Proposer implement?
- Comprehensive communication strategy with affected communities and the general public regarding the proposed Project:
 - Describe frequency of communication
 - Provide source of information
 - Identify communication outlets

- Describe opportunities, if any for affected communities and general public to provide the developer with feedback and comments on the proposed Project

2.8.2 Provide any **documentation of local community support or opposition** including any letters from local organizations, newspaper articles, or communications from local officials.

2.8.3 Provide a **description of community outreach efforts** already taken or currently underway, including the names of organizations and stakeholders contacted about the proposed Project.

2.8.4 Describe any anticipated or negotiated investment in the community and other **community benefits** that the Proposer proposes to provide in connection with the Project, along with an estimated value of the community benefits in dollars (including the cost to Proposers providing the benefits and supporting details on how those costs and benefits were derived).

2.9 OPERATIONS AND MAINTENANCE (O&M)

2.9.1 To demonstrate the long-term operational viability of the proposed Project, describe the **planned operations and maintenance**, including:

- Operations and maintenance funding levels, annually, throughout the term of the contract.
- Description of the operational requirements by frequency (daily, weekly, monthly, yearly, as-necessary, run hour interval) and maintenance requirements by frequency (daily, weekly, monthly, yearly, as-necessary, run hour interval).
- A discussion of the staffing levels proposed for the Project and location of such staff. If such staff is offsite, describe response time and ability to control the Project remotely.
- Technology specific maintenance experience records.
- Identification of any O&M providers.
- The expected role of the Proposer (Owner) or outside contractor.
- Scheduling of major maintenance activity.
- Plan for testing equipment.
- Estimated life of Generation and/or Storage Facilities and associated Interconnection Facilities.
- Safety plan, including historical safety records with environmental history records, violations, and compliance plans.
- Security plan.
- Site maintenance plan.
- Substation equipment maintenance plan.

2.9.2 State whether the Proposer would **consider 24-hour staffing**. Explain how this would be done.

2.9.3 Describe the **Proposer's contingency plan**, including the Proposer's mitigation plans to address failures. Such information should be described in the Proposal to demonstrate the Project's reliability with regard to potential operational issues.

2.9.4 Describe if the Proposer will **coordinate their maintenance schedule** for the Project with the Company's annual planned generation maintenance. See Article 5 of the SCCPA.

2.9.5 Describe the **status of any O&M agreements or contracts** that the Proposer is required to secure. Include a discussion of the Proposer's plan for securing a long-term O&M contract.

2.9.6 Provide **examples of the Proposer's experience** with O&M services for other similar projects.

2.10 PERFORMANCE STANDARDS

2.10.1 Design and operating information. Provide a **description of the project design**. Description shall include:

- Configuration description
- Overview of the Facility Control Systems – central control and inverter- or resource-level control
- Diagrams approved by a Professional Electrical Engineer registered in the State of Hawai'i, indicated by the presence of the Engineer's Professional seal on all drawings and documents. Including but not limited to:
 - A single-line diagram, relay list, trip scheme and settings of the generating facility, which identifies the Point of Interconnection, circuit breakers, relays, switches, synchronizing equipment, monitoring equipment, and control and protective devices and schemes.
 - A three-line diagram which shows the Point of Interconnection, potential transformer (PT) and current transformer (CT) ratios, and details of the generating facility configuration, including relays, meters and test switches.

2.10.1.1 For Generation Facilities, provide the projected **hourly annual energy potential production profile of the Facility**⁵ (24 hours x 365 days, 8760 generation profile) for the provided Daily Energy Potential RFP Projection.

2.10.1.2 Provide the **sample rate of critical telemetry** (i.e. frequency and voltage) based on inputs to the facility control systems.

2.10.2 Capability of **Meeting Performance Standards**. The proposed Facility must meet the performance attributes identified in this RFP and the Performance Standards identified in the SCCPA. Provide **confirmation that the proposed Facility will meet the requirements identified in the SCCPA** or provide clarification or comments about the Facility's ability to meet the performance standards. Proposals should include sufficient documentation to support the stated claim that the Facility will be able to meet the Performance Standards. The Proposal should include information required to make such a determination in an organized manner to ensure this evaluation can be completed within the evaluation review period.

2.10.3 Reactive Power Control: Provide the facility's **ability to meet the Reactive Power Control capabilities**, including Voltage Regulation at the point of interconnection, required in the Performance Standards, including contribution from the inverters of generation and/or storage and means of coordinating the response. Provide the inverter capability curve(s). Confirm ability to provide reactive power at zero active power.

⁵ The projected hourly annual energy production profile is the projected output from the generating facility without curtailment and before any energy is directed to an energy storage component, if one will be provided.

2.10.4 **Ramp Rate** for Generation Facilities: Confirm the ability to meet the ramp rate requirement specified in the SCCPA.

2.10.5 **Undervoltage ride-through:** Provide the facility's terminal voltage level(s) and elapsed time at which the facility will disconnect from the utility system during the disturbance, if any. Confirm the ability to meet ride-through requirements and include supporting documentation regarding inverter design, control parameters, etc.

2.10.6 **Overvoltage ride-through:** Provide the facility's terminal voltage level(s) and elapsed time at which the facility will disconnect from the utility system during the disturbance, if any. Confirm the ability to meet ride-through requirements and include supporting documentation regarding inverter design, control parameters, etc.

2.10.7 **Transient stability ride-through:** Provide the facility's ability to stay online during Company System: (1) three-phase fault located anywhere on the Company System and lasting up to __ cycles; and (2) a single line to ground fault located anywhere on the Company System and lasting up to __ cycles. Provide the Facility's ability to withstand subsequent events.

2.10.8 **Underfrequency ride-through:** Provide the facility's terminal frequency level(s) and elapsed time at which the facility will disconnect from the utility system during the disturbance, if any. Confirm the ability to meet ride-through requirements and include supporting documentation regarding inverter design, control parameters, etc.

2.10.9 **Overfrequency ride-through:** Provide the facility's terminal frequency level(s) and elapsed time at which the facility will disconnect from the utility system during the disturbance, if any. Confirm the ability to meet ride-through requirements and include supporting documentation regarding inverter design, control parameters, etc.

2.10.10 **Frequency Response:** Provide the facility's frequency response characteristics as required by the Model PPA, including time of response, tunable parameters, alternate frequency response modes and means of implementing such features.

2.10.11 **Auxiliary Power Information:** Proposer must provide the maximum auxiliary power requirements for:

- Start-up
- Normal Operations (from generator)
- Normal Operating Shutdown
- Forced Emergency Shutdown
- Maintenance Outage

2.10.12 **Coordination of Operations:** Provide a description of the control facilities required to coordinate generator operation with and between the Company's System Operator and the Company's System.

- Include a description of the equipment and technology used to facilitate dispatch to the Company and communicate with the Company.

- Include a description of the control and protection requirements of the generator and the Company's System.

2.10.13 **Cycling Capability:** Describe the Facility's ability to cycle on/off and provide limitations.

2.10.14 **Active Power Control Interface:** Describe the means of implementing active power control and the Power Possible, including the contribution to the dispatch signal from paired storage, if any. Provide the Proposer's experience dealing with active power control, dispatch, frequency response, and ride-through.

2.10.15 Provide the details of the **major equipment** (i.e. batteries, inverters, battery management system), including, but not limited to, name of manufacturer, models, key metrics, characteristics of the equipment, and performance specifications.

2.10.16 **Energy Storage performance standards:** For stand-alone storage projects or generation projects that include a storage component, provide additional performance standard descriptions as follows:

- Number of cycles per day, or equivalent MWh storage output for a full year
- Ramp Rate: Provide the Facility's ramp rate, which should be no more than 2 MW/minute for all conditions other than those under control of the Company System Operator and/or those due to desired frequency response.
- System Response Time – Idle to Design Maximum (minutes)
- Discharge Start-up time (minutes from notification)
- Charge Start-up time (minutes from notification)
- Start and run-time limitations, if any
- Ancillary Services provided, if any (i.e. Spinning Reserves, Non-Spinning Reserves, Regulation Up, Regulation Down, Black Start capability, other)

2.10.17 Provide the description and details of the **grid-charging capabilities of the Facility**. Include a description on the ability to control the charging source.

2.10.18 For Projects or Project variations with a **Contingency Storage** component, provide a **description and details of the functionality, design, operation and capabilities**. The description should identify all assumptions and associated restrictions on the charging/discharging duty of the proposed Contingency Storage.

2.11 INTERCONNECTION REQUIREMENT STUDY

2.11.1 Provide the appropriate completed **Interconnection Requirement Study Data Request form** for the proposed technology with the Proposal submission. (The forms can be found in the "1. Download Documents" tab as Appx B Att 2 IRS Data Request Form (PV Generation), Appx B Att 3 IRS Data Request Form (Wind Generation) or Appx B Att 4 IRS Data Request Form (Sync Generation) MSEXcel files.) Also provide all **project single line diagram(s)** with the Proposal submission. **Models for equipment and controls, list(s)** identifying components and **respective files** (for inverters and power plant controller), and **complete documentation with instructions** shall be submitted within the timeframes specified in Section 5.1 of the RFP.⁴ Proposers may also download the PSCAD model requirements memo labelled as Appx B Att 5 from the "1. Download Documents" tab also.

2.12 PROVEN TECHNOLOGY

2.12.1 Provide all supporting information for the Company to assess the **commercial and financial maturity of the technology** being proposed. Provide any supporting documentation that shows examples of projects that:

- Use the technology at the scale being proposed
- Have successfully reached commercial operations (for example, by submitting a PPA)
- Demonstrate experience in providing Active Power dispatch

2.13 EXPERIENCE AND QUALIFICATIONS

Proposers, its affiliated companies, partners, and/or contractors and consultants are required to demonstrate project experience and management capability to successfully develop and operate the proposed Project.

2.13.1 Provide an **organizational chart** for the Project that lists the project participants and identifies the management structure and responsibilities.

- For each of the project participants (including the Proposer, partners, and proposed contractors), fill out the table below and provide statements that list the specific experience of the firm in: financing, designing, constructing, interconnecting, owning, operating, and maintaining renewable energy generating or storage facilities, or other projects of similar size and technology, and
- Provide any evidence that the project participants have worked jointly on other projects.

EXPERIENCE:							
	In the applicable columns below, include project details (i.e., project name, location, technology, size) and relevant job duties (role/responsibilities) and time (in years/months) spent on the project. List multiple projects if applicable.						
Participant Name:	Financing	Designing	Constructing	Interconnecting	Owning	Operating	Maintaining
1.							
2.							
3.							
...							

2.13.2 Identify those **member(s) of the team** the Proposer is submitting to meet the experience Threshold Requirement and demonstrate the member(s) firm commitment to provide services to the Proposer.

2.13.3 Identify those **members of the team with experience and qualifications**, including affiliates, and their principal personnel who will be involved in the project contracting to sell and deliver energy. If the Proposer consists of multiple parties, such as joint ventures or partnerships, provide this information for each party, clearly indicating the proposed role of each party, including an ownership chart indicating direct and indirect ownership, and percentage interests in the partnership or joint venture.

2.13.4 Provide a **management chart** which lists the key personnel dedicated to this Project and provide **biographies / resumes** of the key personnel, including position, years of relevant experience, and similar

project experience. Provide specifics as they relate to financing of renewable energy projects. Identify architects and engineers or provision to provide same that are licensed to practice in the State of Hawai'i.

2.13.5 Provide a **listing in the table format below, of all renewable energy generation or energy storage projects** the Proposer has successfully developed or that are currently under construction. Describe the Proposer's role and responsibilities associated with these projects (lead developer, owner, investor, etc.). Provide the following information as part of the response:

Project Name	Location (City, State)	Technology (wind, PV, hydro, plus storage, etc.)	Size (MW/ MWh)	Commercial Operation Date	Offtaker (if applicable)	Role & Responsibilities
1.						
2.						
3.						
...						

2.14 STATE OF PROJECT DEVELOPMENT AND SCHEDULE

2.14.1 Provide a **project schedule in GANTT chart format** with complete **critical path activities** identified for the Proposal from the Notice of Selection of the Proposal for contract negotiation to the start of Commercial Operations.

- The **schedule** must include:
 - Interconnection Requirement Study (IRS) assumptions
 - Anticipated contract negotiation period assumptions
 - Regulatory assumptions
 - Anticipated submittal and approval dates for permitting (including but not limited to environmental and archaeological compliance)
 - Siting and land acquisition
 - Cultural Resource implications and mitigation activities
 - Community outreach and engagement activities
 - Energy resource assessment
 - Financing
 - Engineering
 - Procurement
 - Facility construction including construction management events
 - Applicable reporting milestone events specified in the Model PPA
 - Testing
 - Interconnection (including engineering, procurement, and construction)
 - Commercial Operations Date
 - All other important elements outside of the direct construction of the Project
- For each project element, list the start and end date (must be in MM/DD/YY format), and include predecessors to clearly illustrate schedule dependencies and durations.
- Proposers must also list and describe critical path activities and milestone events, particularly as they relate to the integration and coordination of the project components and the Company's

Electric System. Proposers must ensure that the schedule provided in this section is consistent with the milestone events contained in the PPA and/or other agreements.

- 2.14.2 Describe the **construction execution strategy** including:
- Identification of contracting/subcontracting plans
 - Modular construction
 - Safety plans⁶
 - Quality control and assurance plan
 - Labor availability
 - Likely manufacturing sites and procurement plans
 - Similar projects where these construction methods have been used by the Proposer.
- 2.14.3 Provide a description of any **project activities that have been performed to date**.
- 2.14.4 Explain how you plan to reach **safe harbor milestones** (if applicable) and **guaranteed commercial operations**, including durations and dependencies which support this achievement.

3.0 MINOR PROPOSAL VARIATIONS

Proposers submitting minor variations to a Proposal must provide the **details of each variation in the below section(s)**. In each proposal variation section below, Proposers must add the applicable tables from Section 2.0 Proposal Summary of this Appendix B. The information in these tables should reflect the information for the variation being proposed. Additionally, Proposers must identify all changes to the information provided in response to Sections 2.1 through 2.14 of this Appendix B for the proposal variation. If differences are not identified for the Section 2.0 Proposal Summary or a particular section in Sections 2.1 through 2.14, the Company will assume that the information contained in the base Proposal also applies to the proposal variation.

Note: Section 2.2.2 above requires a table summarizing the differences among the variations, if variations are proposed.

3.1 PROPOSAL VARIATION 1 (BASE VARIATION)

N/A (All information for the base variation is identified in sections 2.0 through 2.14 above.)

3.2 PROPOSAL VARIATION 2 (AS NECESSARY)

Identified changes to Sections 2.0 through 2.14, as required for each variation.

3.3 PROPOSAL VARIATION 3 (AS NECESSARY)

Identified changes to Sections 2.0 through 2.14, as required for each variation.

⁶ A document that describes the various safety procedures and practices that will be implemented on the Project and how applicable safety regulations, standards, and work practices will be enforced on the Project.

3.4 PROPOSAL VARIATION 4 (AS NECESSARY)

Identified changes to Sections 2.0 through 2.14, as required for each variation.

**Certification of Counsel for Proposer
Hawaiian Electric Company, Inc.**

Non-Wires Alternatives to Provide Reliability (Back-Tie) Services RFP

Pursuant to Section 1.5.3 of Hawaiian Electric Company, Inc.'s ("Company") Request For Proposals for Non-Wires Alternatives to Provide Reliability (Back-Tie) Services ("RFP"), the Company may require legal counsel who represent multiple unaffiliated proposers to sign a certification that they have not shared confidential information obtained through the representation of one proposer with any other unaffiliated proposer.

Accordingly, by signing below, I hereby acknowledge, agree and certify that:

(1) in connection with the RFP, I represent the following company that has submitted a proposal(s) for the RFP: _____ ("Proposer");

(2) irrespective of any proposer's direction, waiver or request to the contrary, I will not share a proposer's confidential information or the Company's confidential information associated with such proposer, including, but not limited to, a proposer's or Company's negotiating positions, with third parties unaffiliated with Proposer (by contract or organizational structure), including other proposers responding to the RFP;

(3) the Companies may rely on this certification for purposes of the RFP; and

(4) at the conclusion of power purchase agreement negotiations, if any, the Company may require me to sign a certificate certifying that I have not shared a proposer's confidential information or the Company's confidential information associated with such proposer, including, but not limited to, a proposer's or Company's negotiating positions, with third parties unaffiliated with Proposer (by contract or organizational structure), including other proposers responding to the RFP.

Name (print)

Law Firm (if applicable)

Signature

Date

Section 1.5.3 of the RFP provides in relevant part that:

In submitting a Proposal in response to this RFP, each Proposer certifies that the Proposal has been submitted in good faith and without fraud or collusion with any other unaffiliated person or entity. The Proposer shall acknowledge this in the Response Package submitted with its Proposal. Furthermore, in executing the NDA provided as Appendix E, the Proposer agrees on behalf of its Representatives (as defined in the NDA) that the Company's negotiating positions will not be shared with other Proposers or their respective Representatives.

In addition, in submitting a Proposal, a Proposer will be required to provide Company with its legal counsel's written certification in the form attached as Appendix B Attachment 1 certifying in relevant part that irrespective of any proposer's direction, waiver, or request to the contrary, that the attorney will not share a proposer's confidential information associated with such proposer, including, but not limited to, a proposer's or Company's negotiating positions, with third parties unaffiliated with Proposer (by contract or organizational structure), including other proposers responding to the RFP. If legal counsel represents multiple unaffiliated proposers whose Proposals are selected for the Final Award Group, such counsel will also be required to submit a

similar certification at the conclusion of Agreement negotiations that he or she has not shared a proposer's confidential information or the Company's confidential information associated with such proposer, including but not limited to, a proposer's or Company's negotiating positions, with third parties unaffiliated with such proposer (by contract or organizational structure), including other proposers responding to the RFP.

**Interconnection Requirement Study - Data Request
FOR PV GENERATION**

Updated 7/16/2018

PROJECT: _____

DATE: _____

(Nonexclusive Preliminary List)

*****ALL ITEMS ARE REQUIRED AND ALL RESPONSES MUST BE FILLED UNLESS NOT APPLICABLE.*****

	Response
1) Please provide a plan map of the Non-Utility Generation (NUG) facility. Please indicate the interconnection point to the HECO system.	
2) Please provide the following generation and load information for the NUG facility:	
a. Gross and net output of the facility	
b. Expected KW and KVAR loads including, but not limited to, generators' auxiliary load curve, process load(s) profile(s), etc.	
c. Expected minimum and maximum MW and MVAR "import from" AND "export to" HECO.	
3) Please provide Single-Line Diagram(s), Three-Line Diagram(s), and Protective Relay List & Trip Schedule for the generation and interconnection facilities:	
a. The Single-line diagram(s) and Three-line diagram (s) should include:	
i. For main and generator step up transformer(s), please show:	
<ul style="list-style-type: none"> • Transformer voltage and MVA ratings. 	
<ul style="list-style-type: none"> • Transformer impedance(s). 	
<ul style="list-style-type: none"> • Transformer winding connections and grounding. If neutrals are grounded through impedance, please show the impedance value. 	
ii. The protective relaying and metering for the generators, transformers, buses, and all other main substation equipment.	
iii. For the potential transformers, please indicate the type, quantity, ratio, and accuracy rating.	
iv. For the current transformers, please indicate the type, quantity, ratio, and accuracy rating, and thermal rating factor.	
v. Auxiliary power devices (e.g. capacitors, reactors, storage systems, etc.) and their rating(s); additional inquiries may be made to obtain technical data for these devices.	
vi. For the interconnection / tie lines (overhead or underground) and the plant's generation system, please provide the following, as applicable:	
<ul style="list-style-type: none"> • Installation details such as cross-section(s), plan and profiles, etc. 	
<ul style="list-style-type: none"> • Conductor data such as size, insulation, length etc. 	
<ul style="list-style-type: none"> • Continuous and emergency current ratings. 	
<ul style="list-style-type: none"> • Voltage rating (nominal and maximum KV). 	
<ul style="list-style-type: none"> • BIL rating. 	
<ul style="list-style-type: none"> • Positive, negative, and zero-sequence impedances (resistance, reactance, and susceptance) 	
<ul style="list-style-type: none"> • Capacitance or charging current. 	
<ul style="list-style-type: none"> • Short-circuit current capability. 	
vii. Include station power for facility and all applicable details.	
viii. All applicable notes pertaining to the design and operation of the facility.	
b. The Protective relay list & trip schedule should list the protected equipment; the relay description, type, style number, quantity, ANSI Device No., and range; and the breaker(s)/switching device(s) tripped, for both the generator protection and the interconnection facilities protection.	
c. Please provide both a paper and an electronic version (e.g. dgn, dxf, or pdf) of the single-line diagram(s) and the protective relay list & trip schedule.	
d. Single-line diagrams should be provided for both the generation plant and the interconnection substation.	

**Interconnection Requirement Study - Data Request
FOR PV GENERATION**

Updated 7/16/2018

PROJECT: _____
DATE: _____

(Nonexclusive Preliminary List)

*****ALL ITEMS ARE REQUIRED AND ALL RESPONSES MUST BE FILLED UNLESS NOT APPLICABLE.*****

	Response
4) For the PV Inverter Based Generating Facility, please provide the following data:	
a. Inverter manufacturer, Type, Size, Impedances. Attach copy of inverter data sheet.	
b. Power Factor Range Capability	
c. Inverter Reactive Power Capability Curve	
d. Auxillary loads (P, Q, Power Factor)	
e. Ramp rates (up, down) Typical and Measured Proxy Data	
f. Inverter's Internal Isolation Transformer Grounding Method, if used (i.e. effectively grounded, resonant grounded, low inductance grounded, high-resistance grounded, low-resistance grounded, ungrounded). If the transformer is not solidly grounded, provide the impedance value for the grounding neutral and the impedance for the isolation transformer.	
g. Diagram for Inverter's internal isolation transformer	
h. Switching and service restoration practice	
i. Protection data (voltage ride-through and trip settings, frequency ride-through and trip settings etc.). Include setpoint and clearing time ranges for voltage and frequency settings.	
j. Details of filters etc. at Point of Interconnection	
k. Description of harmonic spectrum of inverter injection (order, magnitude)	
l. Description of PV inverter with respect to varying levels of solar irradiance	
5) Energy Storage System, if applicable	
a. Operation characteristics	
b. Voltage level	
c. Capacity (how long and how much can the battery support)	
d. Deployment strategy/schedule	
e. Energy storage system data sheet	
6) For the PV plant's collector system, please provide the following, as applicable:	
a. Conductor data such as size, insulation, etc.	
b. Continuous and emergency current ratings.	
c. Voltage rating (nominal and maximum kV).	
d. BIL rating.	
e. Positive, negative, and zero-sequence impedances (resistance, reactance, and susceptance).	
f. Capacitance or charging current.	
g. Short-circuit current capability.	

**Interconnection Requirement Study - Data Request
FOR PV GENERATION**

Updated 7/16/2018

PROJECT: _____

DATE: _____

(Nonexclusive Preliminary List)

ALL ITEMS ARE REQUIRED AND ALL RESPONSES MUST BE FILLED UNLESS NOT APPLICABLE.

		Response
7)	<p>Please provide the following software models that accurately represent the Facility:</p> <p>a. Validated PSS/E load flow model up to the point of interconnection. The PSS/E model shall include the main transformer, collection system, generator step-up transformers, inverter systems, and any other components including capacitor banks, energy storage systems, DVAR, etc. An equivalent representation of the collection system, generator step-up transformers, and inverter systems is acceptable. Documentation on the model shall be provided.</p> <p>b. Validated PSS/E dynamic model for the inverter; and other components including energy storage system, DVAR, etc. if applicable. The inverter model shall include the generator/converter, electrical controls, plant-level controller, and protection relays. Generic and Detailed models shall be provided. Documentation on the model(s) shall be provided, including the PSS/E dyre file with model parameters.</p> <p>i. Generic models shall parameterize models available within the PSS/E standard model library.</p> <p>ii. Detailed models shall be supplied by the vendor/manufacturer as user-written models. The uncompiled source code for the user-written model shall be provided to ensure compatability with future versions of PSS/E. In lieu of the uncompiled source code, a compiled object file and applicable library files shall be provided in PSS/E versions 33 AND 34 format. Updates of the object file compatible with future PSS/E versions must be provided as requested for the life of the project as written in the power purchase agreement. Documentation shall include the characteristics of the model, including block diagrams, values, names for all model parameters, and a list of all state variables.</p> <p>c. Validated PSCAD model of the inverter; and other components including energy storage system, DVAR, auxiliary plant controllers, etc. if applicable. Documentation on the model(s) shall be provided. Refer to PSCAD Technical Memo for model requirements.</p> <p>d. Overlaid plots validating the performance of the three dynamic models for a three-phase fault. Plots shall include voltage, real and reactive power, real and reactive current.</p> <p>e. Voltage plot validating the performance of inverter to meet the Companies' Transient Overvoltage (TROV-2) policy. Plot shall show the inverter trip and resulting voltage and current waveforms. Refer to Appendix E of Companies' Grid Supportive Utility-Interactive Inverter Qualification Requirements.</p> <p>f. Validated Aspen Oneliner short circuit model that accurately represents the facility (including energy storage system if applicable), and is valid for all faults conditions anywhere on the Utility system. Documentation on the model(s) shall be provided. (OTHERWISE SEE ADDITIONAL TABS FOR REQUIRED INFORMATION TO MODEL INVERTER)</p>	
8)	<p>For the main transformer and generator step-up transformers, please provide:</p> <p>a. Transformer voltage and MVA ratings, and available taps. Attach copy of transformer test report or data sheet</p> <p>b. The tap settings used.</p> <p>c. The LTC Control Scheme.</p> <p>d. Transformer winding connections and grounding used. If the transformer is not solidly grounded, provide the impedance value for the grounding method.</p> <p>e. Positive, negative, and zero sequence impedance values.</p>	
9)	<p>For the circuit breakers and fault-clearing switching devices, including the generator breakers, please provide:</p> <p>a. The voltage, continuous current and interrupting capability ratings.</p> <p>b. The trip speed (time to open).</p>	

**Interconnection Requirement Study - Data Request
FOR PV GENERATION**

Updated 7/16/2018

PROJECT: _____

DATE: _____

(Nonexclusive Preliminary List)

*****ALL ITEMS ARE REQUIRED AND ALL RESPONSES MUST BE FILLED UNLESS NOT APPLICABLE.*****

		Response
10)	For the power fuses, please provide:	
	a. The manufacturer, type, size, and interrupting capability.	
	b. The minimum melt and total clearing curves.	
11)	For the protective relaying, please provide:	
	a. Data for the CTs used with the relaying including the manufacturer, type of CT, accuracy class, and thermal rating factor.	
	b. Data for the PTs used with the relaying including the manufacturer, type of PT, voltage ratings, and quantity.	
12)	Please provide protective relay settings for existing and proposed generators, including but not limited to, reverse power, negative sequence, over and underfrequency, over and under voltage, volts per hertz, etc.	

Instructions:

Please fill in the data in the green blanks below

(Note: This does not include the internal isolation transformer, if used)

[1] Maximum rated output power = kVA

[2] Impedances in **Per Unit** based on kVA from [1]

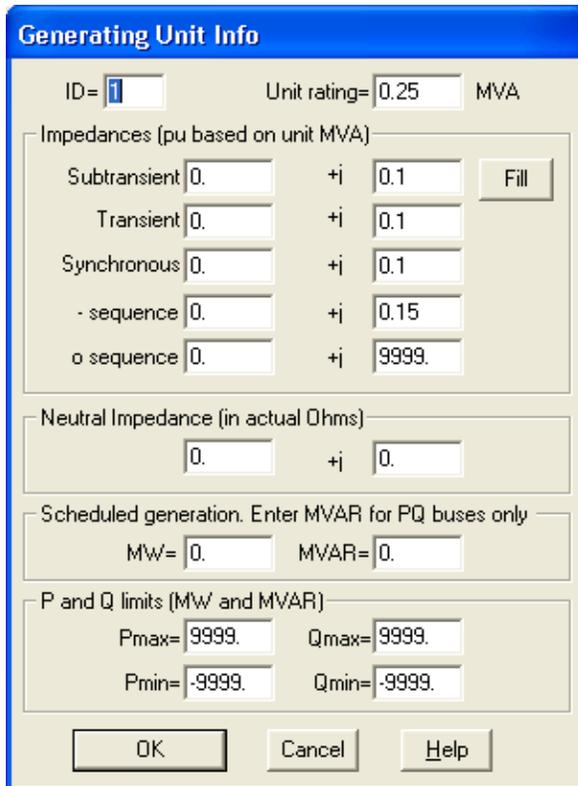
	R	X
Subtransient =	<input type="text"/>	<input type="text"/>
Transient =	<input type="text"/>	<input type="text"/>
Synchronous =	<input type="text"/>	<input type="text"/>
Negative Sequence =	<input type="text"/>	<input type="text"/>
Zero Sequence =	<input type="text"/>	<input type="text"/>

[3] Neutral impedance (if any) in actual **Ohms**:

R	X
<input type="text"/>	<input type="text"/>

NOTE: These parameters should reflect the inverter response for all types of faults at any point on the electrical system to which the inverter is connected. This includes faults at the inverter output terminals, and also on the 138 kV transmission system. If the stated parameters do not cover this range, please state the adjustments needed to these parameters to accurately represent the inverter response across this range.

These parameters will be used to model the inverter in the Aspen Oneliner program as shown in the sample dialog box below:



Instructions:

Please fill in the data in the green blanks below

- [1] Internal open circuit voltage
 Magnitude = Per Unit
 Angle = Degrees
- [2] AC Output Current Limit = Amps

NOTE: These parameters should reflect the inverter response for all types of faults at any point on the electrical system to which the inverter is connected. This includes faults at the inverter output terminals, and also on the 138 kV transmission system. If the stated parameters do not cover this range, please state the adjustments needed to these parameters to accurately represent the inverter response across this range.

These parameters will be used to model the inverter in the Aspen Oneliner program as shown in the sample dialog box below:

Generator Data

Generators at 200 INVERTER 0.2kV

Unit '1' On-Line

Edit

On/Off-Line

New

Delete

Internal V-Source

p.u. = 1

Ref. angle = 0

Current Limits (A)

A: 900 B: 0

Power Flow Regulation

Regulates voltage Fixed P+iQ output

Memo:

Tags: None

Done Help

Last changed Apr 18, 2010

Instructions:

Please fill in the data in the green blanks below

(Note: This is not required if an internal isolation transformer is not used)

[1] Transformer rated power = kVA

[2] Winding Configuration
 Inverter Side = Delta/Wye
 Customer Side = Delta/Wye

[2] Impedances in **Per Unit** based on kVA
 Positive Sequence = R X
 Zero Sequence =

[3] Neutral impedance (if any) in actual **Ohms**:
 R X

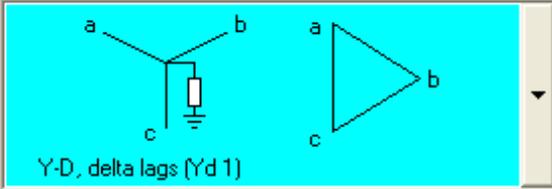
These parameters will be used to model the inverter in the Aspen Onliner program as shown in the sample dialog box below:

2-Winding Transformer Data

100 480 V TERM 0.48kV - 200 INVERTER 0.2kV

Name= INV ISOL TX Ckt ID= 1 MVA1= 0.25 MVA2= 0.25 MVA3= 0.25

MVA base for per-unit quantities= 0.25 Change



Y-D, delta lags (Yd 1)

R= 0.01 X= 0.03
 B= 0.
 Ro= 0.01 Xo= 0.03
 Bo= 0.

480 V TERM 0.48 kV INVERTER 0.2 kV

Tap kV= 0.48 Tap kV= 0.2

G1*= 0. G2*= 0.
 B1*= 0. B2*= 0.
 G10*= 0. G20*= 0.
 B10*= 0. B20*= 0.

Neutral grounding Z (ohms)
 Zg1= 14. +j 0.

*Based on system MVA Metered at: 480 V TERM 0.48 kV

Memo:



**Interconnection Requirement Study - Data Request
FOR WIND GENERATION**

Updated 1/17/2018

PROJECT: _____

DATE: _____

(Nonexclusive Preliminary List)

ALL ITEMS ARE REQUIRED AND ALL RESPONSES MUST BE FILLED UNLESS NOT APPLICABLE.

	Response
1) Please provide a plan map of the Non-Utility Generation (NUG) facility. Please indicate the interconnection point to the HECO system.	
2) Please provide the following generation and load information for the NUG facility:	
a. Gross and net output of the facility	
b. Expected KW and KVAR loads including, but not limited to, generators' auxiliary load curve, process load(s) profile(s), etc.	
c. Expected minimum and maximum MW and MVAR "import from" AND "export to" HECO.	
3) Please provide Single-Line Diagram(s), Three-Line Diagram(s), and Protective Relay List & Trip Schedule for the generation and interconnection facilities:	
a. The Single-line diagram(s) and Three-line diagram (s) should include:	
i. For main and generator step up transformer(s), please show:	
• Transformer voltage and MVA ratings.	
• Transformer impedance(s).	
• Transformer winding connections and grounding. If neutrals are grounded through impedance, please show the impedance value.	
ii. The protective relaying and metering for the generators, transformers, buses, and all other main substation equipment.	
iii. For the potential transformers, please indicate the type, quantity, ratio, and accuracy rating.	
iv. For the current transformers, please indicate the type, quantity, ratio, and accuracy rating, and thermal rating factor.	
v. Auxiliary power devices (e.g. capacitors, reactors, storage systems, etc.) and their rating(s); additional inquiries may be made to obtain technical data for these devices.	
vi. For the interconnection / tie lines (overhead or underground) and the plant's generation system, please provide the following, as applicable:	
• Installation details such as cross-section(s), plan and profiles, etc.	
• Conductor data such as size, insulation, length etc.	
• Continuous and emergency current ratings.	
• Voltage rating (nominal and maximum KV).	
• BIL rating.	
• Positive, negative, and zero-sequence impedances (resistance, reactance, and susceptance)	
• Capacitance or charging current.	
• Short-circuit current capability.	
vii. Include station power for facility and all applicable details.	
viii. All applicable notes pertaining to the design and operation of the facility.	
b. The Protective relay list & trip schedule should list the protected equipment; the relay description, type, style number, quantity, ANSI Device No., and range; and the breaker(s)/switching device(s) tripped, for both the generator protection and the interconnection facilities protection.	
c. Please provide both a paper and an electronic version (e.g. dgn, dxf, or pdf) of the single-line diagram(s) and the protective relay list & trip schedule.	
d. Single-line diagrams should be provided for both the generation plant and the interconnection substation.	

**Interconnection Requirement Study - Data Request
FOR WIND GENERATION**

Updated 1/17/2018

PROJECT: _____

DATE: _____

(Nonexclusive Preliminary List)

ALL ITEMS ARE REQUIRED AND ALL RESPONSES MUST BE FILLED UNLESS NOT APPLICABLE.

	Response
4) For the Wind Generating Facility, please provide the following data:	
a. Turbine manufacturer, Type, Size, Impedances. Attach copy of turbine data sheet.	
b. Power Factor Range Capability	
c. Turbine Reactive Power Capability Curve	
d. Auxillary loads (P, Q, Power Factor)	
e. Ramp rates (up, down) Typical and Measured Proxy Data	
f. Grounding Method (i.e. effectively grounded, resonant grounded, low inductance grounded, high-resistance grounded, low-resistance grounded, ungrounded). If the transformer is not solidly grounded or ungrounded, provide the impedance value for the grounding neutral, if applicable.	
g. Provide grounding diagram.	
h. Switching and service restoration practice	
i. Protection data (voltage ride-through and trip settings, frequency ride-through and trip settings etc.). Include setpoint and clearing time ranges for voltage and frequency settings.	
j. Details of filters etc. at Point of Interconnection	
k. Description of harmonic spectrum of inverter injection (order, magnitude)	
5) Energy Storage System, if applicable	
a. Operation characteristics	
b. Voltage level	
c. Capacity (how long and how much can the battery support)	
d. Deployment strategy/schedule	
e. Energy storage system data sheet	
6) For the Wind plant's collector system, please provide the following, as applicable:	
a. Conductor data such as size, insulation, etc.	
b. Continuous and emergency current ratings.	
c. Voltage rating (nominal and maximum kV).	
d. BIL rating.	
e. Positive, negative, and zero-sequence impedances (resistance, reactance, and susceptance).	
f. Capacitance or charging current.	
g. Short-circuit current capability.	

**Interconnection Requirement Study - Data Request
FOR WIND GENERATION**

Updated 1/17/2018

PROJECT: _____

DATE: _____

(Nonexclusive Preliminary List)

ALL ITEMS ARE REQUIRED AND ALL RESPONSES MUST BE FILLED UNLESS NOT APPLICABLE.

		Response
7)	Please provide the following software models that accurately represent the Facility:	
	a. Validated PSS/E load flow model up to the point of interconnection. The PSS/E model shall include the main transformer, collection system, generator step-up transformers, wind turbines, and any other components including capacitor banks, energy storage systems, DVAR, etc. An equivalent representation of the collection system, generator step-up transformers, and turbines is acceptable. Documentation on the model shall be provided.	
	b. Validated PSS/E dynamic model for the wind turbine; and other components including energy storage system, DVAR, etc. if applicable. The wind turbine model shall include the generator/converter, electrical controls, plant-level controller, protection relays, and mechanical systems that impact its electrical performance. Generic and Detailed models shall be provided. Documentation on the model(s) shall be provided, including the PSS/E dyre file with model parameters.	
	i. Generic models shall parameterize models available within the PSS/E standard model library.	
	ii. Detailed models shall be supplied by the vendor/manufacturer as user-written models. The uncompiled source code for the user-written model shall be provided to ensure compatibility with future versions of PSS/E. In lieu of the uncompiled source code, a compiled object file and applicable library files shall be provided in PSS/E versions 33 AND 34 format. Updates of the object file compatible with future PSS/E versions must be provided as requested for the life of the project as written in the power purchase agreement. Documentation shall include the characteristics of the model, including block diagrams, values, names for all model parameters, and a list of all state variables.	
	c. Validated PSCAD model of the wind turbine; and other components including energy storage system, DVAR, etc, if applicable. Documentation on the model(s) shall be provided. Refer to PSCAD Technical Memo for model requirements.	
	d. Overlaid plots validating the performance of the three dynamic models for a three-phase fault. Plots shall include voltage, real and reactive power, real and reactive current.	
	e. Validated Aspen Oneliner short circuit model that accurately represents the facility (including energy storage system if applicable), and is valid for all faults conditions anywhere on the Utility system. Documentation on the model(s) shall be provided. (OTHERWISE SEE ADDITIONAL TABS FOR REQUIRED INFORMATION TO MODEL INVERTER)	
8)	For the main transformer and generator step-up transformers, please provide:	
	a. Transformer voltage and MVA ratings, and available taps. Attach copy of transformer test report or data sheet	
	b. The tap settings used.	
	c. The LTC Control Scheme.	
	d. Transformer winding connections and grounding used. If the transformer is not solidly grounded, provide the impedance value for the grounding method.	
	e. Positive, negative, and zero sequence impedance values.	
9)	For the circuit breakers and fault-clearing switching devices, including the generator breakers, please provide:	
	a. The voltage, continuous current and interrupting capability ratings.	
	b. The trip speed (time to open).	

**Interconnection Requirement Study - Data Request
FOR WIND GENERATION**

Updated 1/17/2018

PROJECT: _____

DATE: _____

(Nonexclusive Preliminary List)

*****ALL ITEMS ARE REQUIRED AND ALL RESPONSES MUST BE FILLED UNLESS NOT APPLICABLE.*****

		Response
10)	For the power fuses, please provide:	
	a. The manufacturer, type, size, and interrupting capability.	
	b. The minimum melt and total clearing curves.	
11)	For the protective relaying, please provide:	
	a. Data for the CTs used with the relaying including the manufacturer, type of CT, accuracy class, and thermal rating factor.	
	b. Data for the PTs used with the relaying including the manufacturer, type of PT, voltage ratings, and quantity.	
12)	Please provide protective relay settings for existing and proposed generators, including but not limited to, reverse power, negative sequence, over and underfrequency, over and under voltage, volts per hertz, etc.	

Instructions:

Please fill in the data in the green blanks below

(Note: This does not include the internal isolation transformer, if used)

[1] Maximum rated output power = kVA

[2] Impedances in **Per Unit** based on kVA from [1]

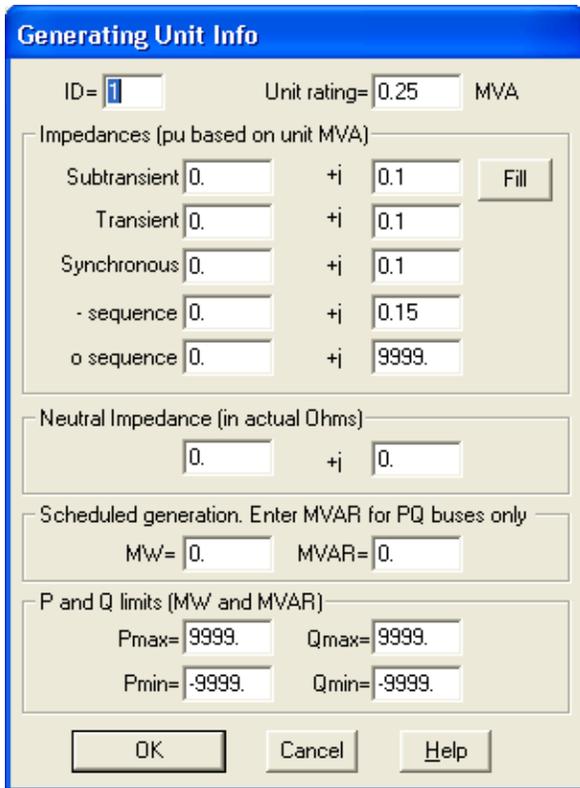
	R	X
Subtransient =	<input type="text"/>	<input type="text"/>
Transient =	<input type="text"/>	<input type="text"/>
Synchronous =	<input type="text"/>	<input type="text"/>
Negative Sequence =	<input type="text"/>	<input type="text"/>
Zero Sequence =	<input type="text"/>	<input type="text"/>

[3] Neutral impedance (if any) in actual **Ohms**:

R	X
<input type="text"/>	<input type="text"/>

NOTE: These parameters should reflect the inverter response for all types of faults at any point on the electrical system to which the inverter is connected. This includes faults at the inverter output terminals, and also on the 138 kV transmission system. If the stated parameters do not cover this range, please state the adjustments needed to these parameters to accurately represent the inverter response across this range.

These parameters will be used to model the inverter in the Aspen Oneliner program as shown in the sample dialog box below:



Instructions:

Please fill in the data in the green blanks below

- [1] Internal open circuit voltage
 Magnitude = Per Unit
 Angle = Degrees
- [2] AC Output Current Limit = Amps

NOTE: These parameters should reflect the inverter response for all types of faults at any point on the electrical system to which the inverter is connected. This includes faults at the inverter output terminals, and also on the 138 kV transmission system. If the stated parameters do not cover this range, please state the adjustments needed to these parameters to accurately represent the inverter response across this range.

These parameters will be used to model the inverter in the Aspen Oneliner program as shown in the sample dialog box below:

Generator Data

Generators at 200 INVERTER 0.2kV

Unit '1' On-Line	Edit
	On/Off-Line
	New
	Delete

Internal V-Source

p.u. =

Ref. angle =

Current Limits (A)

A: B:

Power Flow Regulation

Regulates voltage Fixed P+iQ output

Memo:

Tags: [None](#)

Last changed Apr 18, 2010

Instructions:

Please fill in the data in the green blanks below

(Note: This is not required if an internal isolation transformer is not used)

[1] Transformer rated power = kVA

[2] Winding Configuration
 Inverter Side = Delta/Wye
 Customer Side = Delta/Wye

[2] Impedances in **Per Unit** based on kVA
 Positive Sequence = R X
 Zero Sequence =

[3] Neutral impedance (if any) in actual **Ohms**:
 R X

These parameters will be used to model the inverter in the Aspen Oneliner program as shown in the sample dialog box below:

2-Winding Transformer Data

100 480 V TERM 0.48kV - 200 INVERTER 0.2kV

Name= INV ISOL TX Ckt ID= 1 MVA1= 0.25 MVA2= 0.25 MVA3= 0.25

MVA base for per-unit quantities= 0.25 Change

Y-D, delta lags (Yd 1)

R= 0.01 X= 0.03

B= 0.

Ro= 0.01 Xo= 0.03

Bo= 0.

480 V TERM 0.48 kV

Tap kV= 0.48

G1*= 0.

B1*= 0.

G10*= 0.

B10*= 0.

INVERTER 0.2 kV

Tap kV= 0.2

G2*= 0.

B2*= 0.

G20*= 0.

B20*= 0.

Neutral grounding Z (ohms)

Zg1= 14. +j 0.

*Based on system MVA

Metered at: 480 V TERM 0.48 kV

Memo:

Tags: [None](#)

Last changed Apr 18, 2010

**Interconnection Requirement Study - Data Request
FOR SYNCHRONOUS GENERATION**

Updated 2/13/2018

PROJECT: _____

DATE: _____

(Nonexclusive Preliminary List)

ALL ITEMS ARE REQUIRED AND ALL RESPONSES MUST BE FILLED UNLESS NOT APPLICABLE.

	Response
1) Please provide a plan map of the Non-Utility Generation (NUG) facility. Please indicate the interconnection point to the HECO system.	
2) Please provide the following generation and load information for the NUG facility:	
a. Gross and net output of the facility	
b. Expected KW and KVAR loads including, but not limited to, generators' auxiliary load curve, process load(s) profile(s), etc.	
c. Expected minimum and maximum MW and MVAR "import from" AND "export to" HECO.	
3) Please provide Single-Line Diagram(s), Three-Line Diagram(s), and Protective Relay List & Trip Schedule for the generation and interconnection facilities:	
a. The Single-line diagram(s) and Three-line diagram (s) should include:	
i. For main and generator step up transformer(s), please show:	
<ul style="list-style-type: none"> • Transformer voltage and MVA ratings. 	
<ul style="list-style-type: none"> • Transformer impedance(s). 	
<ul style="list-style-type: none"> • Transformer winding connections and grounding. If neutrals are grounded through impedance, please show the impedance value. 	
ii. The protective relaying and metering for the generators, transformers, buses, and all other main substation equipment.	
iii. For the potential transformers, please indicate the type, quantity, ratio, and accuracy rating.	
iv. For the current transformers, please indicate the type, quantity, ratio, and accuracy rating, and thermal rating factor.	
v. Auxiliary power devices (e.g. capacitors, reactors, storage systems, etc.) and their rating(s); additional inquiries may be made to obtain technical data for these devices.	
vi. For the interconnection / tie lines (overhead or underground) and the plant's generation system, please provide the following, as applicable:	
<ul style="list-style-type: none"> • Installation details such as cross-section(s), plan and profiles, etc. 	
<ul style="list-style-type: none"> • Conductor data such as size, insulation, length etc. 	
<ul style="list-style-type: none"> • Continuous and emergency current ratings. 	
<ul style="list-style-type: none"> • Voltage rating (nominal and maximum KV). 	
<ul style="list-style-type: none"> • BIL rating. 	
<ul style="list-style-type: none"> • Positive, negative, and zero-sequence impedances (resistance, reactance, and susceptance) 	
<ul style="list-style-type: none"> • Capacitance or charging current. 	
<ul style="list-style-type: none"> • Short-circuit current capability. 	
vii. Include station power for facility and all applicable details.	
viii. All applicable notes pertaining to the design and operation of the facility.	
b. The Protective relay list & trip schedule should list the protected equipment; the relay description, type, style number, quantity, ANSI Device No., and range; and the breaker(s)/switching device(s) tripped, for both the generator protection and the interconnection facilities protection.	
c. Please provide both a paper and an electronic version (e.g. dgn, dxf, or pdf) of the single-line diagram(s) and the protective relay list & trip schedule.	
d. Single-line diagrams should be provided for both the generation plant and the interconnection substation.	

**Interconnection Requirement Study - Data Request
FOR SYNCHRONOUS GENERATION**

Updated 2/13/2018

PROJECT: _____

DATE: _____

(Nonexclusive Preliminary List)

ALL ITEMS ARE REQUIRED AND ALL RESPONSES MUST BE FILLED UNLESS NOT APPLICABLE.

	Response
4) For the Synchronous Generating Facility, please provide the following data:	
a. Generator manufacturer, Model, Type. Attach copy of generator data sheet.	
b. Generator Characteristics (SEE "GENERATOR DATA" TAB)	
c. Auxiliary loads (P, Q, Power Factor)	
d. Ramp rates (up, down) Typical and Measured Proxy Data	
e. Switching and service restoration practice	
f. Protection data (voltage ride-through and trip settings, frequency ride-through and trip settings etc.). Include setpoint and clearing time ranges for voltage and frequency settings.	
g. Details of filters etc. at Point of Interconnection	
h. Description of harmonic spectrum of generator injection (order, magnitude)	
5) Energy Storage System, if applicable	
a. Operation characteristics	
b. Voltage level	
c. Capacity (how long and how much can the battery support)	
d. Deployment strategy/schedule	
e. Energy storage system data sheet	
6) Please provide the following software models that accurately represent the Facility:	
a. Validated PSS/E load flow model up to the point of interconnection. The PSS/E model shall include the main transformer, collection system (if applicable), generator step-up transformers (if applicable), generator, and any other components including capacitor banks, energy storage systems, DVAR, etc. Documentation on the model shall be provided.	
b. Validated PSS/E dynamic model for the generator; and other components including energy storage system, DVAR, etc. if applicable. The generator model shall include the generator/converter, excitation system, governor system, power system stabilizer (if applicable), and protection relays that impact its electrical performance. Generic models shall be provided. Detailed Models shall be provided for inverter-based systems (energy storage, DVAR, etc). Documentation on the model(s) shall be provided, including the PSS/E dyre file with model parameters.	
i. Generic models shall parameterize models available within the PSS/E standard model library. Exciter model shall conform to IEEE Std 421.5. Generic models shall be selected from NERC "Acceptable_Models_list_2017-08-19.xlsx"	
ii. Detailed models shall be supplied by the vendor/manufacturer as user-written models. The uncompiled source code for the user-written model shall be provided to ensure compatibility with future versions of PSS/E. In lieu of the uncompiled source code, a compiled object file and applicable library files shall be provided in PSS/E versions 33 AND 34 format. Updates of the object file compatible with future PSS/E versions must be provided as requested for the life of the project as written in the power purchase agreement. Documentation shall include the characteristics of the model, including block diagrams, values, names for all model parameters, and a list of all state variables.	
c. Validated PSCAD model of the generator; and other components including energy storage system, DVAR, etc. if applicable. Documentation on the model(s) shall be provided. Refer to PSCAD Technical Memo for model requirements.	
d. Overlaid plots validating the performance of the three dynamic models for a three-phase fault. Plots shall include voltage, real and reactive power, real and reactive current.	
e. Validated Aspen Oneliner short circuit model that accurately represents the facility (including energy storage system if applicable), and is valid for all faults conditions anywhere on the Utility system. Documentation on the model(s) shall be provided. (OTHERWISE SEE ADDITIONAL TABS FOR REQUIRED INFORMATION TO MODEL INVERTER)	

**Interconnection Requirement Study - Data Request
FOR SYNCHRONOUS GENERATION**

Updated 2/13/2018

PROJECT: _____

DATE: _____

(Nonexclusive Preliminary List)

ALL ITEMS ARE REQUIRED AND ALL RESPONSES MUST BE FILLED UNLESS NOT APPLICABLE.

		Response
7)	For the main transformer and generator step-up transformers, please provide:	
	a. Transformer voltage and MVA ratings, and available taps. Attach copy of transformer test report or data sheet	
	b. The tap settings used.	
	c. The LTC Control Scheme.	
	d. Transformer winding connections and grounding used. If the transformer is not solidly grounded, provide the impedance value for the grounding method.	
	e. Positive, negative, and zero sequence impedance values.	
8)	For the circuit breakers and fault-clearing switching devices, including the generator breakers, please provide:	
	a. The voltage, continuous current and interrupting capability ratings.	
	b. The trip speed (time to open).	
9)	For the power fuses, please provide:	
	a. The manufacturer, type, size, and interrupting capability.	
	b. The minimum melt and total clearing curves.	
10)	For the protective relaying, please provide:	
	a. Data for the CTs used with the relaying including the manufacturer, type of CT, accuracy class, and thermal rating factor.	
	b. Data for the PTs used with the relaying including the manufacturer, type of PT, voltage ratings, and quantity.	
11)	Please provide protective relay settings for existing and proposed generators, including but not limited to, reverse power, negative sequence, over and underfrequency, over and under voltage, volts per hertz, etc.	

**Interconnection Requirement Study - Data Request
FOR SYNCHRONOUS GENERATION**

Updated 2/13/2018

PROJECT: _____

DATE: _____

ALL ITEMS ARE REQUIRED AND ALL RESPONSES MUST BE FILLED UNLESS NOT APPLICABLE.

A) Please provide the following generator machine information:	Response
a. Generator Base MVA	
b. Generator Rated Terminal Voltage (kV)	
c. Power Factor Range Capability	
d. Generator Reactive Power Capability Curve	
e. Generator impedance in per unit	
i. Positive sequence	
ii. Negative sequence	
iii. Zero sequence:	
f. Combined Turbine-Generator Inertia Constant, H (kW-sec / KVA)	
g. Speed damping factor (D)	
h. Generator Open-Circuit Saturation Factors. Attach Generator Saturation Curves.	
i. S(1.0):	
ii. S(1.2):	
i. Generator V-curve	

B) Please provide the following generator reactance data (in per unit on Machine MVA Base):	Response		Response
Direct Axis		Quadrature Axis	
a. Synchronous - Saturated (X _d v)		a. Synchronous - Saturated (X _q v)	
b. Synchronous - Unsaturated (X _d i)		b. Synchronous - Unsaturated (X _q i)	
c. Transient - Saturated (X' _d v)		c. Transient - Saturated (X' _q v)	
d. Transient - Unsaturated (X' _d i)		d. Transient - Unsaturated (X' _q i)	
e. Subtransient - Saturated (X'' _d v)		e. Subtransient - Saturated (X'' _q v)	
f. Subtransient - Unsaturated (X'' _d i)		f. Subtransient - Unsaturated (X'' _q i)	
g. Negative Sequence - Saturated (X ₂ v)			
h. Negative Sequence - Unsaturated (X ₂ i)			
i. Zero Sequence - Saturated (X ₀ v)			
j. Zero Sequence - Unsaturated (X ₀ i)			
k. Leakage Reactance (X _{lm})			

C) Please provide the following generator time constants (in seconds):	Response		Response
Direct Axis		Quadrature Axis	
a. Transient Open Circuit (T' _{do})		a. Transient Open Circuit (T' _{qo})	
b. Subtransient Open Circuit (T'' _{do})		b. Subtransient Open Circuit (T'' _{qo})	
c. Transient Short Circuit (T' _d)		c. Transient Short Circuit (T' _q)	
d. Subtransient Short Circuit (T'' _d)		d. Subtransient Short Circuit (T'' _q)	

Instructions:

Please fill in the data in the green blanks below

(Note: This does not include the internal isolation transformer, if used)

[1] Maximum rated output power = kVA

[2] Impedances in **Per Unit** based on kVA from [1]

	R	X
Subtransient =	<input type="text"/>	<input type="text"/>
Transient =	<input type="text"/>	<input type="text"/>
Synchronous =	<input type="text"/>	<input type="text"/>
Negative Sequence =	<input type="text"/>	<input type="text"/>
Zero Sequence =	<input type="text"/>	<input type="text"/>

[3] Neutral impedance (if any) in actual **Ohms**:

R	X
<input type="text"/>	<input type="text"/>

NOTE: These parameters should reflect the inverter response for all types of faults at any point on the electrical system to which the inverter is connected. This includes faults at the inverter output terminals, and also on the 138 kV transmission system. If the stated parameters do not cover this range, please state the adjustments needed to these parameters to accurately represent the inverter response across this range.

These parameters will be used to model the inverter in the Aspen Oneliner program as shown in the sample dialog box below:

Generating Unit Info

ID= Unit rating= MVA

Impedances (pu based on unit MVA)

Subtransient	<input type="text" value="0.1"/>	+j	<input type="text" value="0.1"/>	<input type="button" value="Fill"/>
Transient	<input type="text" value="0.1"/>	+j	<input type="text" value="0.1"/>	
Synchronous	<input type="text" value="0.1"/>	+j	<input type="text" value="0.1"/>	
- sequence	<input type="text" value="0.15"/>	+j	<input type="text" value="0.15"/>	
o sequence	<input type="text" value="9999.0"/>	+j	<input type="text" value="9999.0"/>	

Neutral Impedance (in actual Ohms)

+j

Scheduled generation. Enter MVAR for PQ buses only

MW= MVAR=

P and Q limits (MW and MVAR)

Pmax= Qmax=

Pmin= Qmin=

Instructions:

Please fill in the data in the green blanks below

- [1] Internal open circuit voltage
 Magnitude = Per Unit
 Angle = Degrees
- [2] AC Output Current Limit = Amps

NOTE: These parameters should reflect the inverter response for all types of faults at any point on the electrical system to which the inverter is connected. This includes faults at the inverter output terminals, and also on the 138 kV transmission system. If the stated parameters do not cover this range, please state the adjustments needed to these parameters to accurately represent the inverter response across this range.

These parameters will be used to model the inverter in the Aspen Onliner program as shown in the sample dialog box below:

Generator Data

Generators at 200 INVERTER 0.2kV

Unit '1' On-Line

Edit
On/Off-Line
New
Delete

Internal V-Source

p.u. =
Ref. angle =

Current Limits (A)

A: B:

Power Flow Regulation

Regulates voltage Fixed P+iQ output

Memo:

Tags: [None](#)

Done Help

Last changed Apr 18, 2010

Instructions:

Please fill in the data in the green blanks below

(Note: This is not required if an internal isolation transformer is not used)

[1] Transformer rated power = kVA

[2] Winding Configuration
 Inverter Side = Delta/Wye
 Customer Side = Delta/Wye

[2] Impedances in **Per Unit** based on kVA
 Positive Sequence = R X
 Zero Sequence =

[3] Neutral impedance (if any) in actual **Ohms**:
 R X

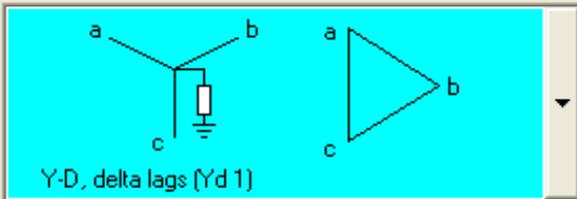
These parameters will be used to model the inverter in the Aspen Oneliner program as shown in the sample dialog box below:

2-Winding Transformer Data

100 480 V TERM 0.48kV - 200 INVERTER 0.2kV

Name= INV ISOL TX Ckt ID= 1 MVA1= 0.25 MVA2= 0.25 MVA3= 0.25

MVA base for per-unit quantities= 0.25 Change

 Y-D, delta lags (Yd 1)

R= 0.01 X= 0.03
 B= 0.
 Ro= 0.01 Xo= 0.03
 Bo= 0.

480 V TERM 0.48 kV INVERTER 0.2 kV Neutral grounding Z (ohms)

Tap kV= 0.48 Tap kV= 0.2 Zg1= 14. +j 0.

G1*= 0. G2*= 0.
 B1*= 0. B2*= 0.
 G10*= 0. G20*= 0.
 B10*= 0. B20*= 0.

*Based on system MVA

Metered at: 480 V TERM 0.48 kV

Memo:

Tags: [None](#)

Last changed Apr 18, 2010

DRAFT REQUEST FOR PROPOSALS
FOR
VARIABLE RENEWABLE DISPATCHABLE GENERATION
AND
ENERGY STORAGE
ISLAND OF O‘AHU

APRIL 1, 2019

Docket No. 2017-0352

Appendix B Attachment 5 – PSCAD Technical Memo



**Hawaiian
Electric**

Recommended PSCAD model requirements Rev. 5

Date: February 15, 2018
Prepared By: Andrew L. Isaacs P.Eng.
Garth Irwin P.Eng.

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Introduction

Specific model requirements for a PSCAD study depend on the type of study being done. A study with a scope covering weak system interconnections, ride-through evaluation, short term¹ event response, and fast control interaction with nearby devices (for example) would require a model which has the following characteristics. Some specialty studies may require other features.

Model Accuracy Features

For the model to be sufficiently accurate, it must:

- A. *Represent the full detailed inner control loops of the power electronics.* The model cannot use the same approximations classically used in transient stability modeling, and should fully represent all fast inner controls, as implemented in the real equipment. It is possible to create models which embed the actual hardware code into a PSCAD component, and this is the recommended type of model.²
- B. *Represent all control features pertinent to the type of study being done.* This may include external voltage controllers, plant level controllers, customized PLLs, ride-through controllers, SSCI damping controllers or others. As in point A, actual hardware code is recommended to be used for most control and protection features. Operating modes that require system specific adjustment should be user accessible. In most cases, plant level voltage control should be represented along with adjustable droop characteristics.
- C. *Represent all pertinent electrical and mechanical configurations.* This includes any filters and specialized transformers. There may be other mechanical features such as gearboxes, pitch controllers, or others which should be modelled if they impact electrical performance within the timeframe of the study. Any control or dynamic features of the actual equipment which may influence behaviour in the simulation period which are not represented or which are approximated should be clearly identified.
- D. *Have all pertinent protections modeled in detail for both balanced and unbalanced fault conditions.* Typically this includes various OV and UV protections (individual phase and RMS), frequency protections, DC bus voltage protections, converter overcurrent protections, and often other inverter

¹ Example analysis periods could be 2 to 10 seconds from fault inception. Some studies could require longer periods.

² The model must be a full IGBT representation (preferred), or may use a voltage source interface that mimics IGBT switching (ie. A firing pulse based model). A three phase sinusoidal source representation is not acceptable. Models manually translated block-by-block from MATLAB or control block diagrams may be unacceptable because the method used to model the electrical network and interface to the controls may not be accurate, or portions of the controls such as PLL circuits or protection circuits may be approximated or omitted. Note, however, that Matlab may be used to generate C code which is used in the real control hardware, and if this approach is used by the developer, the same C code may be directly used to create an extremely accurate PSCAD model of the controls. The controller source code may be compiled into DLLs or binaries if the source code is unavailable due to confidentiality restrictions.

If the model is assembled using standard blocks available in the PSCAD master library, approximations are usually introduced, and specific implementation details for important control blocks may be lost. In addition, there is a risk that errors will be introduced in the process of manually assembling the model. For this type of manually assembled model, (not using a direct “real code” embedding process), extra care is required, and validation is recommended.

specific protections. As in point A, actual hardware code is recommended to be used for these protection features.

- E. *Be configured to match expected site-specific equipment settings.* Any user-tunable parameters or options should be set in the model to match the equipment at the specific site being evaluated, as far as they are known. Default parameters may not be appropriate.

Model Usability Features

In order to allow study engineers to perform system analysis using the model, the PSCAD model must:

- F. *Have control or hardware options which are pertinent to the study accessible to the user.* Examples of this could include protection thresholds, real power recovery ramp rates, or SSCI damping controllers.³ Diagnostic flags (eg. flags to show control mode changes or which protection has been activated) should be visible to aid in analysis.
- G. *Be accurate when running at a simulation time step of 10 us or higher.* Often, requiring a smaller time step means that the control implementation has not used the interpolation features of PSCAD, or is using inappropriate interfacing between the model and the larger network. Lack of interpolation support introduces inaccuracies into the model at larger simulation time-steps.
- H. *Have the ability to disable protection models.* Many studies result in inadvertent tripping of converter equipment, and the ability to disable protection functions temporarily provides study engineers with valuable system diagnostic information.
- I. *Include documentation and a sample implementation test case.* Test case models should be configured according to the site-specific real equipment configuration. Access to technical support engineers is desirable.
- J. *Accept external reference variables.* This includes real and reactive power ordered values for Q control modes, or voltage reference values for voltage control modes. Model should accept these reference variables for initialization, and be capable of changing these reference variables mid-simulation, ie. dynamic signal references.
- K. *Be capable of initializing itself.* Once provided with initial condition variables, the model must initialize and ramp to the ordered output without external input from simulation engineers. Any slower control functions which are included (such as switched shunt controllers) should also accept initial condition variables if required.
- L. *Have the ability to scale plant capacity.* The active power capacity of the model should be scalable in some way, either internally or through an external scaling transformer⁴. This is distinct from a dispatchable power order, and is used for modeling different capacities of plant or breaking a lumped equivalent plant into smaller composite models.

³ Care should be taken to ensure that any user-settable options are not changed in a way that is not implementable in the real hardware, and that any selectable options are actually available at the specific site being considered. Discussion is recommended with the manufacturer prior to any changes being made in model configuration.

⁴ A free publicly available scaling transformer suitable for this purpose is available in the E-Tran library.

Study Efficiency Features

In addition, the following elements are required to improve study efficiency, model compatibility, and enable other studies which include the model to be run as efficiently as possible. If these features are not supported, additional discussion is required⁵:

- M. Model should be compiled using Intel Fortran compiler version 9 or higher. Intel Fortran version 12 or higher is preferred. Model should not be dependent on a specific Fortran version to run.
- N. Model uses PSCAD version 4.5.3 or higher.
- O. Model initializes as quickly as possible (for example <5 seconds) to user supplied terminal conditions.
- P. Model supports multiple instances of its own definition in the same simulation case.
- Q. Model supports the PSCAD “snapshot” feature.
- R. Model supports the PSCAD “multiple run” feature.

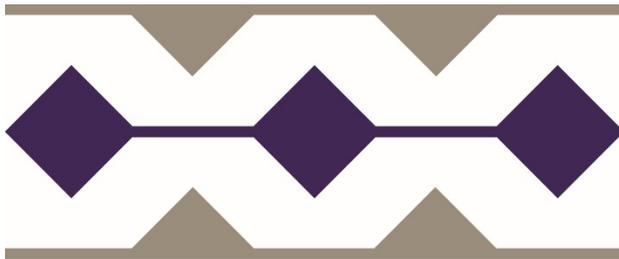
⁵ Electranix has parallelization tools available (E-Tran Plus for PSCAD) which can circumvent compatibility concerns in some cases.

REQUEST FOR PROPOSALS
FOR
NON-WIRES ALTERNATIVES TO PROVIDE RELIABILITY (BACK-TIE)
SERVICES
ISLAND OF O‘AHU – EAST KAPOLEI AREA

November 8, 2019

Docket No. 2018-0165

Appendix C – Code of Conduct Procedures Manual



**Hawaiian
Electric**

**HAWAIIAN ELECTRIC COMPANY, INC.
MAUI ELECTRIC COMPANY, LIMITED
HAWAII ELECTRIC LIGHT COMPANY, INC.**

Code of Conduct Procedures Manual

I. INTRODUCTION

This Code of Conduct Procedures Manual ("Manual") has been developed to outline the procedures to be followed and the policies that have been developed surrounding the implementation of the Companies' competitive bidding process for new Reliability (back-tie) Services. This Code of Conduct Procedures Manual has been developed for the Companies' Reliability (back-tie) Services, Island of O'ahu - East Kapolei Distribution System Request for Proposals ("RFP") to manage the (1) the protocols for communicating with proposers, and others; (2) the documentation forms, including logs for any communications with proposers; and (3) other information consistent with the requirements of the solicitation process.

The procedures and policies set forth herein have been designed to ensure that the procurement process is undertaken in a fair and equitable manner and that each Proposer is afforded an equal opportunity to participate and compete within the RFP requirements.

This Code of Conduct Procedures Manual is intended to be followed by Company personnel in connection with implementing the Companies' solicitation process and to manage communications between Company personnel and consultants participating in the RFP processes covered.

II. DEFINITIONS

- Affiliate – An "affiliated interest" of the Company as defined in Hawaii Revised Statutes Section 269-19.5(a),
- Hawaii Revised Statutes ("HRS"), including a utility's parent holding company but excluding a utility's subsidiary or parent which is also a regulated utility.
- Affiliate Team – Affiliate personnel and outside consultants for the Affiliate responsible for the development of the Affiliate's response to the RFP.
- ATRs – The Affiliate Transaction Requirements issued by the Commission applicable to the Companies and Affiliates, attached as Exhibit B to Order No. 36112 issued on January 24, 2018 in Docket No. 2018-0065.

- Code of Conduct – A written code developed by Hawaiian Electric Company, Inc., Maui Electric Company, Limited and Hawaii Electric Light Company, Inc. (each, a “Company” and collectively, the “Companies”) to ensure the fairness and integrity of the competitive bidding process.
- Company Executive in Charge – A Company’s executive responsible for ensuring compliance with this Code of Conduct and reporting any violations by the Company of the Code of Conduct. For any RFP of the Companies, the Company Executive in Charge shall be the Senior Vice President of Business Development & Strategic Planning. The Company’s Corporate Compliance Officer shall remain responsible for the Companies’ independent corporate code of conduct and may support compliance matters and questions arising with employees, agents and other representatives of the Company, e.g., conflicts of interest, with respect to this Code of Conduct.
- Company RFP Team – The Company personnel and outside consultants responsible for the development of the Company’s RFPs and the evaluation of bids submitted in response to these RFPs.
- Competitive Bidding Code of Conduct Acknowledgement of Receipt (Acknowledgement) – A document that must be signed that shows acknowledgement of receipt of the Code of Conduct and a person’s responsibility to comply with the Code.
- Confidential Information – Any non-public information developed and provided by the Company (i.e., proprietary system information, etc.) or Proposers during the RFP process (such non-public information may include, for example, the identity of competing Proposers, and their technical, trade or financial information). This term includes any material non-public information regarding the RFP process developed for and used during the competitive bidding solicitation process, such as the evaluation process or criteria. Confidential Information includes Confidential Resource Proposal Information and Confidential RFP Process Information but does not include public information, such as information in the Companies’ public filings with the Commission.
- Director of Renewable Acquisition Division – The supervisor of the Division within the Company responsible for the implementation of the competitive bidding

process. The Director of Renewables Acquisition Division shall be a member of the Company RFP Team.

- Eligible Proposer – A Proposer who has met the minimum requirements and threshold requirements in the RFP necessary to remain eligible to compete in the process.
- Energy Contract Manager – The staff position(s) within the Company’s Demand Response Division responsible for managing the RFP.
- Manager of Energy Procurement – The manager of the Division within the Renewable Acquisition Department responsible for directing the resources responsible for the implementation of the competitive bidding process. The Manager of Energy Procurement shall be a member of the Company RFP Team. The Manager of Energy Procurement will report to the Director of Renewable Acquisition on the status of the competitive bidding process.
- Proposer – Entity who submits or plans to submit a proposal in response to a Company-issued RFP. An Affiliate of the Company submitting a proposal shall be considered a Proposer.
- RFP – A written request for proposals issued by one of the Companies to publicly solicit bids for the Reliability (back-tie) Services for the Company’s use pursuant to the competitive bidding process.
- Roster – A consolidated list of members that comprise the Company RFP Team located in the RFP Communication Tool Kit SharePoint Site. Company employee names and titles and consultants in their designated role will be identified.

III. STATEMENT OF OBJECTIVES

From time to time, each of the Companies will be proposing to seek proposals for the delivery of various Reliability (back-tie) Services that best meet the needs of the respective Company’s distribution system. Each of the Companies will undertake a detailed multi-stage review and evaluation process whereby eligible proposals will be selected based upon their ability to most cost-effectively and reliably satisfy the requesting Company’s requirements. While cost minimization is a major criterion, the Companies’ objective is to select those Proposers which, in their opinion, represent the best value to the Companies and their customers regarding economic and technical attributes, limited

risk, and flexibility for meeting their projected requirements. The individual RFPs seeking resources, including those seeking the delivery of reliability services, is based on the Companies' ongoing long range planning, but also may be revised on short notice in order to address unforeseen events such as premature equipment failures or natural events. With each successive RFP, the Companies are seeking to mitigate growth and challenges at the various distribution system on each island.

The needs for each island's distribution system vary, and therefore the timing and schedule of the RFPs cannot be consistently coordinated. Multiple RFPs will likely be active at the same time. Furthermore, because the Companies must work expeditiously, successive RFPs will consider previous procurements and build on appropriate aspects of prior successful RFP execution plans. The Companies also intend that the evaluation process will be well-documented so that the results of the evaluation can be fully reviewed to confirm that all proposals were treated in a fair and consistent manner.

The Code of Conduct and this Manual address communication requirements and procedures associated with the relationship between the Company RFP Team and Proposers, with the express affirmation that a bid from an Affiliate and any communication with an Affiliate will be treated in the same manner as any other bid or communication from an independent third-party Proposer.

IV. ORGANIZATION AND COMMUNICATION RESPONSIBILITIES

A. Essential Teams

1. Company RFP Team. The Company RFP Team, tasked with preparing the RFP and evaluating the responses and bids in response to the RFP, will consist primarily of Director/Manager-level and other experienced employees together with possible outside consultants, with backgrounds in a number of disciplines necessary to conduct a thorough evaluation of each proposal. The members of the team will be prepared to evaluate proposals on the basis of their price and non-price aspects pertaining to their level of expertise. Members of the Company RFP Team will include professionals

with experience in the following areas of expertise: engineering, information technology and operational technology systems, transmission and distribution planning, fuel procurement, legal, financial planning, system operations, integrated resource planning, generation planning, production cost analysis, and others as needed.

Price and non-price sub-teams will conduct their sections of the bid evaluation process separately and will not share the results of their evaluation with members of the other sub-team. Each team will submit their evaluation results to an oversight team, which will be responsible for compiling the results of the evaluations and selecting the short-list.

The Manager of Energy Procurement will be responsible for directing the evaluation efforts of the Company RFP Team when the proposals are received. The Energy Contract Manager will be responsible for maintaining the documentation underlying the evaluation of each proposal as well as all communications with proposers.

B. Communications Protocols

1. Overview and General Requirements.

The Company has developed policies and procedures governing communication between the Company RFP Team, the Proposers, and with the Commission regarding RFP design and bid evaluation. Bid information and evaluation data and information shall not be communicated between members of the Company RFP Team, outside parties and other employees within the Companies except to those with a business need to know.

To ensure that the competitive bidding process is fair and unbiased, that all Proposers have access to the same information so that no Proposer has an unfair advantage, and that any Affiliate proposals do not have any unfair competitive advantage over third-party bids, the Companies shall follow the Code of Conduct whenever the utility or its Affiliate is seeking to advance a resource proposal.

Each employee or consultant on the Company RFP Team, shall read, acknowledge and sign a Competitive Bidding Code of Conduct Acknowledgement of Receipt.

The Company issuing the RFP will establish a shared drive on its corporate computer network designed to maintain the bid evaluation documentation and other information associated with the bidding process. Only Company RFP Team members will have access to all the files on the shared drive.

2. Communications Between the Company RFP Team and Proposers.

During the RFP process, the Energy Contract Manager shall serve as the primary contact person for all RFP communications with Proposers. This is important from the standpoint of maintaining consistency and confidentiality of information between Proposers and the Company. For documentation and oversight purposes, all communications from Proposers must be submitted to an established website link provided by the Company (the "Company RFP website"). To ensure fair and equal access to information, any Affiliate Team shall be considered a Proposer for communication purposes and any request for information from the Affiliate Team to the Company RFP Team shall be through the Company RFP website.

Subject to confidentiality obligations, it is the objective of the Code of Conduct that all Proposers, receive access to information released by the Company RFP Team, whether in response to a question from a Proposer or not, at the same time.

The communications process for addressing questions and requests for information from Proposers, and for the Company RFP Team to provide information to Proposers, is provided below:

- a. Other than during Company sponsored conferences, Proposers must submit all questions to the Company RFP website or the

designated RFP email address (if the Company RFP website has not been opened yet for the RFP).

- b. Questions will be reviewed and responses will be coordinated with the appropriate functional area within the Company for a response. Every reasonable effort will be made to provide responses in a timely manner.

- d. Depending on the questions received, responses may involve Confidential Information of the Company and/or Proposers. Release of any Company Confidential Information must be approved in advance by the Company Executive authorized to release the Confidential Information. Any release of Company Confidential Information shall be accompanied by appropriate confidentiality and non-disclosure agreements, protective orders or other means required to maintain the confidentiality of the Company Confidential Information while still permitting its disclosure under circumstances deemed appropriate by the responsible Company Executive. Other non-Company Confidential Information will not be shared without the prior written consent of the owner of such Confidential Information and the execution of appropriate confidentiality and non-disclosure agreements by all recipients of such Confidential Information. Responses will be categorized as follows:
 - i. Non-Confidential Responses: Questions and responses will either be posted directly on the Company RFP website (process-related questions or simple, non-substantive information) or a description of the information that can be made available will be posted and Proposers will be instructed to submit a request to the Company via the Company RFP website to receive a copy.

ii. Confidential Responses: Questions and a description or notice of a Confidential Information response will be posted on the Company RFP website and Proposers will be instructed to submit a request to the Company via the Company RFP website to receive instructions on how to access the Confidential Information. The Confidential Information will only be provided to the requestor after receipt of an executed confidentiality and non-disclosure agreement. Only those who have qualified to submit a bid (i.e., Eligible Proposers) and have executed a confidentiality and non-disclosure agreement will be considered for receipt of Confidential Information.

iii. Process for Distribution of Confidential Information
Confidential Information provided in response to questions from proposers may be made available only to parties as indicated above via the following:

iv. Confidential Information that is approved for exchanging on a secured access site: (1) Confidential Information may be made available on a secured website with an individual password provided to each approved Proposer; (2) Confidential Information in documents may be transmitted to approved recipients through the Company's secure email system.

v. Confidential Information that can be made available for inspection only, but cannot be copied: There may be some types of Confidential Information that the Company may consider making available for inspection only with no copies allowed. This type of Confidential Information will be made available on Company premises for inspection only. Proposers will be advised via the Company RFP website to make arrangements with Company staff to view the Confidential Information.

- vi. Confidential Information that may not be released. In the event that Proposers submit questions that require responses that the Company feels are not appropriate to provide for reasons which may include, but not be limited to, safety, security, protection of trade secrets or intellectual property rights, Proposers will be advised as such via the Company RFP website.

- e. Prior to and during the RFP, and outside of the Company RFP website protocol, developers may direct questions to the Company prior to submitting a Proposal to discuss specific questions regarding their specific Proposal. Questions shall be directed to the Company Contact for Proposals listed in RFP Section 1.4. Questions and responses that do not contain Confidential Information and which are deemed relevant to all Proposers will be published without identifying information via the Company RFP website.

- f. Once bids are received, the Company may submit information requests to Proposers to clarify their proposals or request additional information. All contacts with Proposers will be through the Company RFP website.

- g. A single exception to the communication process outlined above shall be instituted for the purpose of facilitating the verification of proposed project models and documentation required to perform the IRS. For this limited scope, the Company's Manager of Interconnection Services will serve as the primary contact person for all such interconnection communications with the Proposers on the Priority List, provided that all necessary confidentiality and non-disclosure agreements are in place. The Manager of

Interconnection Services and personnel in the Interconnection Services Department shall be members of the Company RFP Team. Interconnection communications will be limited to a Proposer's bid and no more information other than as necessary to facilitate such communications will be permitted. Discussion of locations of proposed projects shall be limited to that necessary only to determine the interconnection requirements of such project.

3. Communications Between the Companies and the Commission.

The Company's Regulatory Affairs staff will be responsible for initiating communication with the Commission regarding the RFP or the Companies' evaluation process. Regular updates may be provided to the Commission regarding the RFP process if requested.

4. Communications between the Company RFP Team and any Company personnel or consultants not on the Company RFP Team

There may be times where a Company RFP Team may need ancillary or other ministerial or administrative assistance that requires communication and/or assistance from Company personnel who are not on the Company RFP team or consultants. Under those circumstances, such personnel may assist the requesting team member on an ad hoc basis upon the following conditions:

- a. The essential team member making the request must inform the Company personnel that sharing of the requested information or assistance with the Affiliate team is expressly prohibited under the Code of Conduct.

b. The assisting Company personnel shall complete the Code of Conduct training and sign the Code of Conduct Acknowledgement form.

c. The assisting Company personnel shall be directed to the Roster provided by such requesting team member to determine and/or confirm the restrictions on communication with the other team members. The essential team member making the request will ensure the Roster is updated by the Energy Contract Manager to include the assisting Company personnel.

d. A written record of the time, date and substance of all conversations, data and written material directly or indirectly exchanged with the Company RFP Team, that pertain to the RFP shall be maintained on the Communications Log. A SharePoint-based interface will be set up and managed by the Energy Contract Manager to provide an easy to use and understand mechanism to log and memorialize these conversations.

V. WHEN THE CODE OF CONDUCT BECOMES EFFECTIVE

A. No later than 30 days after the RFP is issued, the Code of Conduct for that RFP will be activated.

B. Upon the activation of the Code of Conduct, members of the Company RFP Team must then conduct activities on the RFP in compliance with the Code of Conduct. Once identified and having commenced work, no information may be shared outside the respective team members with respect to the RFP except through the formal communication processes outlined above.

C. Immediately upon assignment to the Company RFP team, each such employee or consultant must review this Manual, and sign the Code of Conduct acknowledgement form. Annually, each member of the RFP team shall reaffirm their

obligations to comply with the Code of Conduct and this Procedures Manual by executing an annual update to the Code of Conduct acknowledgement form.

E. Each employee and consultant working on the RFP shall review the Code of Conduct and sign an acknowledgement attesting to his/her compliance with the Code of Conduct for each subsequent year until the Code of Conduct is terminated, or until the employee is no longer working in the position he/she was in while working on the RFP.

F. The Energy Contract Manager will be responsible for maintaining the Code of Conduct roster and the signed "Acknowledgement of Code of Conduct" letters. The Company Executive in Charge shall be responsible for ensuring compliance with the Code of Conduct and shall have the written authority and obligation to enforce the Code of Conduct.

VI. IMMEDIATE ACTIONS UPON ACTIVATION OF THE CODE OF CONDUCT

The following items are required to be completed as soon as possible after activation of the Code of Conduct, but no later than the designated events specified for each item below.

A. No later than 30 days after the RFP issuance, a Roster listing employee (with their title) and consultants in their Company RFP Team designated role; Company RFP Team. The roster shall be placed in an accessible database (such as the Company's SharePoint database) so that any Company personnel can access the database to determine the identity of the RFP team.

B. Upon the finalization of the roster for the RFP, the Energy Contract Manager shall verify that all employees (whether full-time, part-time, temporary, or contract) and consultants involved in the competitive bidding process, such as members of the Company RFP Team, have acknowledged receipt of the Code of Conduct and his or her responsibility to comply with the Code of Conduct by submitting an "Acknowledgement of Code of Conduct" (with electronic acknowledgment being acceptable) form. If an employee or consultant is added to a team, the Manager of Energy Procurement shall also

verify that such employee or consultant has submitted an "Acknowledgment of Code of Conduct".

C. No later than 30 days after the RFP issuance, establishment of the Company email address to accept requests for information from Proposers, or any Affiliate Team.

D. No later than 30 days after RFP issuance, establishment of the Company secured site that houses the accessible database (such as SharePoint).

VII. WHEN THE CODE OF CONDUCT TERMINATES

The Code of Conduct for a specific RFP will terminate when:

A. The final contract(s) for RFPs conducted with the successful Proposer(s) is/are executed, or when written notice of termination of the RFPs to be conducted is provided by the Manager of Energy Procurement or his/her designee to the Commission; and

B. A certification of Code of Conduct compliance by all employees participating in the specific RFP process is submitted by affidavit by the Company Executive in Charge.

VIII. DOCUMENTATION FORMS

The following documentation forms may be utilized by those Company personnel involved in the RFP. These forms may be amended from time to time as necessary. Additional forms may also be developed as determined necessary.

- Code of Conduct Acknowledgement Form
- Roster

IX. APPLICABILITY OF THE ATRs

Except as specifically made applicable under Section V.C.1.i of the ATRs with respect to wholesale power procurement from Affiliates, the ATRs shall not apply to RFP

matters covered in the RFP, the Code of Conduct and this Procedures Manual as it relates to the Companies' interactions between the Company RFP Teams and Affiliate Teams. Reference to the ATRs in the Code of Conduct and/or this Manual are specifically for matters outside the Companies' administration of the RFP; provided, however, that such applicability may be revised as necessary and as may be directed by the Commission for any RFP.¹

¹ See Decision and Order No. 35962, filed on December 19, 2018, in Docket 2018-0065, at 56-57.

REQUEST FOR PROPOSALS
FOR
NON-WIRES ALTERNATIVES TO PROVIDE RELIABILITY (BACK-TIE)
SERVICES

ISLAND OF O‘AHU – EAST KAPOLEI AREA

NOVEMBER 8, 2019

Docket No. 2018-0165

Appendix D – PowerAdvocate User Information



**Hawaiian
Electric**

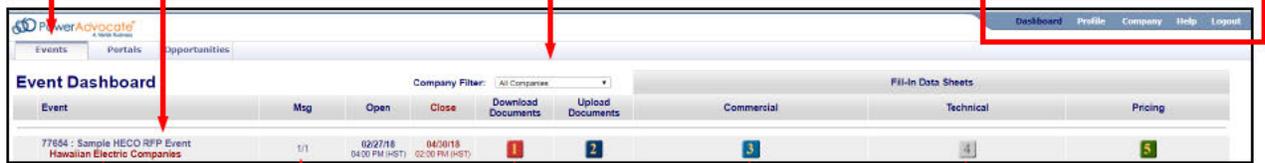
Sourcing Intelligence Quick Start for Suppliers

Logging In

1. Launch a web browser and go to www.poweradvocate.com
2. Click the orange **Login** button.
3. Enter your account **User Name** and **Password** (both are case-sensitive) and click **Login**.
4. Click the **Events** tab if it is not already displayed.

Dashboard

Your Dashboard lists the events you have been invited to. A line divides currently accessible events from others.



Click to view the event's Status tab

Click to view Events

Buyer filter

Navigation bar

Buying entity

Number of unread/total messages

Click to view the event's Messaging tab

Click numbers to view event tabs

Datasheet available

No datasheet available

- Click an event name to view its Status tab, which displays a summary of your activity and key event dates. To view specific details of an event, click the buttons 1-5 to view the corresponding tab.
- To return to the Dashboard, click **Dashboard** in the navigation bar at the top of the window.
- An event will not appear on your Dashboard until you have been added as a participant.

Downloading Bid Packages

All of the Buyer's bid package documents (if any) are centrally stored on the PowerAdvocate Platform. To view bid documents, click "1" on your Dashboard or on the **1. Download Documents** tab from within the event.



Document Description	Issue Date	Ref ID	File Name	File Size	Download
Pre Bid Test Doc	01/15/18		Pre_Bid_Test_Doc.docx	11.63 KB	

- You can access the **Bid** sub-tab after the event opens. You can access Buyer documents before the event is opened from the **Pre-Bid** sub-tab, if the Buyer utilizes this feature.
- To view or download a document, click the file name.
- To download multiple documents:
 1. Select the checkbox in the Download column for each document you wish to download or click **Select All**.
 2. Click **Download Selected Files**.

Uploading Documents

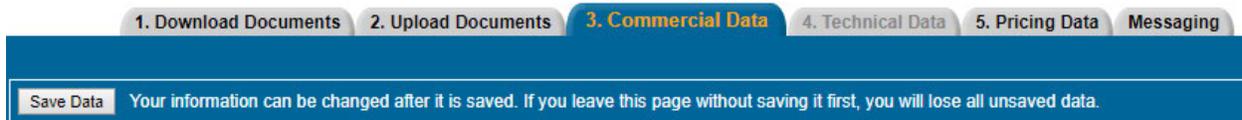
To upload your documents, click "2" on your Dashboard, or on the **2. Upload Documents** tab from within the event.



- Do not upload any files to the Pre-Bid tab.
- To upload a document to the Bid tab:
 1. Specify a **Document Type** (Reference ID can be left blank).
 2. Click **Choose File**, navigate to and select the document, and then click Open; multiple files can also be compressed into one .zip file for upload.
 3. Click **Submit Document**.

Datasheets

Datasheets will not be used in this RFP event. All Proposal information will be uploaded for submission through the 2. Upload Documents tab above. Buttons/tabs are grayed out (e.g., 4) if the event is not using a particular type of datasheet.

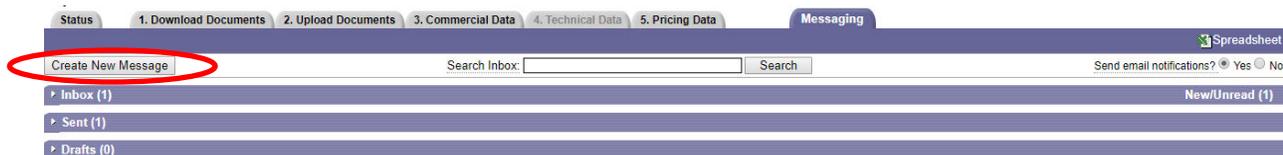


Communicating with the Bid Event Coordinator /Company Contact

Suppliers should use the PowerAdvocate Messaging tool to contact the Bid Event Coordinator (BEC) while the bid event is open.

PowerAdvocate Messaging

To send a message to the BEC, go to the **Messaging** tab and click **Create New Message**. To read or reply to a message from the BEC, click the message subject.



- You can send messages to the BEC and Buyer Team
- The Independent Observer can view all messages in the bid event.
- You can receive external e-mail notification of new PowerAdvocate messages by selecting “Yes” to “Send email notifications?” in the Messaging tab.

Getting More Information

- Click **Help** on the navigation bar to display online help.



- Supplier documentation can be downloaded from the online help system.
- Call PowerAdvocate Support at 857-453-5800 (Mon-Fri, 8 a.m. to 8 p.m. Eastern Time) or e-mail support@poweradvocate.com.

REQUEST FOR PROPOSALS
FOR
NON-WIRES ALTERNATIVES TO PROVIDE RELIABILITY (BACK-TIE)
SERVICES

ISLAND OF O‘AHU – EAST KAPOLEI AREA

NOVEMBER 8, 2019

Docket No. 2018-0165

*Appendix E – Mutual Confidentiality and
Non-Disclosure Agreement*



**Hawaiian
Electric**

APPENDIX E
MUTUAL CONFIDENTIALITY AND NON-DISCLOSURE AGREEMENT
Request for Proposal - ("RFP")

This Mutual Confidentiality and Non-Disclosure Agreement (this "Agreement") is effective as of _____, 20____ (the "Effective Date") between [INSERT NAME OF Proposer], a [State of incorporation/organization] [type of entity] ("Proposer") and Hawaiian Electric Company, Inc., a Hawai'i corporation ("Company"). In consideration of the mutual promises contained in this Agreement, including the provision of Confidential Information (as defined below) by either party to the other hereunder, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

1. Background

The Company has or intends to issue a request for proposals for non-wires alternatives to provide reliability (back-tie) services for the East Kapolei area on the island of O'ahu, State of Hawai'i ("RFP"). The Proposer has or intends to submit one or more proposals in response to the RFP (the "Proposal"). This Agreement supplements the RFP and is intended to be read and construed in harmony with and in support of the RFP. Terms in the RFP relating to confidentiality remain in full force and effect. As part of the RFP process and in considering the Proposal, the Company and the Proposer may disclose to each other certain Confidential Information. The parties are willing to provide such Confidential Information upon the terms and conditions of this Agreement.

In connection with the Proposer's proposed project, the Company may conduct an interconnection requirements study ("IRS") to establish the requirements for interconnection of the Proposer's proposed project to the Company's electric grid. The RFP process may also result in final selection of the proposal for contract negotiations ("Agreement Negotiations"). For the purposes of this Agreement, the term "Project" collectively refers to the RFP, Proposal, potential IRS and Agreement Negotiations.

In order to evaluate the Project, either party may from time to time provide to the other party certain Confidential Information. The parties are willing to provide such Confidential Information to each other upon the terms and conditions of this Agreement.

2. Confidential Information

Except as set forth in Section 3 (Exclusions from Confidential Information) below, "Confidential Information" means all non-public, proprietary or confidential information disclosed by either party (the "Provider") to the other party (a "Recipient"), its affiliates and its and their directors, officers, employees, agents, advisors, consultants (including, without limitation, financial advisors, counsel and accountants) and controlling entities or individuals (collectively, "Representatives") whether disclosed orally or disclosed or accessed in written, electronic or other form of media, and whether or not marked or otherwise identified as "confidential," including, without limitation:

(a) all information concerning the Provider and its affiliates', and their customers', suppliers' and other third parties' past, present and future business affairs including, without limitation, finances, customer information, supplier information, products, services, designs, processes, organizational structure and internal practices, forecasts, sales and other financial results, records and budgets, business, marketing, development, sales and other commercial information and strategies;

(b) information concerning the Company's generation, transmission, and distribution systems (e.g., engineering and operating characteristics of the Company's transmission lines and substations) ("Critical Infrastructure Confidential Information").

(c) the Provider's unpatented inventions (whether or not they are patentable), ideas, methods and discoveries, techniques, formulations, development plans, trade secrets, know-how, unpublished patent applications and other confidential intellectual property;

(d) all designs, specifications, documentation, components, source code, object code, images, icons, audiovisual components and objects, schematics, drawings, protocols, processes, and other visual depictions, in whole or in part, of any of the foregoing;

(e) any third-party confidential information included with, or incorporated in, any information provided by the Provider to the Recipient or its Representatives; and

(f) all notes, analyses, compilations, reports, forecasts, studies, samples, data, statistics, summaries, interpretations and other materials ("Notes") prepared by or for the Provider or its Representatives that contain, are based on, or otherwise reflect or are derived from, in whole or in part, any of the foregoing.

3. Exclusions from Confidential Information

Except as required by applicable federal, state, or local law or regulation, the term "Confidential Information" as used in this Agreement shall not include information that:

(a) at the time of disclosure is, or thereafter becomes, generally available to and known by the public other than as a result of, directly or indirectly, any violation of this Agreement by the Recipient or any of its Representatives; provided, however, that Confidential Information shall not be disqualified as Confidential Information (i) merely because it is embraced by more general or generic information which is in the public domain or available from a third party, or (ii) if it can only be reconstructed from information taken from multiple sources, none of which individually shows the whole combination (with matching degrees of specificity);

(b) at the time of disclosure is, or thereafter becomes, available to the Recipient on a non-confidential basis from a third-party source, provided that such third party is not and was not prohibited from disclosing such Confidential Information to the Recipient by a contractual or other obligation to the Provider;

(c) was known by or in the possession of the Recipient or its Representatives, as established by documentary evidence, prior to being disclosed by or on behalf of the Provider pursuant to this Agreement;

(d) was or is independently developed by the Recipient, as established by documentary evidence, without reference to or use of, in whole or in part, any of the Provider's Confidential Information; or

(e) was or is learned or established entirely from public sources, as established by documentary evidence, without reference to or use of, in whole or in part, any of the Provider's Confidential Information.

The parties acknowledge and understand that the confidentiality obligations of this Agreement apply only to the Confidential Information shared in connection with the Project. The parties may share other information with each other under other agreements, provisions or understandings which are not related to the Project. Such information sharing shall be subject to the provisions of the agreements and confidentiality provisions associated thereto and this Agreement shall not be construed to infringe upon or apply to such agreements or provisions.

4. Non-Disclosure of Confidential Information

Unless otherwise agreed to in writing by the Provider, the Recipient agrees as follows:

(a) except as required by law, not to disclose or reveal any Confidential Information to any person or entity other than its Representatives who are actively and directly participating in the evaluation of the Project or who otherwise need to know the Confidential Information for the purpose of evaluating the Project.

(b) not to use Confidential Information for any purpose other than in connection with its evaluation of the Project or the consummation of the Project.

(c) except as required by law, not to disclose to any person or entity (other than those of its Representatives who are actively and directly participating in the evaluation of the Project or who otherwise need to know for the purpose of evaluating the Project) any information about the Project, or the terms or conditions or any other facts relating thereto, including, without limitation, the fact that discussions are taking place with respect thereto or the status thereof, or the fact that Confidential Information has been made available to the Recipient or its Representatives.

(d) to use diligent efforts to safeguard and protect the confidentiality of the Confidential Information, including, at minimum, implementing the same commercial measures that the Recipient uses to protect its own confidential information. Before disclosing the Confidential Information to any Representative, the Recipient will inform such Representative of the confidential nature of such information, their duty to treat the Confidential Information in

accordance with this Agreement and shall ensure that such Representative is legally bound by the terms and conditions of this Agreement or subject to confidentiality duties or obligations to the Recipient that are no less restrictive than the terms and conditions of this Agreement.

(e) Any provision herein to the contrary notwithstanding, the Company may disclose Confidential Information to the State of Hawai‘i Public Utilities Commission (“Commission”) and/or the State of Hawai‘i Division of Consumer Advocacy (including their respective staffs) provided that such disclosure is made under a protective order entered in the docket or proceeding with respect to which the disclosure will be made or any general protective order entered by the Commission.

5. Required Disclosure and Notice

If the parties or any of their Representatives become legally compelled (by deposition, interrogatory, request for documents, subpoena, civil investigative demand, court order, or similar process) to disclose any of the Confidential Information, the compelled party shall undertake reasonable efforts to provide the other party with notice within three (3) business days of such requirement or advice prior to disclosure so that the other party may (a) seek a protective order or other appropriate remedy, (b) consult with the other party with respect to the compelled party taking steps to resist or narrow the scope of such requirement or advice, and/or (c) waive compliance, in whole or in part, with the terms of this Agreement. If such protective order or other remedy is not obtained, or the other party waives compliance with the provisions hereof, the compelled party agrees to furnish only that portion of the Confidential Information which it is legally required to so furnish and, at the request of the other party, to use reasonable efforts to obtain assurance that confidential treatment will be accorded such Confidential Information, it being understood that such reasonable efforts shall be at the cost and expense of the party whose Confidential Information has been sought. In any event, neither the Proposer nor any of its Representatives will oppose action by the Company to obtain an appropriate protective order or other reliable assurance that confidential treatment will be accorded the Confidential Information.

6. Return or Destruction of Confidential Information

At any time during or after the term of this Agreement, at the Provider’s written request, and in any event, upon the termination of the Agreement, the Recipient shall certify within ten (10) business days that it has destroyed all Confidential Information by using industry standard data elimination methods used to prevent unauthorized disclosure of information, and for Personally Identifiable Information (defined as personally identifiable information of individuals, and any information that may be used to track, locate or identify such individuals (or which is otherwise protected by privacy laws), including any automatically generated information (such as IP addresses and other customer identifiers) that identifies or is unique or traceable to a particular individual or computer or other electronic device capable of accessing the internet, including without limitation, name, address, telephone number, social security number, credit card account numbers, email addresses, user identification numbers or names and passwords, which is disclosed to the Recipient or its subcontractors in connection with this Agreement by the Provider, which products and services are used or intended to be used for personal, family or household purposes),

such methods shall be consistent with Hawai'i Revised Statutes 487-R; provided, however, that with respect to Confidential information in tangible form, the Recipient may return such Confidential Information to the Provider within ten (10) business days in lieu of destruction. The Recipient's sole obligation with respect to the disposition of any Notes shall be to redact or otherwise expunge all such Confidential Information from such Notes and certify to the Provider that it has so redacted or expunged the Confidential Information. Notwithstanding the foregoing, with respect to any Confidential Information stored in Recipients disaster recovery backups or other electronic archives, Recipient is not required to destroy such Confidential Information if it would impose a material cost or burden; provided, however, such Confidential Information shall be destroyed when such archives are destroyed in accordance with Recipients records retention policies.

7. Authority

Each party represents and warrants that it has full power and authority to enter into and perform this Agreement, and the person signing this Agreement on behalf of each has been properly authorized and empowered to enter into this Agreement, understands it and agrees to be bound by it.

8. No Representations or Warranties

Neither the Provider nor any of its Representatives make any express or implied representation or warranty as to the accuracy or completeness of any Confidential Information disclosed to the Recipient hereunder, and the Recipient agrees that it is not entitled to rely on the accuracy or completeness of any Confidential Information. Neither the Provider nor any of its Representatives shall be liable to the Recipient or any of its Representatives relating to or arising from the use of any Confidential Information or for any errors therein or omissions therefrom. Notwithstanding the foregoing, the Recipient shall be entitled to rely solely on such representations and warranties regarding Confidential Information as may be made to it in any final agreement relating to the Project, subject to the terms and conditions of such agreement.

9. No Other Obligations

Neither this Agreement nor the disclosure of the Confidential Information shall result in any obligation on the part of either party to enter into any further agreement with the other with respect to the subject matter hereof or otherwise, to purchase any products or services from the other, or to require either party to disclose any further information to the other. Nothing in this Agreement shall be deemed to constitute either party hereto as partner, agent or representative of the other party or to create any fiduciary relationship between the parties. Either party may offer products or services which are competitive with products or services now offered or which may be offered by the other. Subject to the express terms and conditions of this Agreement, neither this Agreement nor discussions and/or communications between the parties will impair the right of either party to develop, make, use, procure, and/or market any products or services, alone or with others, now or in the future, including those which may be competitive with those offered by the other. Whether or not the Project is consummated, neither party shall issue a press release or

release any information to the general public concerning such transaction or the absence thereof without the express prior written consent of the other, and the parties agree that neither party will use the other's name whether by including reference to the other in any press release, list of customers advertising that its services are used by Company or otherwise, without written authorization by the respective party's authorized representative.

10. Property Rights in Confidential Information

All Confidential Information shall remain the sole and exclusive property of the Provider and nothing in this Agreement, or any course of conduct between the parties shall be deemed to grant to the Recipient any license or rights in or to the Confidential Information of the Provider, or any part thereof. Unless otherwise expressly agreed in a separate license agreement, the disclosure of Confidential Information to the Recipient will not be deemed to constitute a grant, by implication or otherwise, of a right or license to the Confidential Information or in any patents or patent applications of the Provider.

11. Publicly Traded Company

The Proposer acknowledges that the Company's holding company is a publicly traded company, and that Confidential Information of the Company may constitute material, non-public information with respect to the Company. The Proposer understands, and will advise its Representatives to whom Confidential Information of the Company is disclosed, of the restrictions imposed by the United States securities laws on (a) the purchase or sale of securities by any person in possession of material, non-public information with respect to such securities, and (b) the communication of material, non-public information with respect to securities to a person who may purchase or sell such securities in reliance upon such information.

12. Remedies

(a) Each party acknowledges and agrees that any breach or threatened breach of this Agreement may give rise to an irreparable injury to the Provider or its Representatives, for which compensation in damages is likely to be an inadequate remedy. Accordingly, in the event of any breach or threatened breach of this Agreement by the Recipient or its Representatives, the Provider shall be entitled to seek equitable relief, including in the form of injunctions and orders for specific performance, in addition to all other remedies available at law or in equity.

(b) In the event that the Recipient learns of dissemination, disclosure, or use of the Confidential Information which is not permitted by this Agreement, the Recipient shall notify the Provider immediately in writing and shall use reasonable efforts to assist the Provider in minimizing damages from such disclosure. Such remedy shall be in addition to, and not in lieu of, any other rights or remedies available to the Provider at law or in equity.

13. Cumulative Remedies

No rights or remedy herein conferred upon or reserved to either party hereunder is intended to be exclusive of any other right or remedy, and each and every right and remedy shall be cumulative and in addition to any other right or remedy under this Agreement, or under applicable law, whether now or hereafter existing.

14. Notice

(a) By delivering written notice, either party may notify the other that it no longer wishes to receive or provide Confidential Information. Any further information received or provided by the party who received such notice following receipt of such notice, shall not be subject to the protection of this Agreement.

(b) All notices, consents and waivers under this Agreement shall be in writing and will be deemed to have been duly given when (i) delivered by hand, (ii) sent by electronic mail (“E-mail”) (provided receipt thereof is confirmed via E-mail or in writing by recipient), (iii) sent by certified mail, return receipt requested, or (iv) when received by the addressee, if sent by a nationally recognized overnight delivery service (receipt requested), in each case to the appropriate addresses and E-mail Addresses set forth below (or to such other addresses and E-mail addresses as a party may designate by notice to the other party):

(1) Company:

By Mail:

Hawaiian Electric Company, Inc.
P.O. Box 2750
Honolulu, Hawai‘i 96840
Attn: Manager of Procurement, Renewable Acquisition Division

Delivered By Hand or Overnight Delivery:

Hawaiian Electric Company, Inc.
Central Pacific Plaza
220 South King St., 21st Floor
Honolulu, HI 96813
Attn: Manager of Procurement, Renewable Acquisition Division

By E-mail:

Hawaiian Electric Company, Inc.
Attn: Manager of Procurement, Renewable Acquisition Division
Email: renewableacquisition@hawaiianelectric.com

With a copy to:

By Mail:

Hawaiian Electric Company, Inc.
Legal Department
P.O. Box 2750
Honolulu, Hawai'i 96840

Delivered By Hand or Overnight Delivery:

Hawaiian Electric Company, Inc.
American Savings Bank Tower
1001 Bishop Street, Suite 1100
Honolulu, Hawai'i 96813
Attn: Legal Department

By E-mail:

Hawaiian Electric Company, Inc.
Legal Department
Email: legalnotices@hawaiianelectric.com

(2) **[Proposer]**

By Mail:

[INSERT ADDRESS/CONTACT]

Delivered By Hand or Overnight Delivery:

[INSERT ADDRESS/CONTACT]

By E-mail:

[INSERT ADDRESS/CONTACT]

With a copy to:

By Mail:

[INSERT ADDRESS/CONTACT]

Delivered By Hand or Overnight Delivery:

[INSERT ADDRESS/CONTACT]

By E-mail:

[INSERT ADDRESS/CONTACT]

15. No Waiver

Except as otherwise provided in this Agreement, no delay or forbearance of a party in the exercise of any remedy or right will constitute a waiver thereof, and the exercise or partial exercise of a remedy or right shall not preclude further exercise of the same or any other remedy or right.

16. Governing Law

This Agreement is made under, governed by, construed and enforced in accordance with, the laws of the State of Hawai'i. Any action brought with respect to the matters contained in this Agreement shall be brought in the federal or state courts located in the State of Hawai'i. Each party agrees and irrevocably consents to the exercise of personal jurisdiction over each of the parties by such courts and waives any right to plead, claim or allege that the State of Hawai'i is an inconvenient forum or improper venue. Notwithstanding the foregoing, Company, at its option, may elect to submit any such dispute to binding arbitration pursuant to the commercial arbitration rules of Dispute Prevention & Resolution, Inc. or the American Arbitration Association then in effect in which case the parties agree that any alternative dispute resolution shall take place in the State of Hawai'i.

17. Attorneys' Fees and Costs

If there is a dispute between the parties and either party institutes a lawsuit, arbitration, mediation or other proceeding to enforce, declare, or interpret the terms of this Agreement, then the prevailing party in such proceeding shall be awarded its reasonable attorneys' fees and costs.

18. Assignment Prohibited

This Agreement shall be binding upon and inure to the benefit of the parties hereto and their respective successors, legal representatives, and permitted assigns. Neither party shall have the right to assign any of its rights, duties or obligations under this Agreement, by operation of law or otherwise, without the prior written consent of the other party. Any purported assignment in violation of this section shall be null and void.

19. No Third Party Beneficiaries

Nothing expressed or referred to in this Agreement will be construed to give any person or entity other than the parties any legal or equitable right, remedy, or claim under or with respect to

this Agreement or any provision of this Agreement. This Agreement and all of its provisions and conditions are for the sole and exclusive benefit of the parties and their successors and permitted assigns.

20. Entire Agreement

This Agreement constitutes the entire agreement between the parties relating to the subject matter hereof, superseding all prior and contemporaneous agreements, understandings or undertakings, oral or written with respect to the subject matter. Any amendment or modification of this Agreement or any part hereof shall not be valid unless in writing and signed by the parties. Any waiver hereunder shall not be valid unless in writing and signed via by the party against whom waiver is asserted.

21. Further Assurances

If either party determines in its reasonable discretion that any further instruments, assurances or other things are necessary or desirable to carry out the terms of this Agreement, the other party will execute and deliver all such instruments and assurances and do all things reasonably necessary or desirable to carry out the terms of this Agreement.

22. Term and Survival

This Agreement shall remain in full force and effect for a period of two (2) years from the Effective Date. All confidentiality obligations within this Agreement shall survive following expiration or termination of this Agreement.

23. Severability

If any term or provision of this Agreement, or the application thereof to any person, entity or circumstances is to any extent invalid or unenforceable, the remainder of this Agreement, or the application of such term or provision to persons, entities or circumstances other than those as to which it is invalid or unenforceable, shall not be affected thereby, and each term and provision of this Agreement shall be valid and enforceable to the fullest extent permitted by law, and the parties will take all commercially reasonable steps, including modification of the Agreement, to preserve the economic “benefit of the bargain” to both parties notwithstanding any such aforesaid invalidity or unenforceability.

24. Counterparts and Electronic Signatures

This Agreement may be executed in counterparts, each of which shall be deemed an original, and all of which shall together constitute one and the same instrument binding all parties notwithstanding that all of the Parties are not signatories to the same counterparts. For all purposes, duplicate unexecuted and unacknowledged pages of the counterparts may be discarded and the remaining pages assembled as one document. The parties agree that this Agreement and any subsequent writings, including amendments, may be executed and delivered by exchange of

executed copies via E-mail or other acceptable electronic means, and in electronic formats such as Adobe PDF or other formats mutually agreeable the parties which preserve the final terms of this Agreement or such writing. A party's signature transmitted by E-mail or other acceptable electronic means shall be considered an "original" signature which is binding and effective for all purposes of this Agreement.

[Signature Page Follows]

IN WITNESS WHEREOF, each party has caused this Agreement to be executed on its behalf by a duly authorized representative, all as of the Effective Date.

HAWAIIAN ELECTRIC COMPANY, INC.
("Company")

By: _____
Print Name: _____
Its: _____

[Insert Name of Proposer]

("Proposer")

By: _____
Print Name: _____
Its: _____

REQUEST FOR PROPOSALS
FOR
NON-WIRES ALTERNATIVES TO PROVIDE RELIABILITY (BACK-TIE)
SERVICES

ISLAND OF O‘AHU – EAST KAPOLEI AREA

NOVEMBER 8, 2019

Docket No. 2018-0165

*Appendix F – Interconnection Facilities and Cost
Information*



**Hawaiian
Electric**

To assist Bidders in assessing the impacts of location on potential projects, the per unit cost figures provided in the sections and tables below are to be used to provide an approximate estimated cost for interconnecting, including communications and distribution line cost to the existing Hawaiian Electric System. The per-unit cost figures below should not be used to create a detailed project estimate. A detailed project estimate typically requires a certain level of engineering to assess project site conditions and to factor in other parameters specific to the project.

The Bidder should identify the components assumed for their project and the quantity assumed for each. Each table below provides notes on the assumptions for each of the unit cost estimates. If a Bidder’s proposed project requirements are different than what is assumed in the notes, the Bidder should identify each difference and provide an estimated additional cost or savings resulting from those different requirements.

1 Distribution Line Interconnection Costs

Figure 1 shows a simple overhead interconnection diagram for generation only proposals or generation coupled with energy storage connecting to a 12 kV circuit.

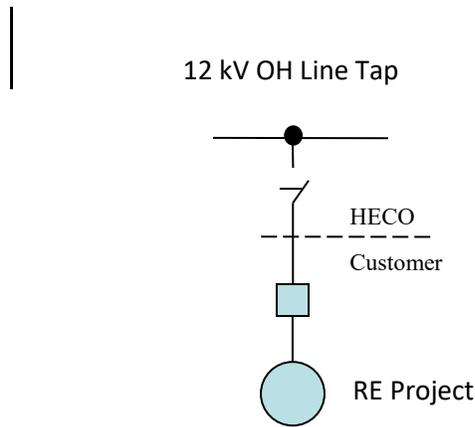


Figure 1

Figure 2 shows a simple underground interconnection diagram for generation only proposals or generation coupled with energy storage connecting to a 12 kV circuit.



Hawaiian Electric Company
 NWA APPENDIX F - INTERCONNECTION FACILITIES AND COST INFORMATION 2019

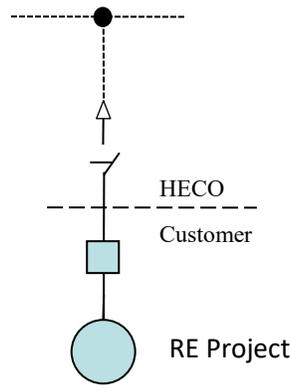


Figure 2

Component	Description	Cost per mile
1	New 12 kV Overhead line (accessible 150' spans)	\$1,176,000
2	New 12 kV Overhead line (inaccessible 250' spans)	\$1,655,000
3	12kV underbuild on existing 46kV line (accessible 150' spans)	\$808,000
4	12kV underbuild on existing 46kV line (inaccessible 250' spans)	\$1,137,000
5	New 12kV Underground line (1 feeder)	\$1,118,000
6	New 12kV Overhead line tap	\$56,000
7	New 12kV Underground line tap (1 feeder)	\$128,000

Notes:

1. Easement and/or land costs are NOT included with these estimates.
2. EA/EIS costs are NOT included with these estimates.
3. Costs are in 2022 dollars.
4. Components 1, 2 and 6 assume wood poles.
5. Components 3 and 4 assume no pole replacements needed.
6. All estimates are single respective circuits (i.e. single 12kV circuit or single 46kV circuit with single 12kV circuit underbuild).
7. Component 5 does NOT include duct bank and MH construction.
8. Component 6 assumes one wood pole install, one OH switch, and 100ft span.
9. Component 7 assumes a 150ft run and installation of a PMH-3 switchgear to terminate the cables and does NOT include duct bank, MH and pad construction.

2 Telecommunication Interconnection Costs

Hawaiian Electric Company
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1. Point-to-point microwave: \$1,125,196 with the following assumptions:
 - a. There is radio line-of-sight clearance between the communications endpoints.
 - b. FCC licensed Microwave Frequencies are available.
 - c. There are existing structures/buildings with space available on both ends to house the radio equipment.
 - d. Telecommunications grounding standards are up-to-date at both sites.
 - e. 48 V DC power with 12 hour battery backup is available.
 - f. This estimate does not include any special site-specific permit/approval activities that may be required including, but not limited to, Neighborhood Board (s), Conservation District Use Application, Environmental Assessment, Shoreline Management Area approval, biological (endangered species or habitat) surveys, and/or cultural (archeological) surveys or the cost of any migration required for approvals to be granted.
 - g. Space is available at both ends to construct antenna towers or structures that are rated to survive a Saffir-Simpson category 4 hurricane. Cost includes 1 each 50 foot tower.
 - h. Cost to interconnect to Hawaiian Electric’s existing communications network is not included.
 - i. Costs are in 2019 dollars.

2. Fiber with overbuild and new construction with the following assumptions:

Component	Description	Cost per mile
1	Fiber underbuild on existing poles (accessible 500’ spans)	\$367,000
2	Fiber underbuild on existing poles (accessible 150’ spans)	\$542,000

- a. No pole replacements or reframing.
 - b. Costs are in 2022 dollars.
 - c. 48-strand Singlemode Fiber optic cable, All Dielectric Self-Supporting (ADSS) Cable
3. Supervisory Control and Data Acquisition (SCADA) Communications: \$90,179 with the following assumptions:
 - a. 1.5 Mbps leased communications circuit is typically used for SCADA (Supervisory Control and Data Acquisition) applications via Fiber optics, or Ground Potential Rise (GPR) equipment where required. Hawaiian Telcom leased line costs are not included in this estimate.
 - b. Existing leased communications network is in close proximity to the substation.
 - c. Space and power will be provided in control house or cabinet.
 - d. Costs are in 2019 dollars.
4. Direct Transfer Trip equipment: \$273,369 per link with the following assumptions:
 - a. Space is provided in control house or cabinet with power, GPS timing, and grounding.

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- b. Point-to-point communication (Hawaiian Electric Fiber or Microwave) is available between the developer substation and Hawaiian Electric substation
- c. If Hawaiian Electric communications links are unavailable, Hawaiian Telecom leased T1 is required, costs are not included in this estimate.
- d. Costs are in 2019 dollars.

For interconnections to the Hawaiian Electric System at 12 kV or lower, data lines may be used to maintain the stability of the electric grid as specified in applicable Interconnection Requirements Studies.

3 Station Service Costs

Component	Description	Cost per mile
1	Padmount service 500KVA transformer	\$87,000
2	PME9 and PME3 switches for 1-ph and 3-ph transformers	\$282,000

Notes

- 1. See Section 1 - Distribution Line Interconnection Costs for overhead and underground unit cost estimates.
- 2. Easement and/or land costs are NOT included with these estimates.
- 3. EA/EIS cost are NOT included with these estimates.
- 4. Cost will vary depending on the transformer size
- 5. Cost may vary depending on site condition.
- 6. Costs are in 2022 dollars.

The customer shall be responsible to confirm with Hawaiian Electric Project Management to determine if independent station power is required. Meter requirements and location(s) should also be discussed with Hawaiian Electric's Customer Installation Division (CID) during the customer's design stage. The customer shall submit an Electrical Service Request/Customer Installation Form via www.hawaiianelectric.com. Please refer to the Large Customer New Service Request brochure for milestones and estimated timelines:

https://www.hawaiianelectric.com/documents/for_business/large_customer_NSC_brochure_web.pdf

Station power shall emanate from an existing 12kV distribution line to the customer's point of connection, either by overhead utility poles installed by Hawaiian Electric, or underground line extension. For underground line extensions, the customer will be responsible to install and maintain the

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NWA APPENDIX F - INTERCONNECTION FACILITIES AND COST INFORMATION 2019

infrastructure consisting of, but not limited to, concrete encased ducts, manholes/handholes, transformer and switchgear pads, and meter equipment.

All cost associated with this line extension shall be the responsibility of the customer/developer and shall be provided to the customer in a proposal letter from Customer Installation Division.

The customer shall also be responsible for obtaining easements for line extensions thru properties in which Hawaiian Electric does not have rights. Please note that easements must be recorded with the Hawaii Bureau of Conveyances prior to energizing service.

It is recommended that the services of a consultant be used by the customer as early as possible in this process for guidance and help in preparation of scope and cost related to station power.

Hawaiian Electric Information Assurance Assessment Questionnaire				Vendor Response Options											
Project name				XYZ, Inc.											
Vendor Name:				XYZ, Inc.											
Project:				Project name											
Date Questionnaire Released:				01/01/15											
Date Questionnaire Due:				01/01/15											
Date of Last Assessment Ratings Added by HE:															
				Spreadsheet Template Version is:											
				2.1 as of 11/1/2015											
Information Only	Ideal	Core	Mandatory	Hawaiian Electric Technology Standards				Insert '1' for Non Applicable	Enter the numeric value "1" (not text) as the flag values in the yellow highlighted response options. Do not flag more than 1 (one) box per row. Use Grouping controls on far left side of this spreadsheet to fully open all text and response options. Use beige areas in expanded rows to enter any desired hyperlinks or additional explanation text.	System as Proposed Meets Standard	System will meet standard in scheduled upcoming release	System can meet standard using 3rd Party products	System can meet standard with customization	System as proposed does not meet standard	Other

Security and Privacy Architecture							Meets	Will	3rd P	Cust	No	Other
User Access Management												
		1	Authentication and Identification									
Information Only	Ideal	Core	Mandatory				Vendors may add any hyperlink to right:					
				<p>Standard: System shall provide or allow for user authentication and identification.</p> <p>Comment: System integrated into the HE environment must provide user ID management and logon functions as well as provide or interface with measures designed to guard against fraudulent transmission and imitative communication deception by establishing the validity of the transmission, message, station or individual. System shall provide authentication and identification for employees and customers.</p> <p>Preference: MS Active Directory preferred.</p> <p>Desired Feedback: System provider shall describe authentication and ID capabilities.</p>			<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					
		1	Use of Integrated Windows Authentication for Web Services									
Information Only	Ideal	Core	Mandatory				Vendors may add any hyperlink to right:					
				<p>Standard: If system uses web based components, system shall interface with Integrated Windows Authentication (IWA) to provide for user authentication and identification.</p> <p>Comment: Any new software package must provide user ID management and logon functions and HE desires that its systems use in as much as appropriate, the features of MS Integrated Windows Authentication.</p> <p>Preference: MS Active Directory preferred.</p> <p>Desired Feedback: System provider shall describe the extent of IWA capabilities.</p>			<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					
		1	Internal and External Password Management									
Information Only	Ideal	Core	Mandatory				Vendors may add any hyperlink to right:					
				<p>Standard: System must be capable of enforcing strong password handling for all external customer users and for HE users (employees or contractors), and the ability to enforce different rules based on account type (e.g. internal, customer, supervisor, administrator)</p> <p>Comment: If Hawaiian Electric's AD or ADFS are not used, vendor system must support the following.</p> <ul style="list-style-type: none"> - Must have capability to have passwords expire on a configurable timeline based on account/user role, with 90-days being the default for internal system users and no expiration date for customers. - Must have configurable complexity requirements based on account/user role, including the ability to require: <ul style="list-style-type: none"> - passwords for internal system accounts must contain three or more of the following groups: <ul style="list-style-type: none"> --- Upper case letters; --- Lower case letters; --- Numbers; --- Special characters (ex: \$, @, #, %, etc.); - At least eight (8) characters long; - Must not be common words or combinations of common words; - Must not be the same as the user ID, nor an anagram or variation of the user ID. - Cannot reuse the last (configurable number) passwords by user type, with 10 being the default for internal system users and no re-use restriction for customers. <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider must verify that password strength and reset requirements can be configured and enforced.</p>			<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					
		1	Customer Privacy Settings- Web									
Information Only	Ideal	Core	Mandatory				Vendors may add any hyperlink to right:					
				<p>Standard: System must not store cookies containing personally identifiable information and use the standard privacy settings of the browser.</p> <p>Comment: The system must also not employ SuperCookies, EverCookies, PermaCookies or any other mechanism that circumvents a user's browser privacy settings.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider must verify that cookies containing customer privacy information are not stored. System provider must verify that browser privacy settings are not overridden.</p>			<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>					
		1	Customer Privacy Settings-Mobile									

Information Only	Ideal	Core	Mandatory		Vendors may add any hyperlink to right:						
				<p>Standard: System must not override a customer's mobile privacy settings.</p> <p>Comment: If the solution contains a mobile application (smart phone, tablet, etc.) The mobile application must obey the customer's mobile privacy settings for sharing or collection of customer data, such as contacts, geo-location data, or any other information not explicitly entered by the customer into the application.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider must verify that mobile application privacy settings are not overridden.</p>	At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.						
				1	Confirmation of Customer Privacy Settings-Mobile						
Information Only	Ideal	Core	Mandatory		Vendors may add any hyperlink to right:						
				<p>Standard: System shall prompt for permission to access customer data.</p> <p>Comment: If the solution contains a mobile application (smart phone, tablet, etc.) The mobile application must prompt before accessing customer data, such as contacts, geo-location data, or any other information not explicitly entered by the customer into the application.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider must verify that mobile application requires customer action to approve.</p>	At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.						
Connection and Data Transport Security						Meets	Will	3rd P	Cust	No	Other
				1	Web browser session protection						
Information Only	Ideal	Core	Mandatory		Vendors may add any hyperlink to right:						
				<p>Standard: For web based components, the system supports the Transport Layer Security (TLS) protocol for internet session security.</p> <p>Comment:</p> <p>1) For web browser based components, the system must support the Transport Layer Security (TLS) protocol for internet browser session security, but the vendor is free to recommend alternative encryption methods as well.</p> <p>2) Unless otherwise agreed to during system implementation, set a default of using TLS for all web browser pages handling non-public data.</p> <p>3) Use HTTP Strict Transport Security (HSTS) and the Secure Cookie flag for all browser sessions handling non-public data.</p> <p>4) Do not include Hawaiian Electric Company non-public data as part of any URL.</p> <p>Preference: TLS v1.2.</p> <p>Desired Feedback: System provider shall verify that system uses TLS where appropriate.</p>	At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.						
				1	SSH File Transfer Protocol						
Information Only	Ideal	Core	Mandatory		Vendors may add any hyperlink to right:						
				<p>Standard: System shall support large file transfer utilizing a SSH (Secure Shell) File Transfer Protocol (SFTP) Server.</p> <p>Comment: SFTP is the current industry standard for secure file transfer and is a HE mandate for open transfer of HE information.</p> <p>Preference: See "Cryptographic System" requirement for algorithm.</p> <p>Desired Feedback: System provider shall verify system uses SFTP where appropriate.</p>	At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.						
				1	Inter-process Communication						
Information Only	Ideal	Core	Mandatory		Vendors may add any hyperlink to right:						
				<p>Standard: The system shall enforce security policies from the critical side when interprocess communication is initiated from a less privileged application.</p> <p>Comment: Separation of privileges between different applications is critical for minimizing the extent of system vulnerability if a particular application is compromised.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall verify its ability to configure interprocess communication and privilege separation.</p>	At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.						
				1	Secure Transport of Company non-Public Data						
					Vendors may add any hyperlink to right:						

Information Only	Ideal	Core	Mandatory	<p>Standard: System shall support secure transmission of all non-public data.</p> <p>Comment: All non-public data must be encrypted in accordance with the standard depicted in the "Cryptographic System" requirement .</p> <p>Preference: See "Cryptographic System" requirement for algorithm.</p> <p>Desired Feedback: System provider shall specify the algorithms used for secure transports.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant</p>						
Information Only	Ideal	Core	Mandatory	<p>1</p> <p>Multi-Tier System Architecture</p>	<p>Vendors may add any hyperlink to right:</p>						
				<p>Standard: The system must be implemented using a minimum of three-tier client-server system architecture consistent with NIST Interagency Report 6926 "The NIST Design Repository Project"</p> <p>Comment: Outlined in NISTIR 6926, Section 2.2 Figure 2, is the standard three-tier client/application/database system architecture. For Hawaiian Electric, each of these tiers will be in its own network security zone. Use of specific vendor products mentioned in NISTIR 6926 is not required – this requirement is just about the high-level multi-tier architecture.</p> <p>See the "Network Security Zones" requirement for additional information about controls to be implemented between these security zones.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall identify and explain how their system and its implementation fulfills this requirement.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
Information Only	Ideal	Core	Mandatory	<p>1</p> <p>Network Security Zones</p>	<p>Vendors may add any hyperlink to right:</p>						
				<p>Standard: Vendor must document all data flows required to traverse any electronic security perimeter (ESP), whether between multiple internal ESPs or between internal and external ESPs. Requirements for Medium Impact BES Cyber Systems found in NERC CIP-005-5 Electronic Security Perimeters shall be followed.</p> <p>Comment: The network shall be segmented into multiple network security zones, and methods shall be in place to restrict communication between zones. Also see the "System Interfaces" requirement.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall describe its proposed network architecture and methods for controlling communication between network security zones. Vendor must provide this information regardless of whether the security zone interface devices are provided or maintained by the vendor.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
Information Only	Ideal	Core	Mandatory	<p>1</p> <p>Wireless Technology</p>	<p>Vendors may add any hyperlink to right:</p>						
				<p>Standard: Where wireless links are used in the implemented system, the system shall support wireless technologies while remaining compliant with security standards. System shall support link or end-to-end encryption independent of data transmission carrier.</p> <p>Comment: The system shall be compatible with other wireless equipment and shall minimize the potential for signal interception. The system shall be resilient to high-level threats including denial of service, eavesdropping, man-in-the-middle, masquerading, message modification, message replay, and traffic analysis. The system provider shall provide documentation regarding capabilities, requirements, limitations, and security of the system's wireless communication devices.</p> <p>Preference: See "Cryptographic System" requirement for algorithm. WPA-2 Enterprise for 802.11 for authentication.</p> <p>Desired Feedback: System provider shall describe the wireless protocols that are compatible with the provider's devices and demonstrate that known attacks do not compromise receiving devices. Describe their link or end-to-end encryption method and how it is independent of a data provider encryption (e.g. cellular data or microwave).</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
Information Only	Ideal	Core	Mandatory	<p>1</p> <p>Network Intrusion Detection</p>	<p>Vendors may add any hyperlink to right:</p>						
				<p>Standard: The system shall allow for means to document that network traffic is monitored, filtered, and alarmed (e.g., alarms for unexpected traffic through network security zones) and provide filtering and monitoring rules on a 24x7x365 basis.</p> <p>Comment: The system shall be configured with an intrusion detection system (IDS), which may be either host-based or network-based. The system provider shall provide recommendations for optimal IDS configuration which will enable HE to monitor traffic.</p>	<p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant</p>						

Information Or	Ideal	Core	Mandatory	<p>Comment: In particular, the system shall allow for configuration and rule definition of either the period of time after which purging or archiving is desired or the definition of individual customers or groups of customers for purging or archiving.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall verify that the system has the capabilities to allow for this flexibility.</p>	<p>vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
Information Only	Ideal	Core	Mandatory	<p>1</p> <p>Customer Communications Preference</p> <p>Standard: System shall allow customers to define their preferred means of communications with HE.</p> <p>Comment: Customers shall be able to configure methods of communication including telephone, email, or text.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall verify that multiple communications channels are enabled throughout the system and that customers can be afforded the option as to which communication channel is preferred.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
Information Only	Ideal	Core	Mandatory	<p>1</p> <p>Customer Opt-out</p> <p>Standard: The system shall manage and track customer Opt-outs. (Applies only to systems with which customers directly interact.)</p> <p>Comment: In particular, customer Opt-Out shall store an effective date to provide an audit trail and clarity of the customer's choice at any given period of time.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: The system provider shall verify that customer opt-out, at a minimum, stores an effective date of opt-out. The system provider shall describe how the opt-out works.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
Information Only	Ideal	Core	Mandatory	<p>1</p> <p>Customer Data Control</p> <p>Standard: The system shall allow for customers to exercise meaningful control over their data.</p> <p>Comment: Specifically, customers shall be permitted to opt-out of providing secondary data use; and, customers shall be permitted to retrieve and update their data as desired.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall describe how the system provides for ad hoc data retrieval and updating as well as use of secondary data opt-out.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
Information Only	Ideal	Core	Mandatory	<p>1</p> <p>Customer Authentication</p> <p>Standard: The system should allow flexibility and choice with respect to customer authentication.</p> <p>Comment: Customers should be able to use 2 factor authentication for their accounts if they desire.</p> <p>Preference: SAML support.</p> <p>Desired Feedback: System provider should describe how the system affords multiple authentication optionality for customers.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
Security Compliance						Meets	Will	3rd P	Cust	No	Other
Information Only	Ideal	Core	Mandatory	<p>1</p> <p>Encryption Key Exchange</p> <p>Standard: The system should employ Ephemeral Key Exchange.</p> <p>Comment: Describe how your system can be used with ephemeral key exchanges for all key exchanges protecting transmission of highly sensitive data (Hawaiian Electric Confidential, Confidential-Restricted data, and control data) which traverses both an electronic and a physical security perimeter. Describe any performance or support implications of the use of Ephemeral Key Exchanges for your implementation.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider should describe its cryptographic methods, how these support ephemeral key exchange.</p>	<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>						
				<p>1</p> <p>Cryptographic System</p>							

Remote Host and Application Service Provider (ASP) Architecture (IF APPLICABLE)

Remote Security				Meets	Will	3rd P	Cust	No	Other		
Information Only	Ideal	Core	Mandatory	1 Determination of Security Trust Level							
				<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>							
<p>Standard: The remote host or ASP system shall be covered by a SSAE 16 SOC Type II SysTrust/WebTrust or else the host/ASP can provide an independent security assessment (attestation) report by a reputable reporting agency that covers the ASP's application and infrastructure.</p> <p>Comment: Some independent evidence or report shall be provided to HE showing that the provider's security meets professional standards or has otherwise been evaluated. Attestation reports by a qualified professional assessment firm are preferred.</p> <p>Preference: No products specifically preferred.</p> <p>Desired Feedback: System provider shall provide copies or links to attestation reports if available.</p>											

Certification Requirements				Meets	Will	3rd P	Cust	No	Other		
Information Only	Ideal	Core	Mandatory	1 Sarbanes Oxley's (SOX) IT General Controls							
				<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>							
<p>Standard: Vendor must follow SOX IT General Controls</p> <p>Comment: Compliance report must report on the following ITGC's</p> <ul style="list-style-type: none"> <input type="checkbox"/> Security Standards <input type="checkbox"/> Access and Authentication <input type="checkbox"/> Network Security <input type="checkbox"/> Monitoring <input type="checkbox"/> Segregation of Duties <input type="checkbox"/> Physical Security <p>Preference: No products specifically preferred</p> <p>Desired Feedback: System provider must provide proof of compliance to SOX IT General Controls.</p>											

Information Only	Ideal	Core	Mandatory	1 Current Statement on Standards for Attestation Engagements (SSAE) No. 16 Service Organization Control (SOC) Type II report							
				<p>Vendors may add any hyperlink to right:</p> <p>At right, enter any expanded explanation. Typically, a positive response above to the 'Proposal Meets Standard' is sufficient, but vendors may add comments as desired. Responses to any of the other variations should be explained. Also, please pay attention to the Desired Feedback text as it may suggest a helpful response comment. Explanations should be short, but vendors may also use hyperlinks above or references in text at right to highlight other relevant sections of proposal materials.</p>							
<p>Standard: Vendor must provide current SSAE 16 SOC Type II report</p> <p>Comment: Report must include the following contents:</p> <ol style="list-style-type: none"> 1. Independent service auditor's report 2. Service organization's description of its system (including controls) 3. Information provided by the independent service auditor; includes a description of the service auditor's tests of operating effectiveness and the results of those tests 4. Other information provided by the service organization (i.e. glossary of terms) <p>Preference: No products specifically preferred</p> <p>Desired Feedback: System provider must provide SSAE 16 documentation</p>											

Scores for Remote Host				Avg Scores			Mandatory Compliance	Vendor Responses include:	Avg. HE Rating
				Ideal	Core	Joint			
				0	0				

Summary Across All Categories				Weighted Scores			Mandatory Compliance	Average HE Quality Rating
				Ideal	Core	Overall		
				0	0	0		

REQUEST FOR PROPOSALS
FOR
NON-WIRES ALTERNATIVES TO PROVIDE RELIABILITY (BACK-TIE)
SERVICES

ISLAND OF O‘AHU – EAST KAPOLEI AREA

NOVEMBER 8, 2019

Docket No. 2018-0165

Appendix H – Aggregator Handbook



**Hawaiian
Electric**

Aggregator Handbook

This handbook describes processes required to implement and maintain data exchange and control functionality between the aggregator/supplier and the Companies. Aggregators must comply with the data exchange, control functionality, and testing requirements specified in this handbook.

Data Integration

Participant data will be provided to the Companies using a combination of comma-separated value (CSV) and extensible markup language (XML) files delivered to a secure file transfer protocol (SFTP) site. The SFTP location is unique to each aggregator and as such will be provided in advance of integration testing.

Participant Enablement Status

Aggregator will provide the Participant Enablement File in XML that contains data describing Participants that have been enabled and enrolled, i.e. are ready to be included in the dispatch or scheduling of Supplier's Grid Services Capability.¹ A new file will be provided via SFTP to the Company daily, except weekends and holidays, and will reflect enrollment changes since the previous file was provided, i.e. incremental changes. The file will also include any Participant removal (un-enrollment) from participation and during the allowed window, changes to Enabled Capability, Minimum Incentive (as impacted by Enabled Capability), and Incentive Adder (Additional Incentive).

File naming convention for enrollment data is as follows: {EnrollerId}_HECO_{Date:yyyy-MM-dd_HH-mm-ss_SSS}_enrollment.xml, for example, 100001_HECO_2018-07-13_16-59-03_089_enrollment.xml. HH represents hour in military time (0-23). In the future, if an aggregator has Participants that are customers of Maui Electric or Hawaii Electric Light, MECO or HELC respectively, a separate file would be submitted where MECO or HELC replaces HECO.

The file details, including the XML Schema Definition (XSD) are specified in Exhibit A. Grid Service Program Names are specified in Exhibit B.

Enrollment Transactions

Participant Enrollment

Each Participant must be enrolled via the Participant Enablement File. Each program or Grid Service that Participant is enabled to participate in requires its own separate enrollment. Each meter or meters that will be impacted by participation must be enrolled in a separate enrollment. For example, if a Participant has two meters at a single location and both meters will be impacted

¹ An enrollment (or un-enrollment) is an "EnrollmentDetailsType" as specified in Attachment A.

(i.e. participating in events for Grid Services) and the Participant will be participating in two Grid Services, four (4) separate enrollments will be required. See Table 1 for a conceptual representation of required enrollments.

Table 1: Conceptual enrollment for single participant with two meters, enrolled in two Grid Services

Enrollment 1	Participant 1	Meter 1	Grid Service 1
Enrollment 2	Participant 1	Meter 2	Grid Service 1
Enrollment 3	Participant 1	Meter 1	Grid Service 2
Enrollment 4	Participant 1	Meter 2	Grid Service 2

The total minimum and adder incentive for the Participant should be split appropriately between the two Grid Service enrollments. While each meter is a separate enrollment, both enrollments must have the same enrollment date. All dates must be specified in “yyyy-MM-dd” format. If the Enrollment End Date is populated, when that date is reached, the Participant will be considered to no longer be participating and incentives will no longer be paid.

Participant Minimum Incentive, additional incentive, and enrollment start date must be the same for a new enrollment.

Participant Un-Enrollment

If a Participant will no longer be participating a un-enrollment must be submitted via the Participant Enablement File. Enrollment End Date must be populated; this is the Participant’s un-enrollment date. All dates must be specified in “yyyy-MM-dd” format. Incentive payment will be prorated from the un-enrollment date. If a Participant changes address, but wishes to continue participating, a un-enrollment and new enrollment (with Participant’s new address) must be submitted.

Updates to Participant Information

The following Participant information may only be updated during windows which will be specified by the Company:

- Incentive update: Incentive Name, Incentive Value, Incentive Start Date
- Enrolled kW: Participant Resource Capability, Participant Resource Capability Effective Start Date. Enrolled kW updates must be aligned to the start of month.

The following Participant information may be updated at any time:

- W4 Email
- Customer Name

Error Handling

The Company will contact the aggregator regarding any failed enrollments within 48 hours of submission. The following items will result in an error and failed enrollment:

- Incorrect meter id and contract account pairing will result in a failed enrollment
- Incorrect meter id
- Enrollment with another aggregator – Participant must not be enrolled with another aggregator when enrollment is received.

- Submitted file name or contents are not in the required format.

Aggregated Operational Forecast

After the receipt and processing of the Participant Enablement File, Company expects the Participant's Resource Capability to be included in Aggregator's Operational Forecast. Aggregator will submit an Operational Forecast file in CSV format as specified herein. The Operational Forecast represents Supplier's Total individual Grid Service Capability for the given period. An Operational Forecast submitted in a separate file is required for each Grid Service that Supplier is contracted to provide. The Operational Forecast shall be submitted in accordance with the following attributes:

Attributes	FFR	Capacity Build	Capacity Reduction	Reliability (grid-tie) Service	Distribution Capacity
Forecast Capability	kW/kWh	kW/kWh	kW/kWh	kW/kWh	kW/kWh
Forecast Term	Min 4 days	Min 4 days	Min 4 days	Min 4 days	Min 4 days
Data Resolution (Interval)	15 Minute	15 Minute	15 Minute	15 Minute	15 Minute
Update Timing	Hourly	1am/1pm	1am/1pm	Hourly	1am/1pm
Update Frequency	Hourly	12 hours	12 hours	Hourly	12 hours

Aggregator's Operational Forecast will be provided to the Companies using a comma-separated value (CSV) file delivered to a secure file transfer protocol (FTP) site. File naming convention for the Operational Forecast is as follows:

{EnrollerId}_{GridServiceProgramName}_{Date:yyyy-MM-dd_HH-mm-ss_SSS.csv, for example, 100001_Capacity Build_2018-07-13_16-59-03_089.csv. HH represents hour in military time (0-23). In the future, if an aggregator has Participants that are customers of Maui Electric or Hawaii Electric Light, MECO or HELC respectively, a separate file would be submitted where MECO or HELC replaces HECO.

Table 2 shows the fields included in the file to be submitted by the Aggregator with the Aggregated Operational Forecast. There should be one row for each Forecast Interval End Time entry, e.g. 384 entries for 15 minute interval data for four (4) days. The values/columns shall be in the order specified in Table 2.

Table 2: Operational Forecast Format

Field Name	Format	Values/Comments
VEN ID	String	ID of the Aggregator's VEN for this Grid Service Program. Assigned by the VTN to the VEN at the time of provisioning.
Enroller Id	Char 16	ID for the Aggregator who is providing the forecast. ID will be provided by the Companies.

Grid Service Program Name	String	Grid Service program name as provided by the Companies in Attachment B. Aggregator will have 1 VEN per Grid Service.
Forecast Unit of Measure	String	Identifier of the type of forecast value being provided. Two (2) possible values: <ul style="list-style-type: none"> Aggregate Operational Forecast KWH 15 Minute Aggregate Operational Forecast KW 15 Minute
Forecast Interval End Time	Date/Time	End of interval timestamp for the forecast value. MM/DD/YYYY HH:MM where HH is a 24 hour (0-23) format.
Forecast Value	Real	Aggregator's operational forecast capability (shed) aggregated for all their enrolled customers in this Grid Service. This will be reported as a positive number.

Error Handling

The import of the aggregator operational forecast will fail if the VEN ID and enroller id pairing is incorrect or the submitted file name or contents are not in the required format. If there is an error, the last submitted operational forecast will be used as the current Operational Forecast.

Forecast Assumptions

Forecast interval end times are aligned to the interval length and hour. For example, 1:15, not 1:17 for a 15 minute interval forecast.

A single granularity for the Operational Forecast is required, i.e. aggregators may not provide both 5 minute forecast and 15 minute forecast for a single Grid Service.

Participant Energy Reduction Incentive Data

For Participants receiving an Energy Reduction Incentive (ERI), Aggregator Supplier will submit a Participant Incentives File in CSV format as specified herein. ERI should only be calculated and provided for Participant's that participated in events in the previous month. Participants who are enrolled but did not participate in any events in the previous month should not be included in the Participant Incentives File, i.e. no \$0 incentive payments should be included in the file. Aggregator must submit the incentive file by 7th day of the month for Participant energy reduction in the previous month.

File naming convention for enrollment data is as follows: {EnrollerId}_HECO_{Date:yyyy-MM-dd_HH-mm-ss_SSS}.csv, for example, 100001_HECO_2018-07-13_16-59-03_089.csv HH represents hour in military time (0-23). In the future, if an aggregator has Participants that are customers of Maui Electric or Hawaii Electric Light, MECO or HELC respectively, a separate file would be submitted where MECO or HELC replaces HECO.

Table 3 shows the fields to be included in the file submitted by the Aggregator with the monthly ERI payments to be made for their Participants. The format will be a CSV file. The values/columns shall be in the order described in following table.

Table 3: Participant Incentives File Format

Field Name	Format	Values/Comments
EnrollerID	Char 16	ID for the Aggregator who has enrolled the customer. ID will be provided by the Companies.
Contract Account	Char 12	Participant's Account No. to which this incentive should be applied. Must match account number supplied with Participant's enrollment.
Utility Contract	Char 10	Contract No. from Participant bill. Contact to which this incentive applies
Grid Service Program Name	String	Grid Service program name as provided by the Companies in Attachment B. Program Name must match the value sent by the Aggregator with Participant's enrollment.
Incentive Type	String	Must be Energy. This indicates the type of incentive.
Incentive Month	Date	Month to which the incentive applies in the following format: MM/YYYY.
Incentive Amount	Real	Monthly incentive amount for this incentive type to be paid to customer. No currency sign should be provided.

Error Handling

The Company will contact the aggregator regarding any failed enrollments within 48 hours of submission. The following items will result in an error and failed import:

- Participant's Contract Account No. provided is not enrolled.
- Participant Account and Contract No. pairing are invalid or does not match an enrolled Participant.
- Participant is not enrolled in Grid Service program that allows energy payment, e.g. FFR.
- The Participant's Contract Account is not associated with the Aggregator as of the Incentive Month.
- Submitted file name or contents are not in the required format.

Operational Communications, Control, and Telemetry

The Hawaiian Electric Companies rely on Open Automated Demand Response (OpenADR) to support demand response (DR) communications and controls. OpenADR provides a non-proprietary, open standardized DR interface that allows the Companies to communicate DR signals directly to customers or aggregators using a common language and existing communications such as the Internet. The Figure 1 depicts the exchange of data and controls via

OpenADR between the Companies' Virtual Top Node (VTN)² and customer Virtual End Nodes (VEN),³ as well as to other DR resources that may be aggregated by a third party (VEN/VTN). There is no peer-to-peer communication in OpenADR 2.0, i.e. VTNs do not communicate directly other VTNs and VENs do not communicate directly with other VENs.

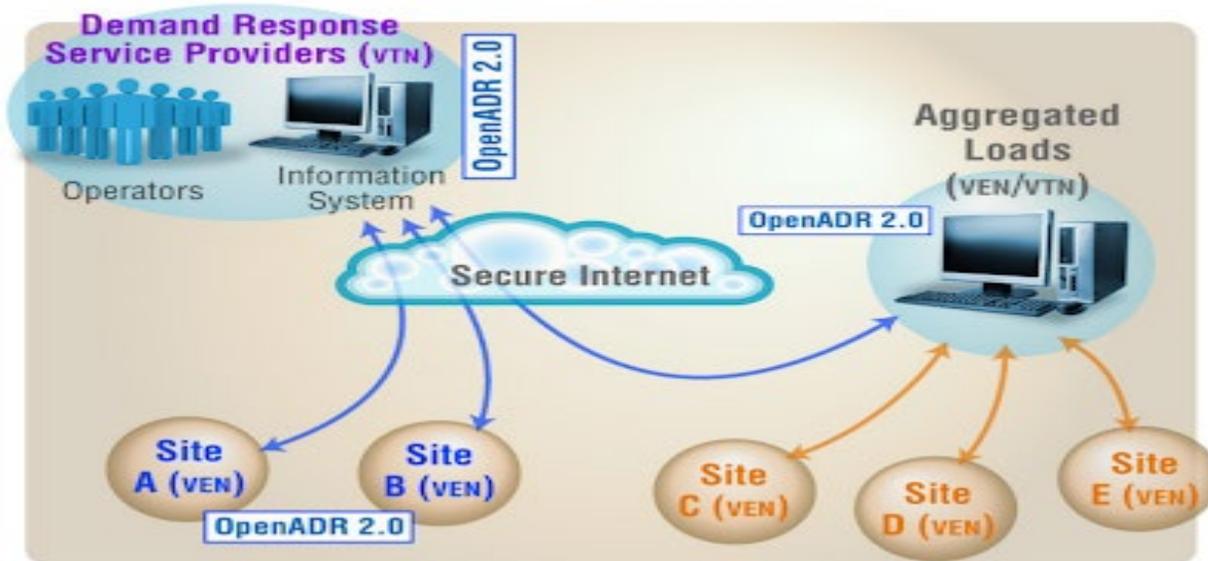


Figure 1: VTN/VEN Communications

OpenADR Requirements

The Companies' VTN is OpenADR 2.0 B profile (OpenADR2.0b) certified. The Companies require that all VENs connecting to the Companies VTN be OpenADR 2.0b certified. OpenADR Certification means that VTNs and VENs have undergone OpenADR testing and conform to the current OpenADR interface specification. The OpenADR Alliance manages the OpenADR certification process⁴ and the OpenADR 2.0 (A and B) Profile Specification (OpenADR Specification).⁵ One OpenADR 2.0b VEN is required to enable delivery of Grid Services. The Companies require one VEN for each Grid Service to be delivered. The VEN may be a software or hardware VEN.

Security and Security Certificates

OpenADR requires VTN and VEN digital certificates to authenticate communication links. VEN certificates will be embedded on the VEN by the manufacturer or the VEN purchaser will be required to contact the manufacturer to obtain the certificate. The Certificate Authority for OpenADR is Kyrio (previously NetworkFX).⁶ The fingerprint file for the VEN which is

² The VTN is an information exchange server. This server can be located at the highest infrastructure level (e.g. Utility Company), at an aggregator level, or at the managed facility. Each VTN can have 1-N VENs. Commonly VTNs are reasonably powerful computer systems.

³ The VENs are clients to one or more VTN and can be located one level below any of the suitable VTN locations. VENs can be simple devices like load controllers, thermostats or more powerful implementations like energy management systems or aggregator level control servers.

⁴ <https://www.openadr.org/certification-process>

⁵ <https://www.openadr.org/specification>

⁶ <https://www.openadr.org/cyber-security>

provided with the VEN zip package from Kyrio, must be provided to the Companies for each VEN prior to provisioning.

Data and Event Signal Details

Capability in kW shall be made available for polling by the DERMS every five (5) minutes using the OpenADR 2.0b Data Reports TELEMETRY_USAGE. During a GS Event, TELEMETRY_USAGE shall reflect Capability. The OpenADR SignalPayload will be SIMPLE, specific SignalPayload value will depend on the finalization of the design and implementation of the DERMS. Table 4 presents OpenADR parameters/configuration is required:

Configuration/ Parameter	Description	Value
SignalType	Describes type of signal	Level
marketContext	Provided by Companies	Name of Grid Service program
Priority	Priority of current even in relation to other events	1
Resource ID	Common name for VEN; provided by Companies	Client Id
Poll rate for event signal		1 minute
Poll rate for report		5 minutes
Telemetry_Usage: Report type	Report for data that is periodically reported	Usage
Telemetry_Usage: Units		powerReal

Table 4: OpenADR Parameters

Provisioning Process

The Companies will create a participant username for login to the VTN. From the VTN, connectivity between the VTN and VEN can be monitored as well as status of the event and telemetry by the Aggregator and the Company.

During the initial connection attempt to the Companies’ VTN, a VEN_ID will be assigned to the VEN. The VEN should be left online and connected during this time. The VEN_ID assigned to the VEN must be emailed to the Companies, to allow the Companies to link the VEN_ID to the client in the VTN.

FFR Certification and Testing

Supplier must demonstrate to the Company compliance with FFR response timing and accuracy requirements. Demonstration may be performed through observed testing using appropriate testing equipment, or a report documenting operation that resources are activated within the specified period.

A monthly FFR manual dispatch test event will be performed by the Companies. For the test, resources enrolled in FFR must be activated using the same method as the autonomous frequency response. The FFR test event duration will be a minimum of 15 minutes and a maximum of 30

minutes. At the end of the test event, the aggregated resource must ramp out of the event as required for FFR.

RBT Certification and Testing

Supplier must demonstrate to the Company compliance with RBT response timing and accuracy requirements. Demonstration may be performed through observed testing using appropriate testing equipment, or a report documenting operation that resources are activated within the specified period.

A monthly RBT manual dispatch test event will be performed by the Companies. For the test, resources enrolled in RBT must be activated using the agreed upon event trigger. The RBT test event duration will be a minimum of 15 minutes and a maximum duration as specified per the grid service requirement (Exhibit A) hours. At the end of the test event, the aggregated resource must ramp out of the event as required for RBT.

REQUEST FOR PROPOSALS
FOR
NON-WIRES ALTERNATIVES TO PROVIDE RELIABILITY (BACK-TIE)
SERVICES

ISLAND OF O‘AHU – EAST KAPOLEI AREA

NOVEMBER 8, 2019

Docket No. 2018-0165

Appendix I – Supplemental Review Process



**Hawaiian
Electric**

Supplemental Review Process

Suppliers intending to deliver grid service products utilizing end devices that have the potential to export power to the grid may be subject to additional technical review. This document provides clarification and guidelines for Generating Facilities that are Interconnected under an existing approved interconnection application.

Any material changes or additions made to a Generating Facility cannot be made without written consent from the Companies. However, to the extent that a Generating Facility owner, operator, or Customer-Generator wishes to participate in a DR program without making a material change to their existing Generating Facility may be afforded expedited review upon meeting certain requirements. The table below clarifies that solar photovoltaic facilities that have an approved Interconnection Agreement under the NEM, CGS, CGS+, CSS, Smart Export, or SIA programs may deliver a grid service as long as the export across the Point Of Interconnections does not exceed the limits indicated in Table 1 between the hours of 9am – 5pm. If solar photovoltaic facility is capable of export of power after 5pm (through the use of an energy storage system), the Generating Facility may do so without having to go through a Technical Review screening process as long as the export is limited to the values indicated in Table 1.

Program	NEM (including add-ons)	CGS	CGS+	CSS	Smart Export	App-IIB	SIA
9AM -5PM	Existing Program Size	Existing Program Size	Existing Program Size	0 ¹	0 ²	0 ⁴	Existing Program Size ⁵
5PM - 9AM	3kW	3kW	3kW	3kW	3kW ³	0 ⁴	3kW

Table 1: Existing Executed Interconnection Agreement Pre-Approved Net Export

¹ Participants in non-export programs will have to go through re-screening and obtain approval if exporting occurs during grid service delivery.

² The 0 export applies to smart export systems that have controls in place to prevent export between 9AM and 5PM (like a CSS, these customers received expedited technical review based on having non-export controls). Smart export systems that were approved and did not have CSS, non-export controls, may export up to the program system size during the hours of 9AM to 5PM.

³ 3 kW or Max Generation Capacity between 4PM – 9AM, whichever is greater.

⁴ App-IIB systems must file an Interconnection Application with the Company to convert to another DER program such as CSS.

⁵ Limited to 100kW or less based on current export program screening process.

If a Supplier wishes to utilize a DER for the delivery a grid service in a manner that exceeds the Pre-approved Export Participation Limit, the Companies will require a Technical Review of the Generating Facility in accordance with Tariff Rule No. 14. The Companies thought it prudent to make Suppliers aware of this requirement so that Suppliers can take these potential timelines into

account when developing a customer enrollment plan. Enrollment of DER customers with export expectations that exceed the limits noted above will not be permitted until written consent and approval is provided by the Company.

Below is an outline of the indicative data that is expected to be required for the review process.

Anticipated Data Required

- Aggregator Information
- Customer Equipment Information (derived from DER application):
- Grid Services Anticipated to be delivered
 - Demand Response Program(s) resource will subscribe to (REQUIRED)
 - DR Capability (kW)

Additionally, the following is reflective of the type of data that may be required per location/device:

FAST FREQUENCY RESPONSE	
<u>PARTICIPANT NAME</u>	
PARTICIPANT ADDRESS	
DER APPLICATION OR ACCOUNT NUMBER	
DATE OF DER PROGRAM ENROLLMENT	
CIRCUIT	
NODE	
INTERCONNECTION TYPE	
<u>MAXIMUM CAPABILITY (KW)</u>	
<u>MAXIMUM NET EXPORT DURING GS EVENT</u>	
<u>(KW)</u>	
9AM – 5PM	
5PM – 9AM	
<u>GROSS MINIMUM LOAD</u>	
<u>MAXIMUM IMPORT FOR LOAD (KW)</u>	
9AM – 5 PM	
5PM – 9AM	

CAPACITY	
<u>PARTICIPANT NAME</u>	
PARTICIPANT ADDRESS	
DER APPLICATION OR ACCOUNT NUMBER	
DATE OF DER PROGRAM ENROLLMENT	
CIRCUIT	
NODE	
INTERCONNECTION TYPE	
<u>MAXIMUM CAPABILITY (KW)</u>	
<u>MAXIMUM NET EXPORT DURING GS EVENT</u>	
<u>(KW)</u>	
9AM – 5PM	

5PM – 9PM	
<u>GROSS MINIMUM LOAD</u>	
<u>MAXIMUM IMPORT FOR LOAD (KW)</u>	
9AM – 5 PM	
5PM – 9PM	

REQUEST FOR PROPOSALS
FOR
NON-WIRES ALTERNATIVES TO PROVIDE RELIABILITY (BACK-TIE)
SERVICES

ISLAND OF O‘AHU – EAST KAPOLEI AREA

NOVEMBER 8, 2019

Docket No. 2018-0165

*Appendix J – Distribution Needs and Ho‘opili Area
Planning Study*



**Hawaiian
Electric**

Overview of the Ho'opili and East Kapolei Area NWA Opportunities

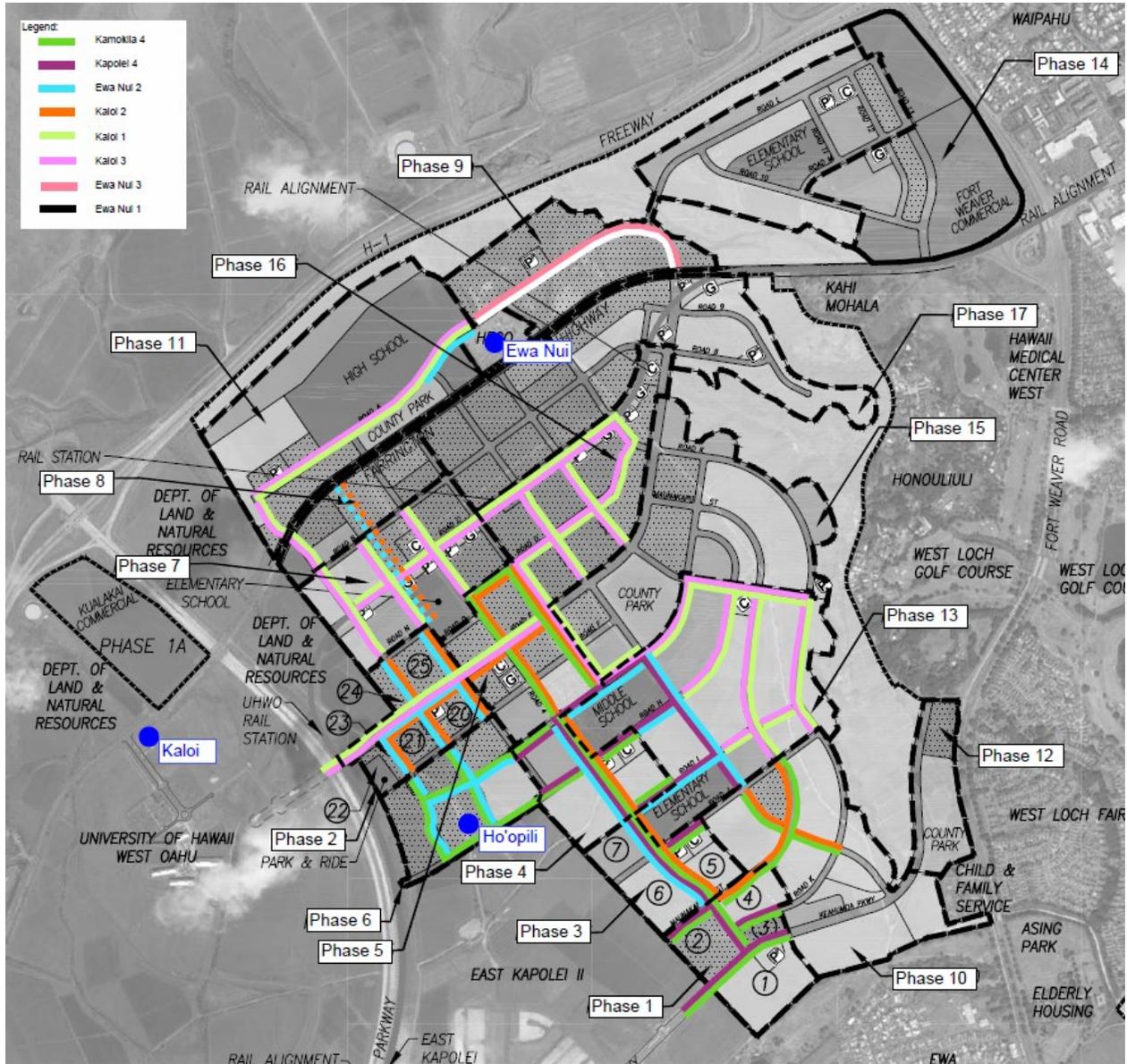


Figure 1: Planned Ho'opili Development

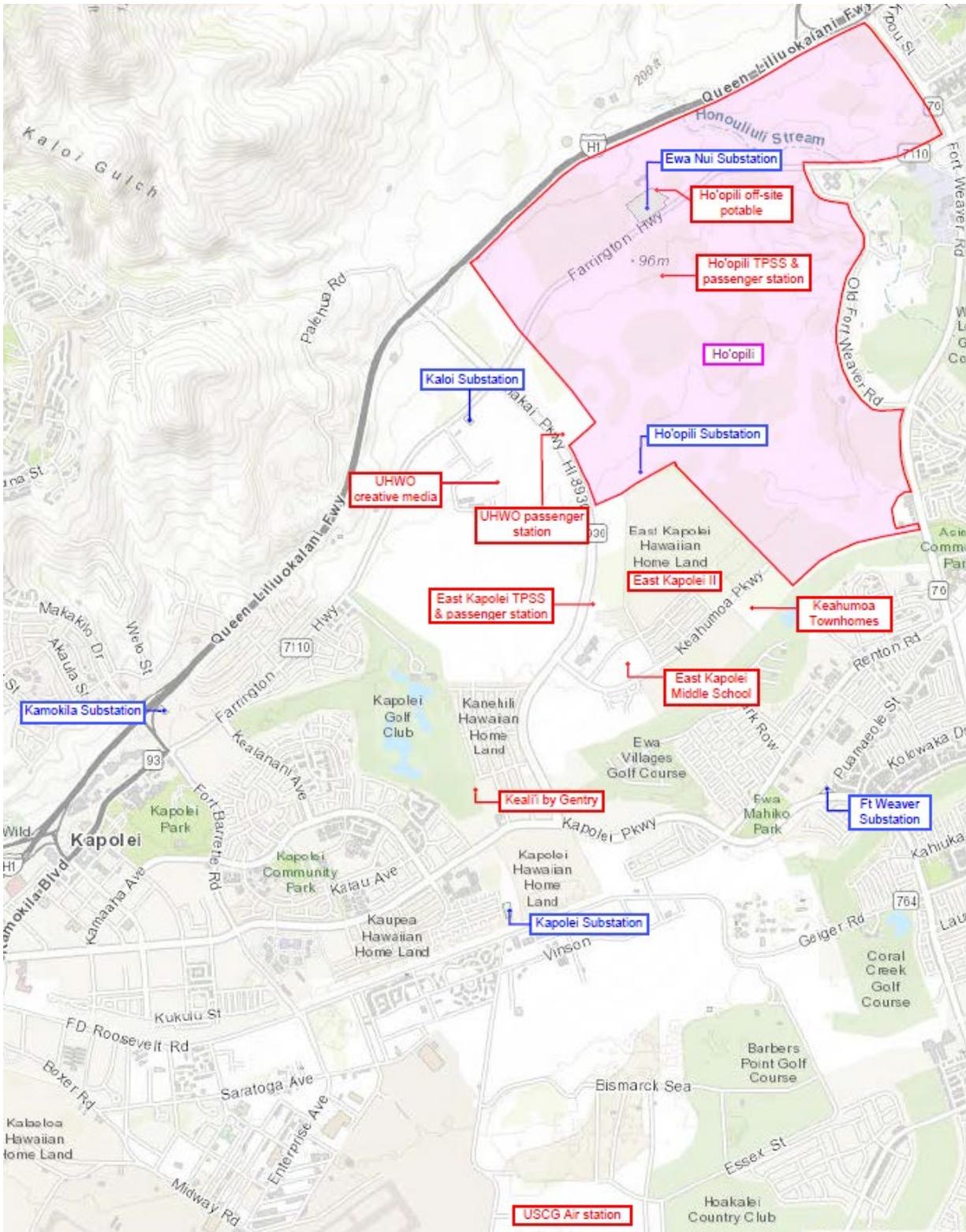


Figure 2: Overall Area Map

Ho’opili and East Kapolei Customer Composition

Existing Customer Composition

Table 1 provides the existing meter counts on the circuits and transformers causing the contingency overloads. These meter counts also include the initial phases of Ho’opili that have been energized.

The Kamokila 4 circuit customer counts only represent the meters that will transfer to Kapolei 4 circuit when the Kamokila 4 circuit or transformer is out of service.

While the remaining circuits and transformers affected by the Ho’opili development have existing customers, the loads will be transferred to other circuits to maximize the available capacity to serve load growth in the East Kapolei area.

Table 1: Existing Customer Counts

Equipment	Residential Customer Count	Commercial and Industrial Customer Count	Existing PV (MW)
Ewa Nui 2 Ckt	0	0	0
Ewa Nui 3 Ckt	0	0	0
Kaloι 1 Ckt	0	10	0.6
Kaloι 2 Ckt	0	0	0
Kaloι 3 Ckt	0	0	0
Portion of Kamokila 4 Ckt	744	236	1.2
Kapolei 4 Ckt	435	101	6.2

Forecasted Customer Composition

Table 2 and Table 3 provide forecasted residential customer counts by circuit and forecasted customer square footage. In the current forecast, each single family home (“SF”) is assumed to produce a coincident peak load of 3 kVA, and the multifamily and apartment unit (“MF/A”) is assumed to produce a peak load of 2.5 kVA. The projected load for commercial loads are .0045 kVA/sq ft unless otherwise noted. Table 4 contains the other loads forecasted to be in-service in the near-term in the East Kapolei Area. Table 5 contains the Ho’opili loads.

Table 2: Projected Ho’opili Single Family (SF) and Multi-Family and Apartment (MF/A) Customer Counts

Circuit	2022		2023		2024	
	SF	MF/A	SF	MF/A	SF	MF/A
Ewa Nui 2	580	1,234	580	1,234	580	1,234
Ewa Nui 3	0	0	0	0	0	0
Kaloι 1	92	493	184	1,151	184	1,151
Kaloι 2	651	1,251	651	1,251	651	1,671
Kaloι 3	407	328	407	1,882	407	1,882
Kapolei 4	0	0	0	0	0	0
Kamokila 4	396	366	396	366	396	366

Table 3: Ho'opili for Commercial (C), Industrial (I), and School (S) Square Footage

Circuit	2022			2023			2024		
	C	I	S	C	I	S	C	I	S
Ewa Nui 2	371,698	0	0	371,698	0	0	371,698	0	666,468
Ewa Nui 3	0	797,039	0	0	797,039	0	0	797,039	0
Kaloi 1	620,730	0	0	1,110,548	0	2,064,744	1,110,548	0	2,064,744
Kaloi 2	703,102	0	0	703,102	0	0	1,107,296	0	0
Kaloi 3	60,984	0	0	551,252	0	0	551,252	0	509,652
Kapolei 4	0	0	0	0	0		0	0	
Kamokila 4	570,331	0	0	570,331	0	0	570,331	0	0

Table 4: Other New Loads (Non-Ho'opili driven)

Customer	Year	Load Type	Customer Count	Load MVA	Primary Circuit	Backup Circuit
East Kapolei TPSS Initial Load	2019	Constant	1	1.5	Kamokila 4	Kapolei 4
East Kapolei Passenger Station	2019	Constant	1	0.5	Kamokila 4	Kapolei 4
UHWO Passenger Station	2019	Constant	1	0.6	Kaloi 1	Kaloi 3
UHWO Creative Media	2019	Commercial	1	0.6	Kaloi 1	Kaloi 3
East Kapolei II	2019–2022	Residential	387 SF 322 MF	2.0	Kapolei 4	Kamokila 4
East Kapolei II Middle School	2019	Commercial	1	1.5	Kapolei 4	Kamokila 4
Keali'i by Gentry	2019	Residential	66 SF	0.3	Kamokila 4	Kapolei 4
US Coast Guard Air Station	2022	Commercial	1	2.9	Kapolei 4	Kapolei 2
East Kapolei TPSS Testing	2023	Constant	1	1.2	Kamokila 4	Kapolei 4

Table 5: Ho‘opili loads by phase

Ho‘opili Phase	Year	Load Type	Load KVA	Primary Circuit	Backup Circuit
1	Existing	Single Family	465	Kamokila 4	Kapolei 4
	Existing	Apartment MU	380	Kamokila 4	Kapolei 4
	2019	Commercial	687	Kamokila 4	Kapolei 4
2	2020	Multi Family	1350	Kaloi 1	Ewa Nui 2
	2020	Commercial	743	Kaloi 1	Ewa Nui 2
3	Existing	Single Family	345	Kamokila 4	Kapolei 4
	Existing	Multi Family	265	Kamokila 4	Kapolei 4
	2019	Commercial	39	Kamokila 4	Kapolei 4
4	2020	Single Family	378	Kamokila 4	Kapolei 4
	2020	Multi Family	270	Kamokila 4	Kapolei 4
	2020	Commercial	33	Kamokila 4	Kapolei 4
6	2020	Single Family	174	Ewa Nui 2	Kamokila 4
	2020	Apartment MU	2000	Ewa Nui 2	Kamokila 4
	2020	Commercial	673	Ewa Nui 2	Kamokila 4
5	2021	Single Family	153	Kaloi 2	Kamokila 4
	2021	Multi Family	1137.5	Kaloi 2	Kamokila 4
	2021	Commercial	603	Kaloi 2	Kamokila 4
10A	2021	Single Family	1422	Kaloi 2	Kamokila 4
	2021	Multi Family	370	Kaloi 2	Kamokila 4
	2021	Commercial	130	Kaloi 2	Kamokila 4
13A	2022	Single Family	1221	Ewa Nui 2	Kapolei 4
	2022	Multi Family	820	Ewa Nui 2	Kapolei 4
	2022	Commercial	24	Ewa Nui 2	Kapolei 4
	2024	School	1500	Ewa Nui 2	Kapolei 4
9	2020	Industrial	3606	Ewa Nui 3	Ewa Nui 2 SB
11	2022	Single Family	276	Kaloi 1	Ewa Nui 2
	2022	Multi Family	1232.5	Kaloi 1	Ewa Nui 2
	2022	Commercial	437	Kaloi 1	Ewa Nui 2
	2023	School	4000	Kaloi 1	Ewa Nui 2
13B	2022	Single Family	1221	Kaloi 3	Kaloi 1
	2022	Multi Family	820	Kaloi 3	Kaloi 1
	2022	Commercial	24	Kaloi 3	Kaloi 1
	2024	School	1500	Kaloi 3	Kaloi 1
7	2023	Single Family	276	Kaloi 1	Kaloi 3
	2023	Multi Family	1645	Kaloi 1	Kaloi 3
	2023	Commercial	644	Kaloi 1	Kaloi 3
16	2023	Multi Family	3885	Kaloi 3	Kaloi 1
	2023	Commercial	1252	Kaloi 3	Kaloi 1

Ho'opili Phase	Year	Load Type	Load KVA	Primary Circuit	Backup Circuit
8	2024	Multi Family	1050	Kaloi 2	Ewa Nui 2
	2024	Commercial	1146	Kaloi 2	Ewa Nui 2
10B	2025	Single Family	1422	Kamokila 4	Kapolei 4
	2025	Multi Family	370	Kamokila 4	Kapolei 4
	2025	Commercial	130	Kamokila 4	Kapolei 4
12	2026	Commercial	679	Kamokila 4	Kapolei 4
17	2027	Single Family	834	Ewa Nui 2	Kaloi 1
	2027	Multi Family	4525	Ewa Nui 2	Kaloi 1
	2027	Commercial	1442	Ewa Nui 2	Kaloi 1
14	2029	Single Family	609	Ewa Nui 2	Ewa Nui 1
	2029	Apartment MU	1700	Ewa Nui 2	Ewa Nui 1
	2029	Commercial	6999	Ewa Nui 2	Ewa Nui 1
	2029	School	1500	Ewa Nui 2	Ewa Nui 1
15	2030	Single Family	645	Kaloi 2	Kaloi 3
	2030	Multi Family	1830	Kaloi 2	Kaloi 3
	2030	Commercial	561	Kaloi 2	Kaloi 3
1A	TBD	Commercial	2239	TBD	TBD

Ho'opili Area NWA

Ho'opili and East Kapolei Distribution System Overview

Figure 3 illustrates the expected configuration of the distribution system to serve projected Ho'opili and East Kapolei loads.

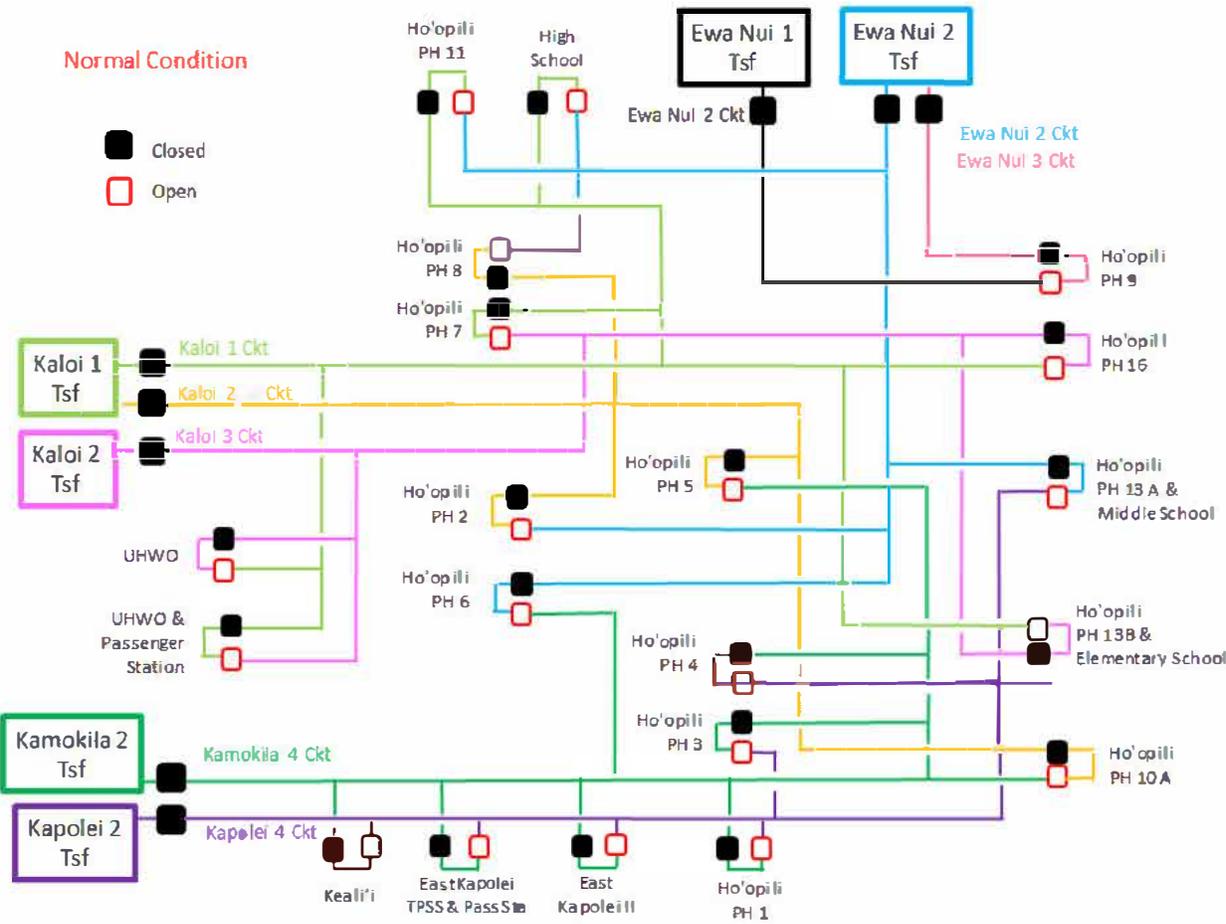


Figure 3: Simplified Distribution System Map of Projected Service of Ho'opili Loads

Table 6 provides the contingency scenarios that are forecasted to have overloads by 2024. For example, in Figure 3, when the Ewa Nui 2 circuit is out of service, a portion of its loads (Ho'opili Phase 6) transfers to Kamokila 4, and the remaining portion (Ho'opili 13A and Middle School) transfers to Kapolei 4.

Table 6: Contingency Scenarios for Ho'opili and East Kapolei in 2024

Circuit	Backed Up By							
	Ewa Nui 2 SB	Ewa Nui 2	Ewa Nui 3	Kaloi 1	Kaloi 2	Kaloi 3	Kamokila 4	Kapolei 4
Ewa Nui 2							X	X
Ewa Nui 3	X							
Kaloi 1		X				X		
Kaloi 2		X					X	
Kaloi 3				X				
Kamokila 4								X
Kapolei 4							X	

Table 7 provides the allowable supply and demand reduction solutions for each distribution circuit. Supply solutions include inverter-based resources such as PV or battery systems. Demand reduction solutions include energy efficiency and demand response.

Table 7: Allowable Supply and Demand Reduction Solutions per Distribution Circuit

Location of Resource	Supply (Inverter-Based)		Demand Reduction	
	BTM ¹	IFTM ²	BTM	IFTM
Ewa Nui 2 Ckt	Yes	Yes	Yes	Yes
Kaloi 1 Ckt	Depends	Depends	Yes	Yes
Kaloi 2 Ckt	Depends	Depends	Yes	Yes
Kaloi 3 Ckt	Depends	Depends	Yes	Yes
Portion of Kamokila 4 Ckt	Depends	Depends	Yes	Yes
Kapolei 4 Ckt	Yes	Yes	Yes	Yes

¹ Behind the meter

² In front of the meter

During a contingency event, inverter-based resources will trip and remain offline until voltage and frequency are restored and remain stable for five minutes. Under a contingency event where a circuit trips and its loads transfer to a backup circuit, the transferred loads will momentarily lose power (for 12 seconds) and the inverter-based resources connected to those loads will trip on under-voltage until voltage is restored and remains stable for five minutes. In other words, if inverter-based resources are being transferred to the back-up circuit, the back-up circuit will experience unacceptable overloading for at least a 5-minute duration. For the loads on the circuit(s) that experience the momentary outage, only demand reduction solutions are capable of maintaining load reduction during the contingency event. Both demand reduction solutions and supply (inverter-based) solutions are capable of maintaining load reduction for the backup circuit(s) that accept the loads from the circuit(s) that experience the outage during the contingency event.

Depending on the overload to be solved and the location of the resource an inverter-based resource may or may not be acceptable. The Company will consider solutions to mitigate the anti-islanding, 5-minute reconnection time. For instance, the company may consider solutions such as interrupting proportional amount of load until the inverter-based resource is restored to full output as to not overload the circuit, and/or modifying the 5-minute reconnection setting.

Ho’opili and East Kapolei Distribution System Forecasted Service Needs through 2024

Overview of Reliability (Back-Tie) Service Needs

Table 8 and Table 9 summarize the normal and contingency overloads for which Reliability (back-tie) Services are needed. There are other overloads in other contingency scenarios studied. However, the tables below and in subsequent sections, represent the scenarios which, if solved, will also solve the other identified overloads, therefore deferring the planned distribution investment.

All identified overloads listed for each deferral opportunity must be met through the Reliability Service in order to defer the distribution investment. Only meeting a portion of the need will not defer the need. For example, to defer the Ho’opili Substation, the overloads on Ewa Nui 2 circuit, Kaloi 1 transformer, Kaloi 3 circuit, and Kamokila 4 circuit must be fully met.

Table 8: Summary of Normal Overloads

Deferral Opportunity	Equipment	MW Peak	Operational Date	Delivery Months	Delivery Hours	Duration (Hr)	Max # of Days	MWH
Ho’opili Substation	Kaloi 1 Tsf	4.7	Jan 2023	Jan - Dec	1PM – 11AM	10	365	21.5
	Kaloi 3 Ckt	0.3	Aug 2023	Aug - Oct	7PM - 9PM	2	69	0.4

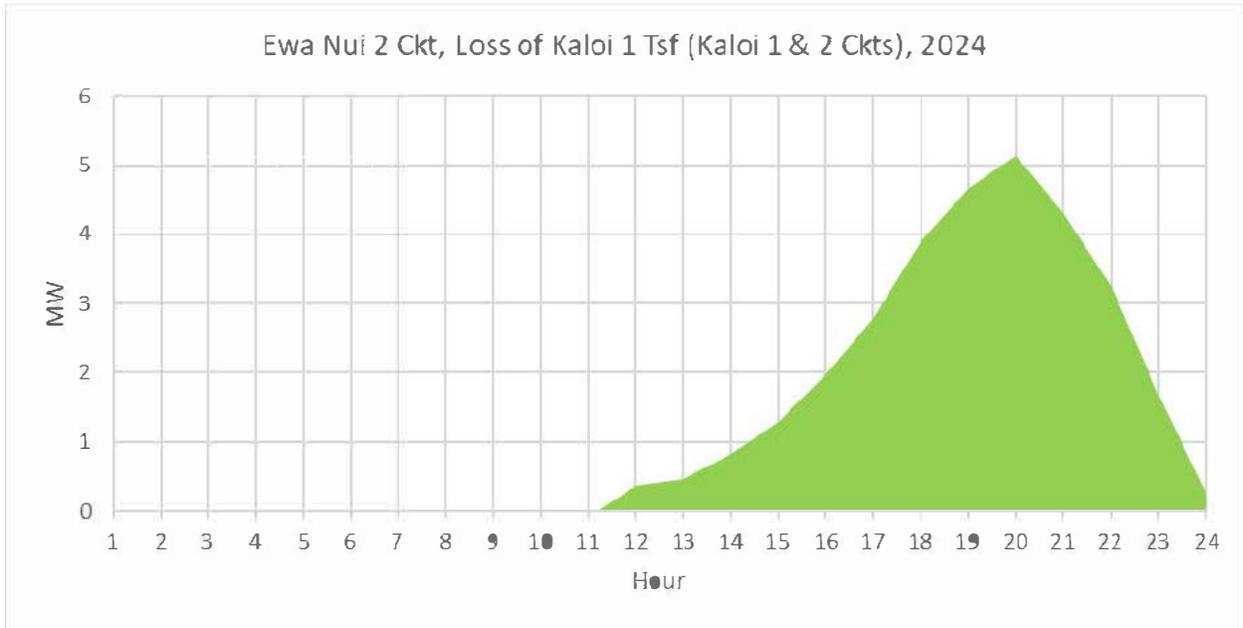
Table 9: Summary of Contingency Overloads

Deferral Opportunity	Equipment	MW Peak	Operational Date	Delivery Months	Delivery Hours	Duration (Hr)	Max # of Days	MWH
Kapolei 4 Circuit Extension	Kapolei 2 Tsf	3.5	Feb 2022	Jan - Dec	5PM - 11PM	6	365	11.4
Ho’opili Substation	Ewa Nui 2 Ckt	5.1	Jan 2023	Jan - Dec	11AM - 12AM	13	365	30.9
	Kaloi 1 Tsf ¹	9.7	Jan 2023	Jan - Dec	6AM - 8AM, 9AM - 12AM	17	365	62.8
	Kaloi 3 Ckt ¹	2.6	Jan 2023	Jan - Dec	5PM - 11PM	6	365	8.5
	Kamokila 4 Ckt	1.0	May 2023	Jan - Dec	5PM - 10PM	5	226	2.9

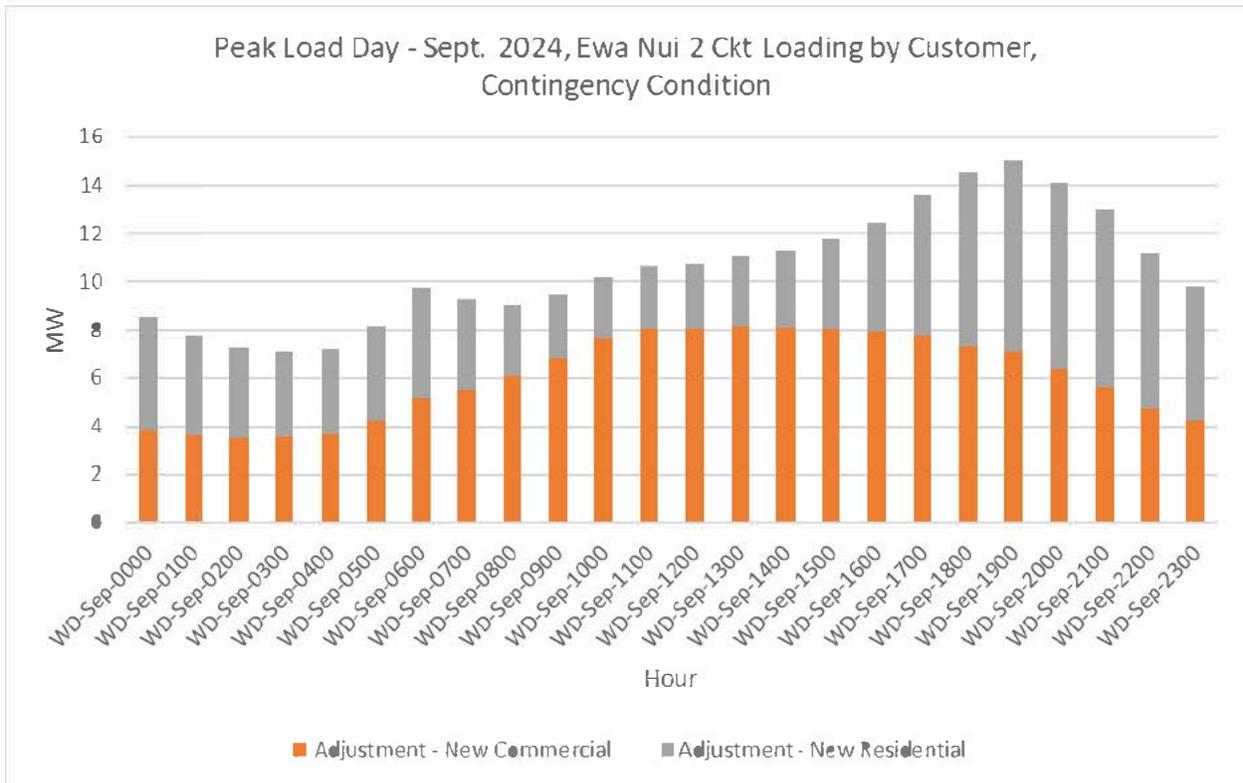
¹ If the Reliability (back-tie) Service is scheduled dispatch (i.e., dispatched each day specified in the “Max # of Days” column) then the normal overload need will also be met.

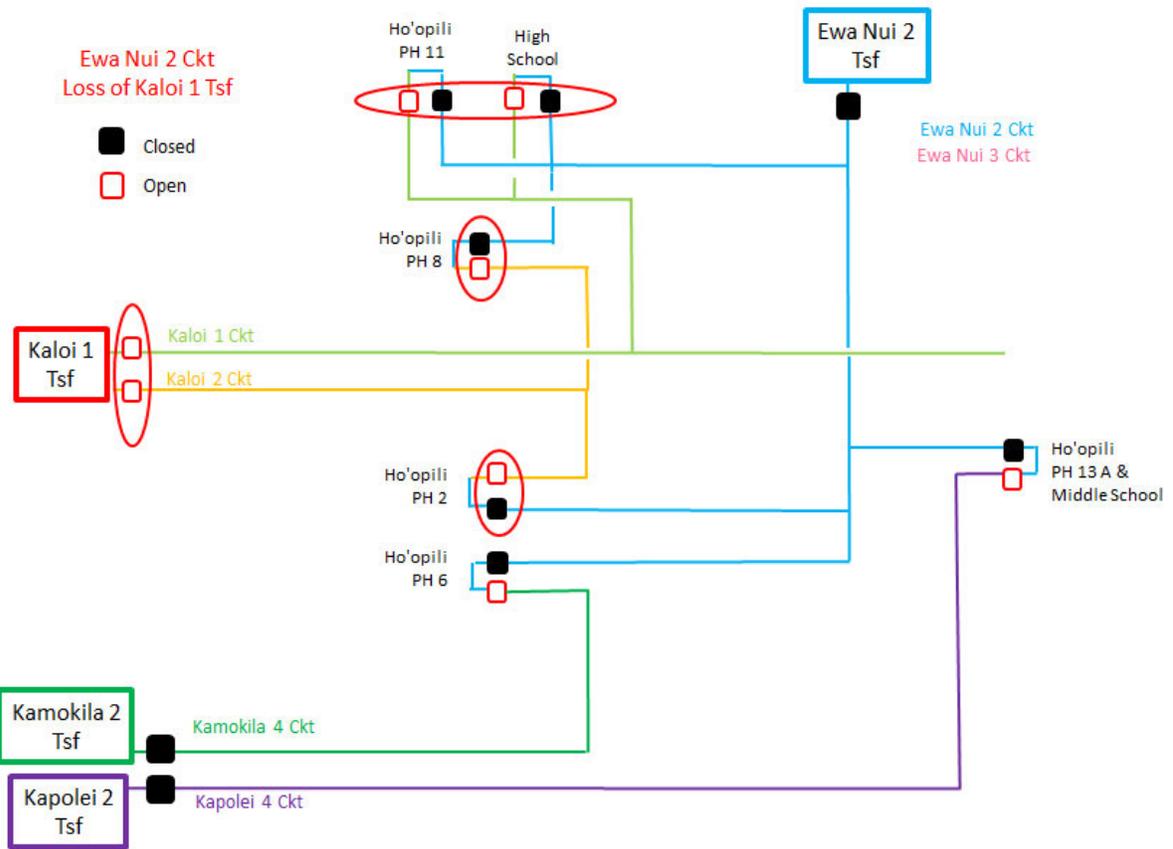
The following sections provide additional details for each identified need in Table 7 and Table 8.

Projected Ho'opili and East Kapolei Reliability (Back-Tie) Service Needs

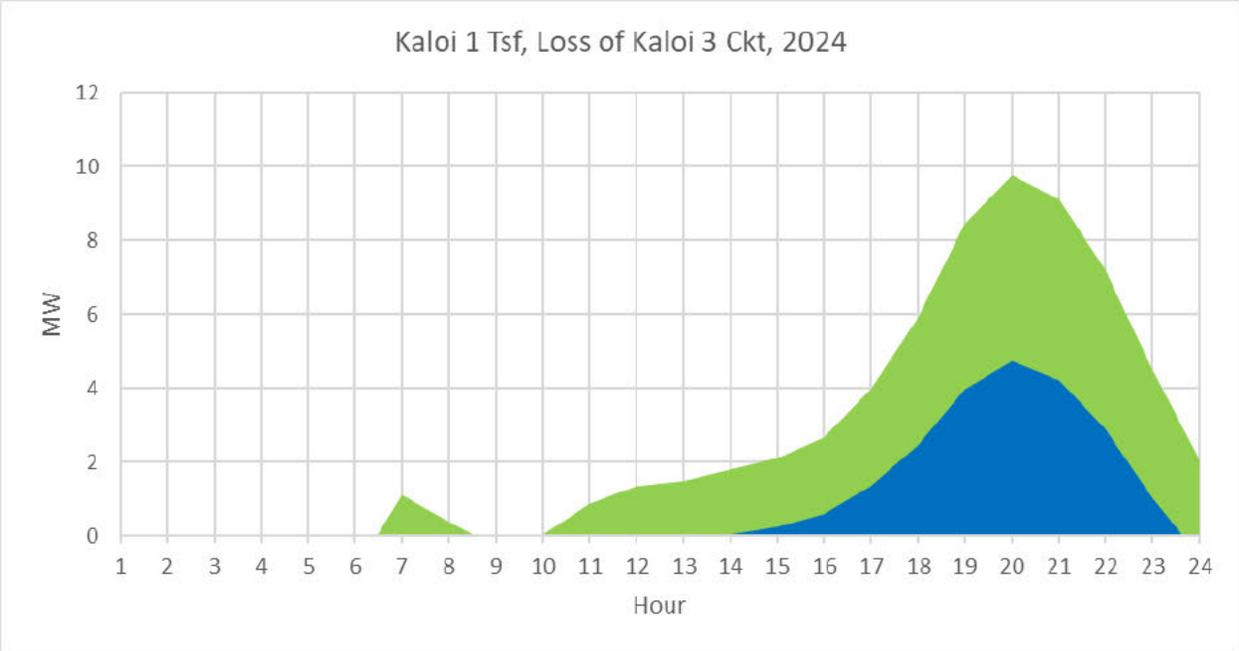


Equipment	MW Peak	Delivery Months	Delivery Hours	Duration (Hr)	Max # of Days	MWH
Ewa Nui 2 Ckt	5.1	Jan - Dec	11AM - 12AM	13	365	30.9



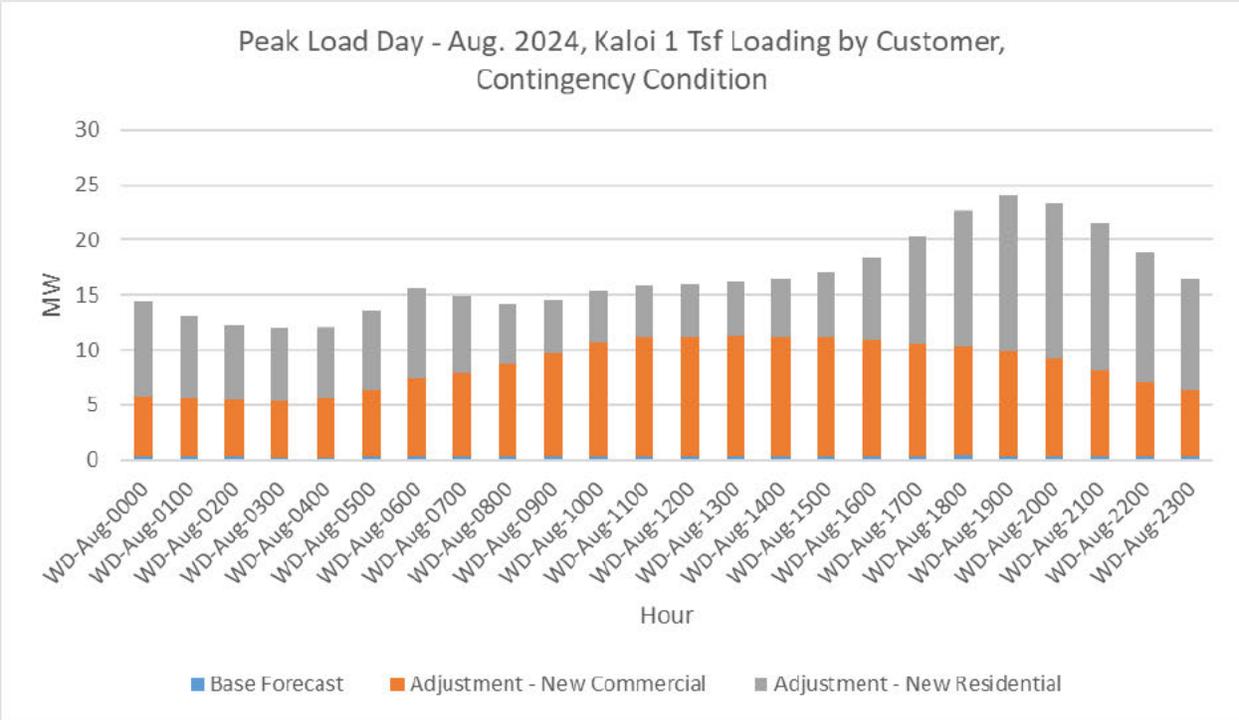


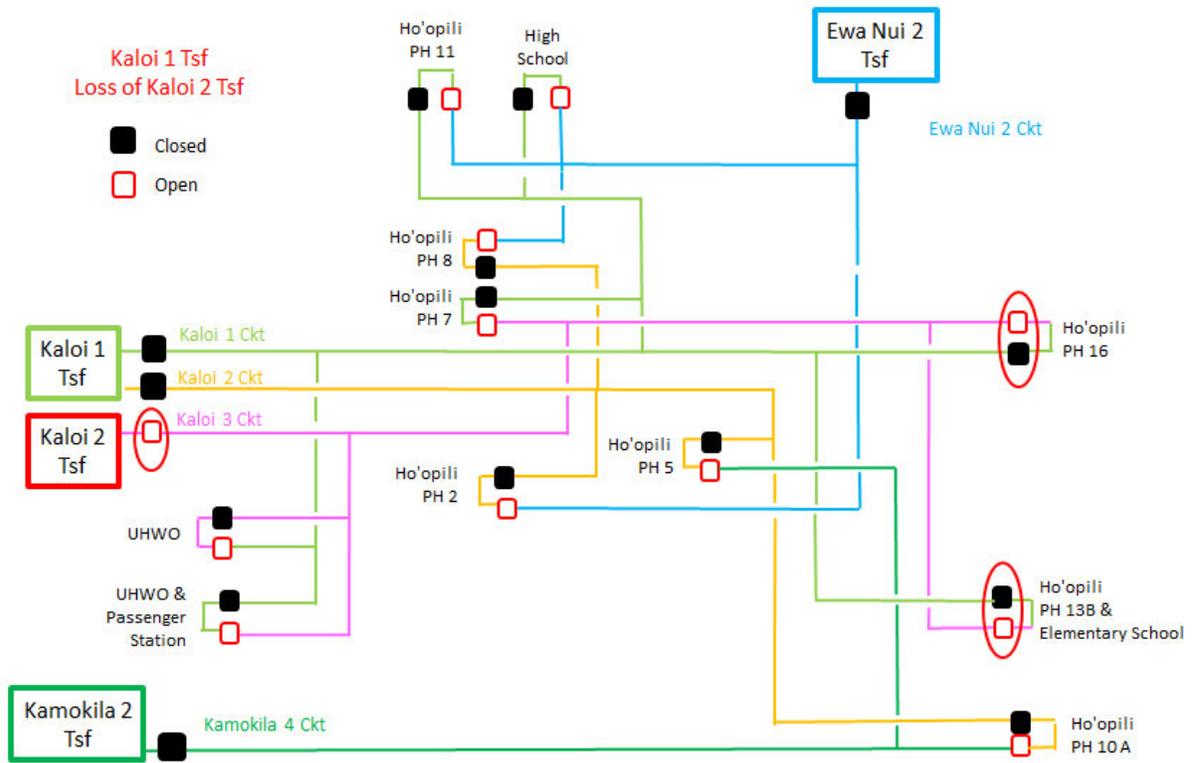
Supply and Demand Reduction NWA: Ewa Nui 2 Circuit
 Demand Reduction NWA: Kaloi 1 Circuit, Kaloi 2 Circuit



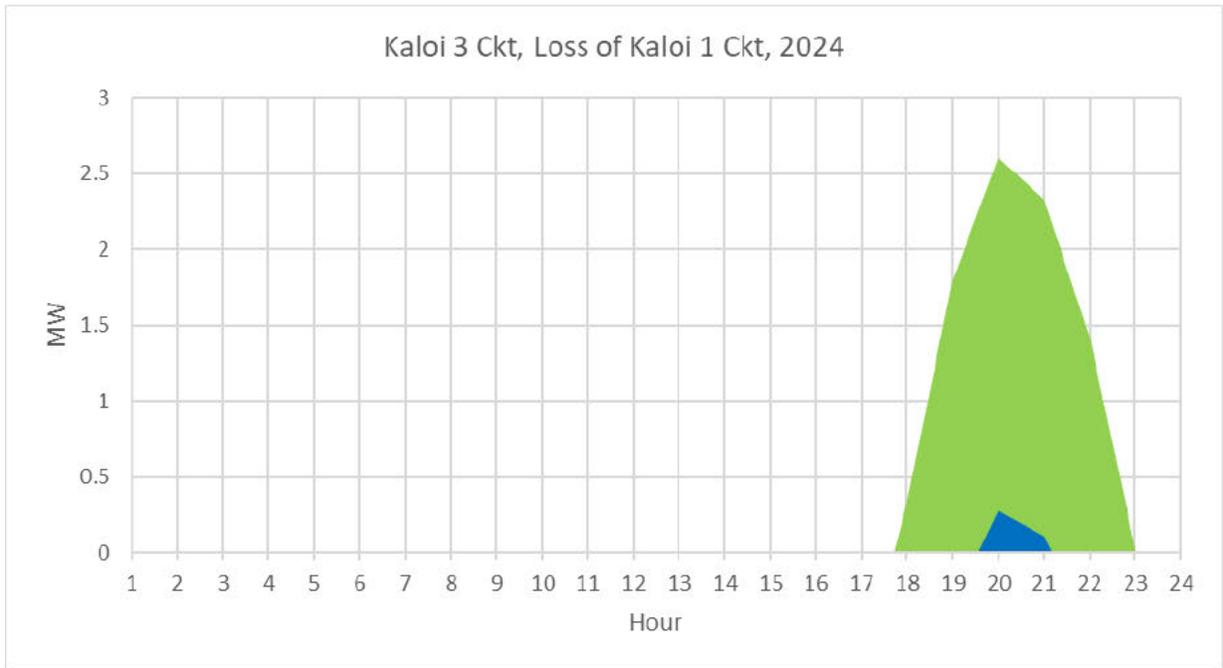
Equipment	MW Peak	Delivery Months	Delivery Hours	Duration (Hr)	Max # of Days	MWH
Kaloi 1 Tsf Normal¹	4.7	Jan - Dec	1PM - 11AM	10	365	21.5
Kaloi 1 Tsf Contingency	9.7	Jan - Dec	6AM - 8AM, 9AM - 12AM	17	365	62.8

¹ If the Reliability (back-tie) Service is scheduled dispatch (i.e., dispatched each day specified in the “Max # of Days” column) then the normal overload need will also be met.



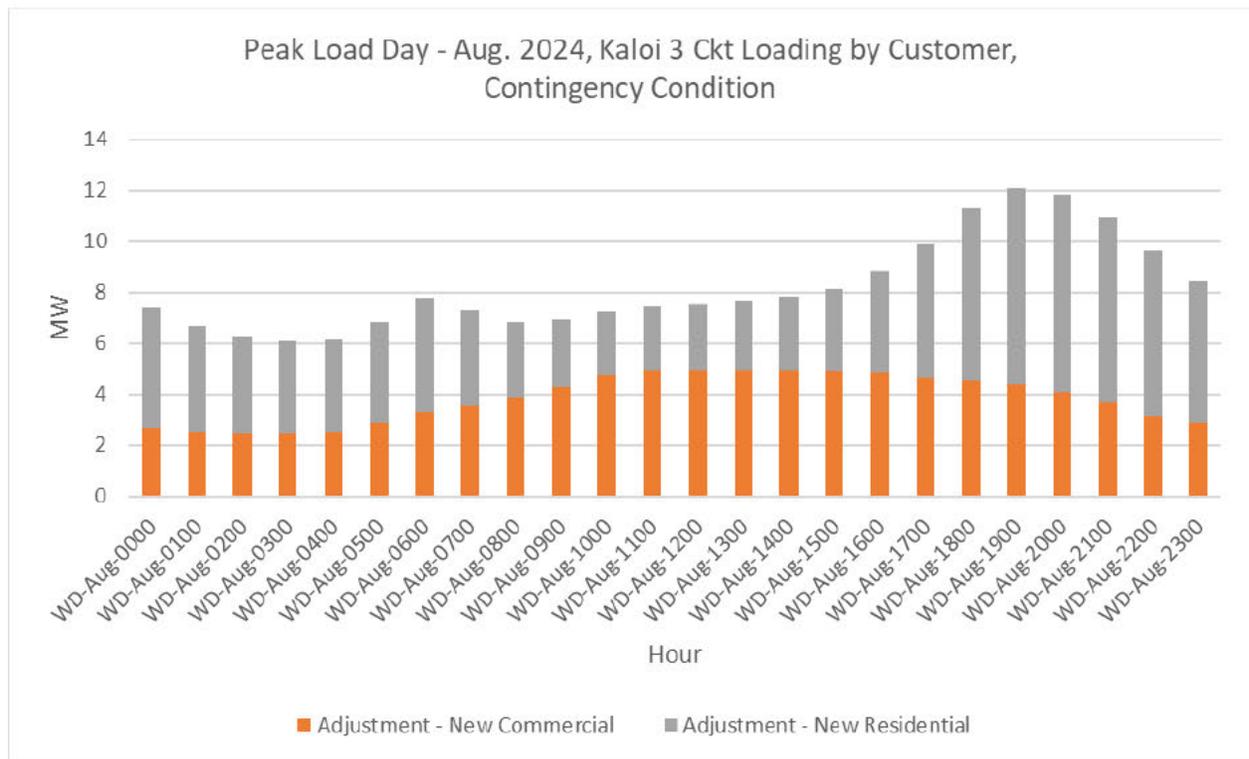


Supply and Demand Reduction NWA: Kalo 1 Circuit, Kalo 2 Circuit
 Demand Reduction NWA: Kalo 3 Circuit



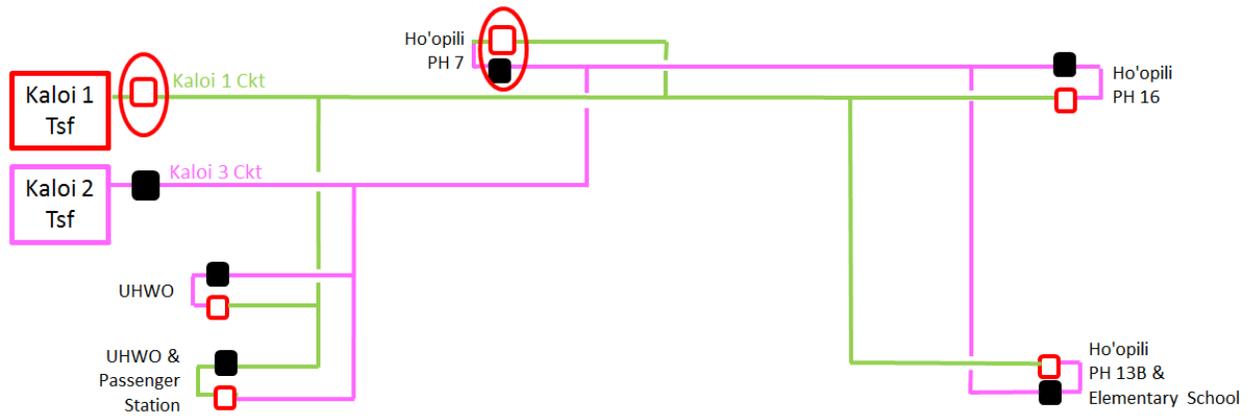
Equipment	MW Peak	Delivery Months	Delivery Hours	Duration (Hr)	Max # of Days	MWH
Kaloi 3 Ckt Normal¹	0.3	Aug - Oct	7PM - 9PM	2	69	0.4
Kaloi 3 Ckt Contingency	2.6	Jan - Dec	5PM - 11PM	6	365	8.5

¹ If the Reliability (back-tie) Service is scheduled dispatch (i.e., dispatched each day specified in the "Max # of Days" column) then the normal overload need will also be met.

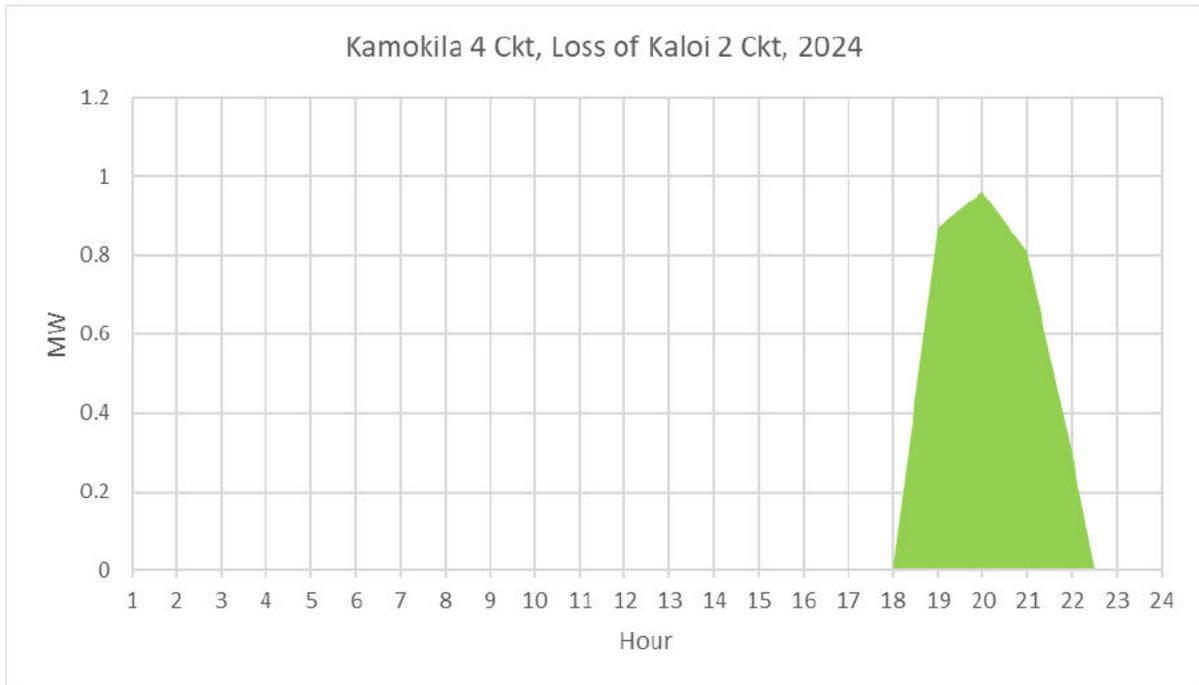


Kaloi 3 Ckt
Loss of Kaloi 1 Tsf

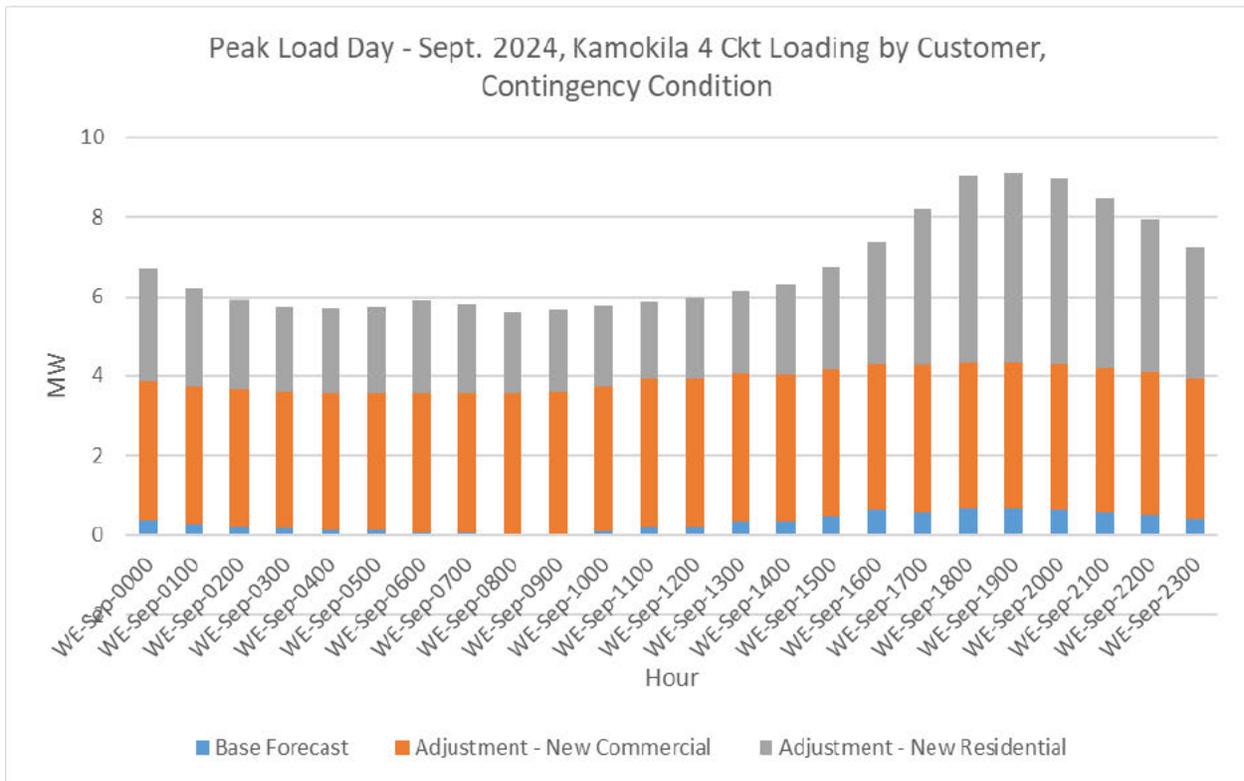
- Closed
- Open



Supply and Demand Reduction NWA: Kaloi 3 Circuit
Demand Reduction NWA: Kaloi 1 Circuit

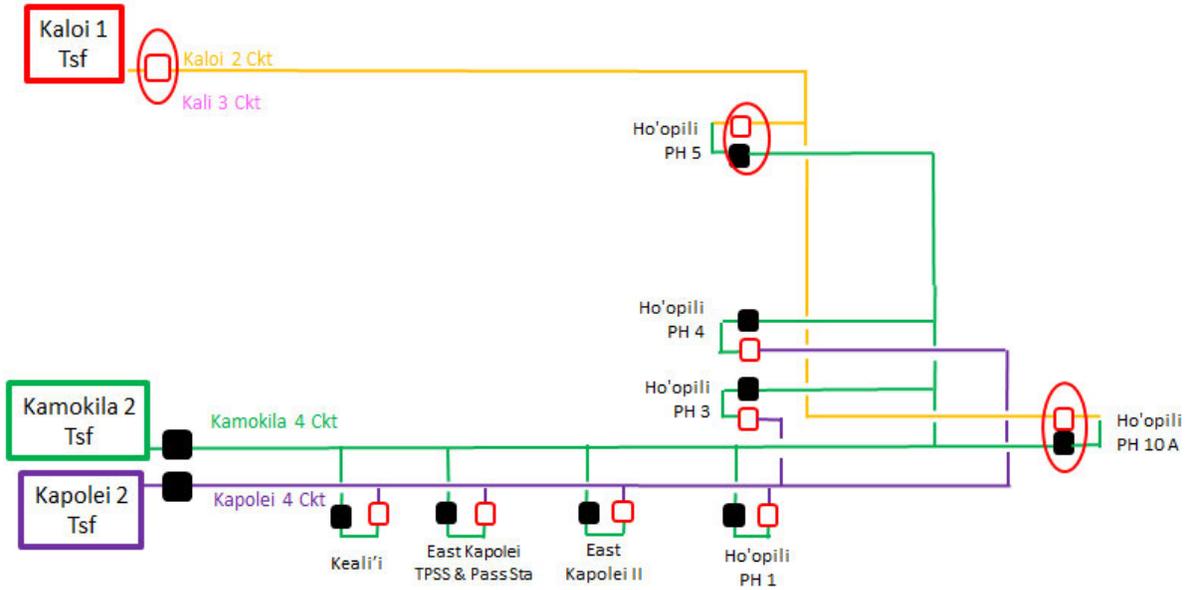


Equipment	MW Peak	Delivery Months	Delivery Hours	Duration (Hr)	Max # of Days	MWH
Kamokila 4 Ckt	1	May - Dec	5PM - 10PM	5	226	2.9

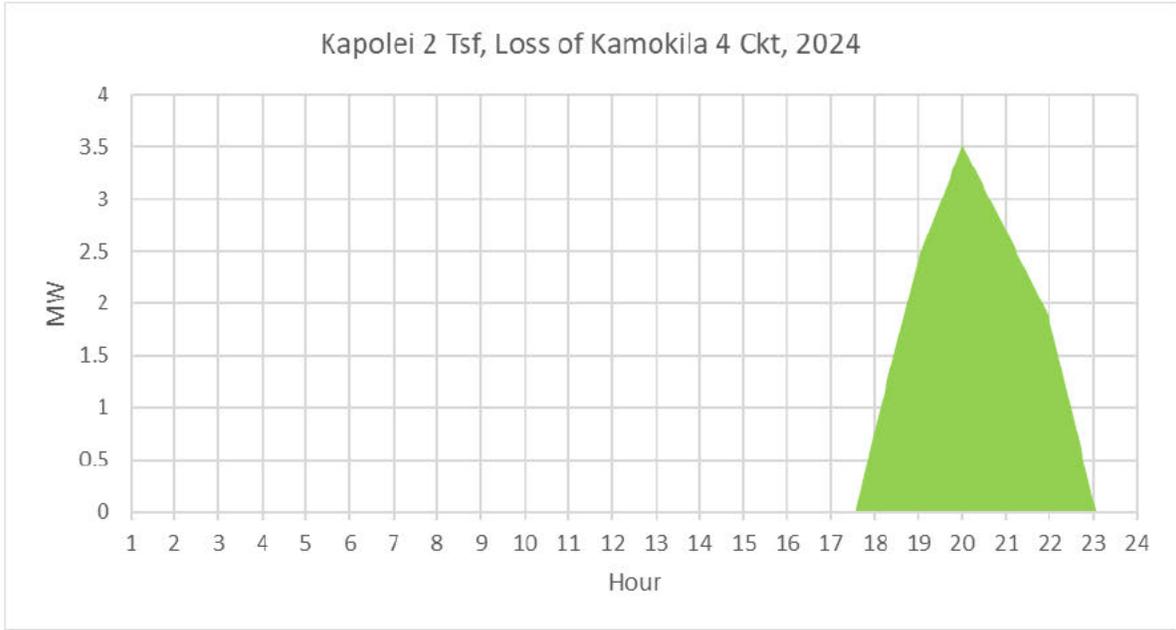


Kamokila 4 Ckt
 Loss of Kaloi 1 Tsf

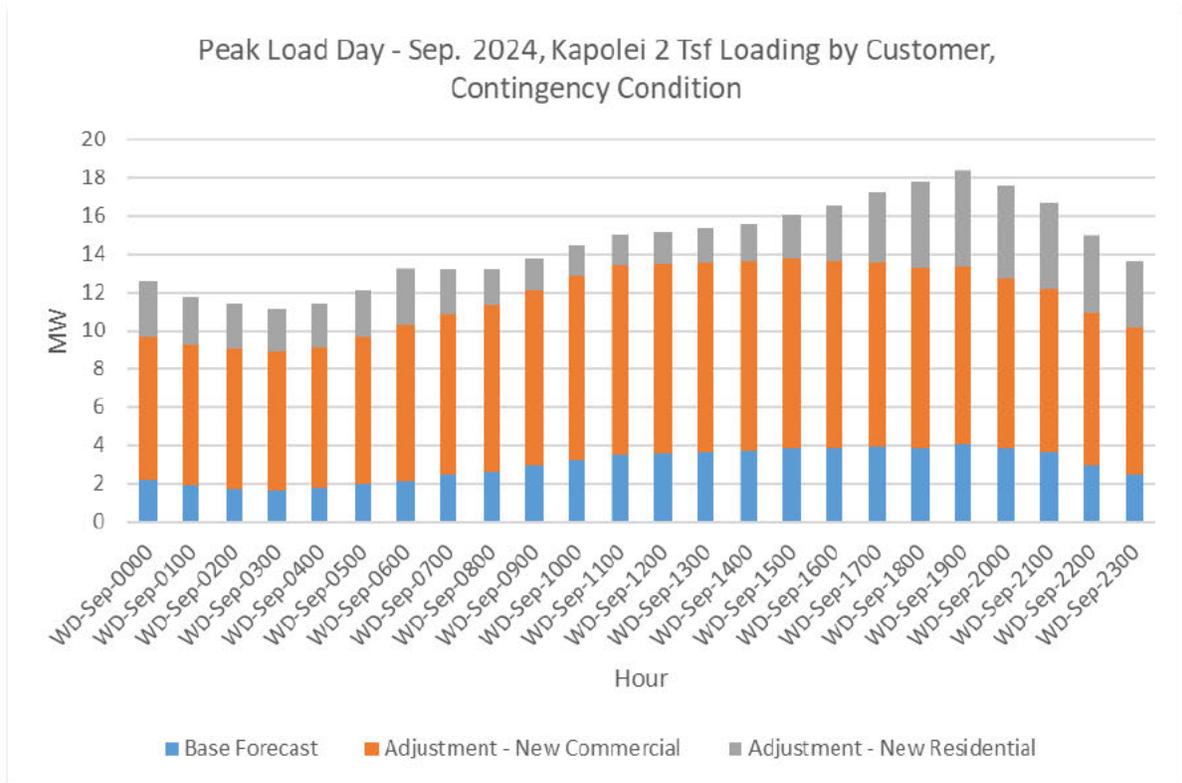
Closed
 Open



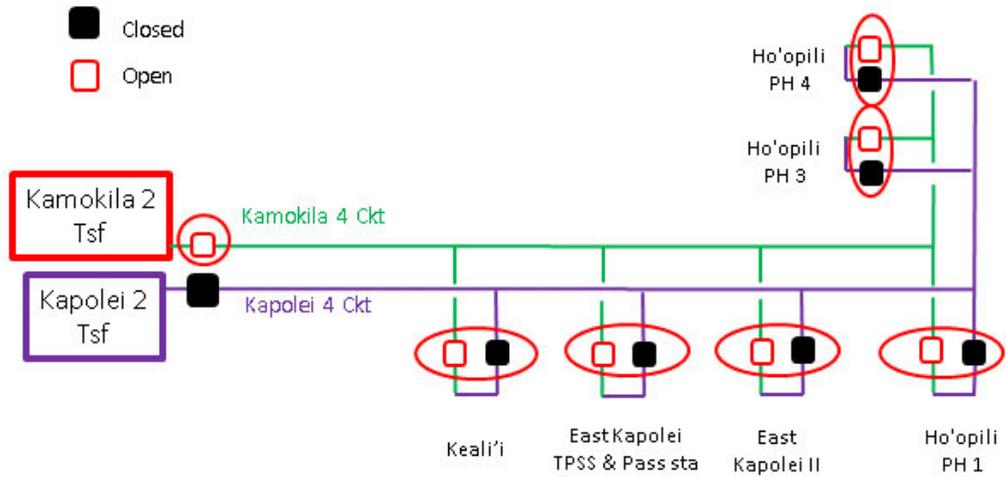
Supply and Demand Reduction NWA: Kamokila 4 Circuit
 Demand Reduction NWA: Kalo 2 Circuit



Equipment	MW Peak	Delivery Months	Delivery Hours	Duration (Hr)	Max # of Days	MWH
Kapolei 2 Tsf	3.5	Jan - Dec	5PM - 11PM	6	365	11.4



Kapolei 4 Ckt
Loss of Kamokila 2 Tsf



Supply and Demand Reduction NWA: Kapolei 4 Circuit
Demand Reduction NWA: Kamokila 4 Circuit

East Kapolei Area NWA

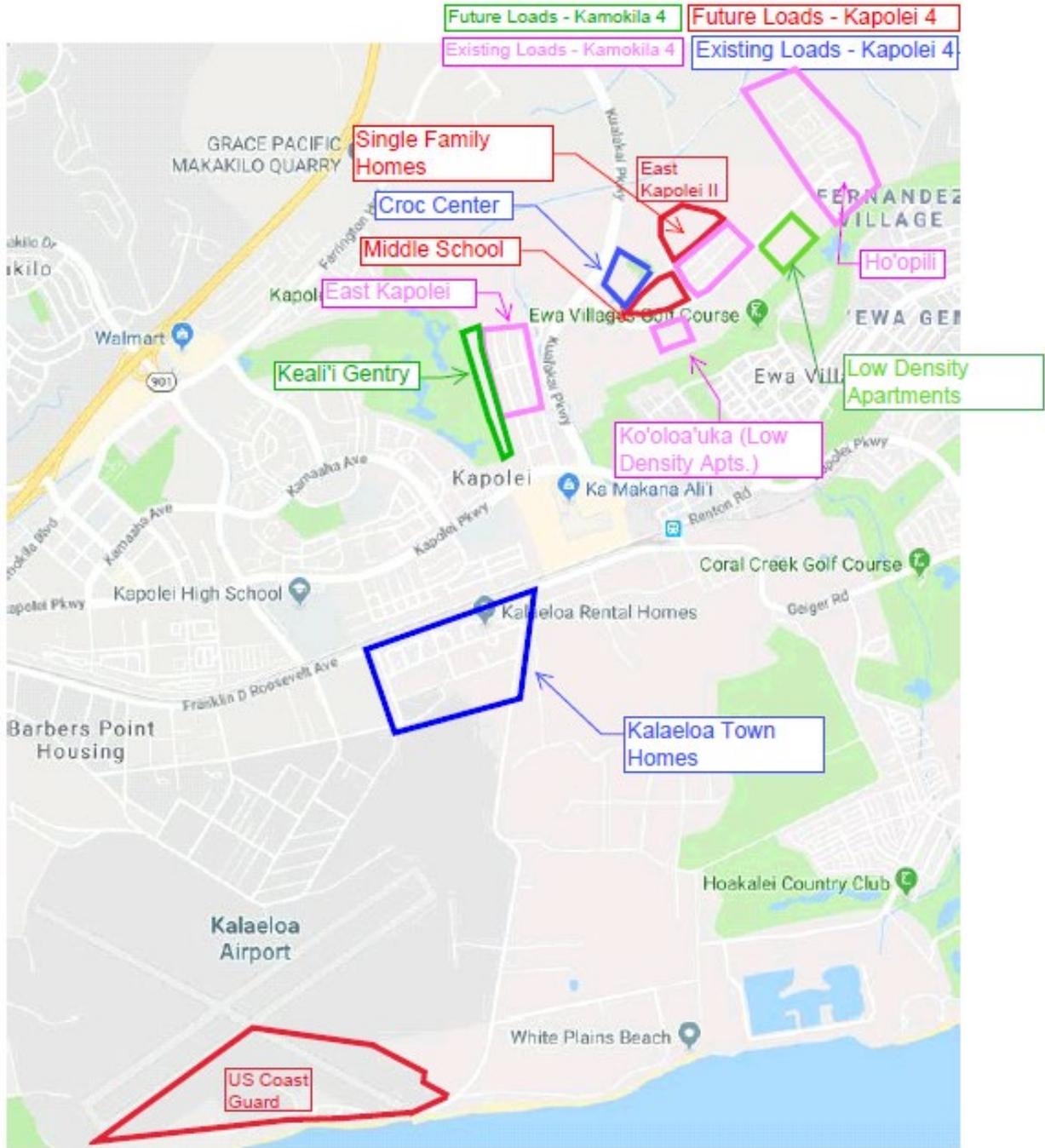


Figure 4: East Kapolei Existing and Forecasted Loads

East Kapolei Distribution System Overview

Figure 5 illustrates the expected configuration of the distribution system to serve East Kapolei loads. Table 10 provides the allowable supply and demand reduction solutions for each distribution circuit.

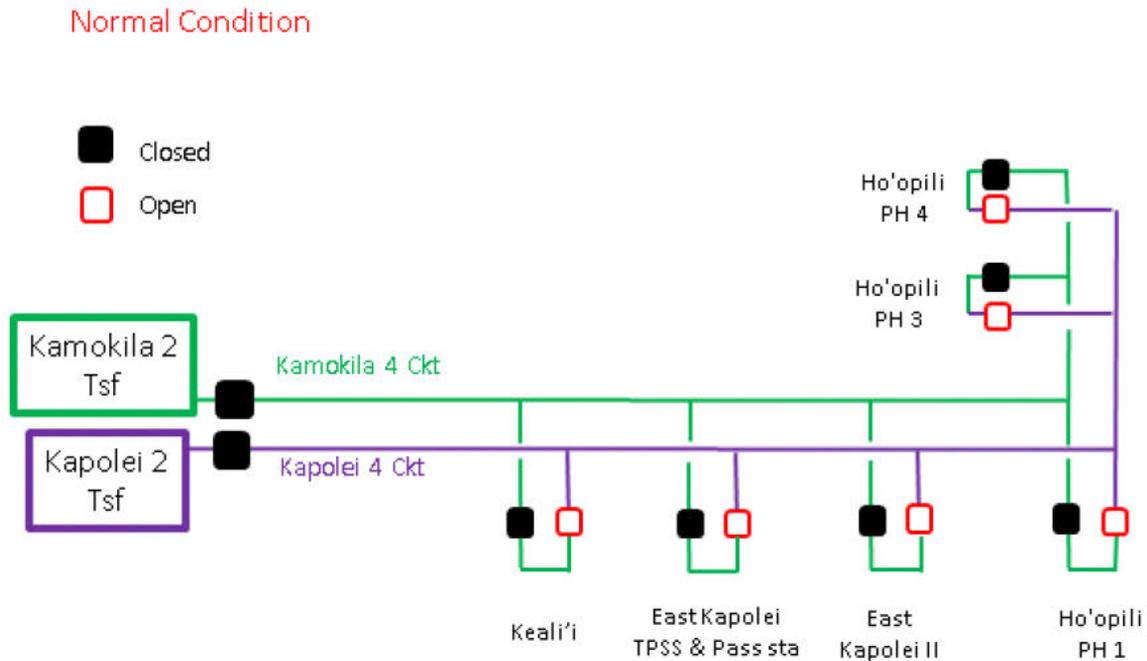


Figure 5: Simplified Distribution System Map of Projected Service of East Kapolei Loads

Table 10: Allowable Supply and Demand Reduction Solutions per Distribution Circuit

Location of Resource	Supply (Inverter-Based)		Demand Reduction	
	BTM	IFTM	BTM	IFTM
Portion of Kamokila 4 Ckt	Depends	No	Yes	Yes
Kapolei 4 Ckt	Yes	Yes	Yes	Yes

East Kapolei Distribution System Forecasted Service Needs through 2024

Overview of Reliability (Back-Tie) Service Needs

Table 11 summarizes the contingency overload for which Reliability (back-tie) Services are needed.

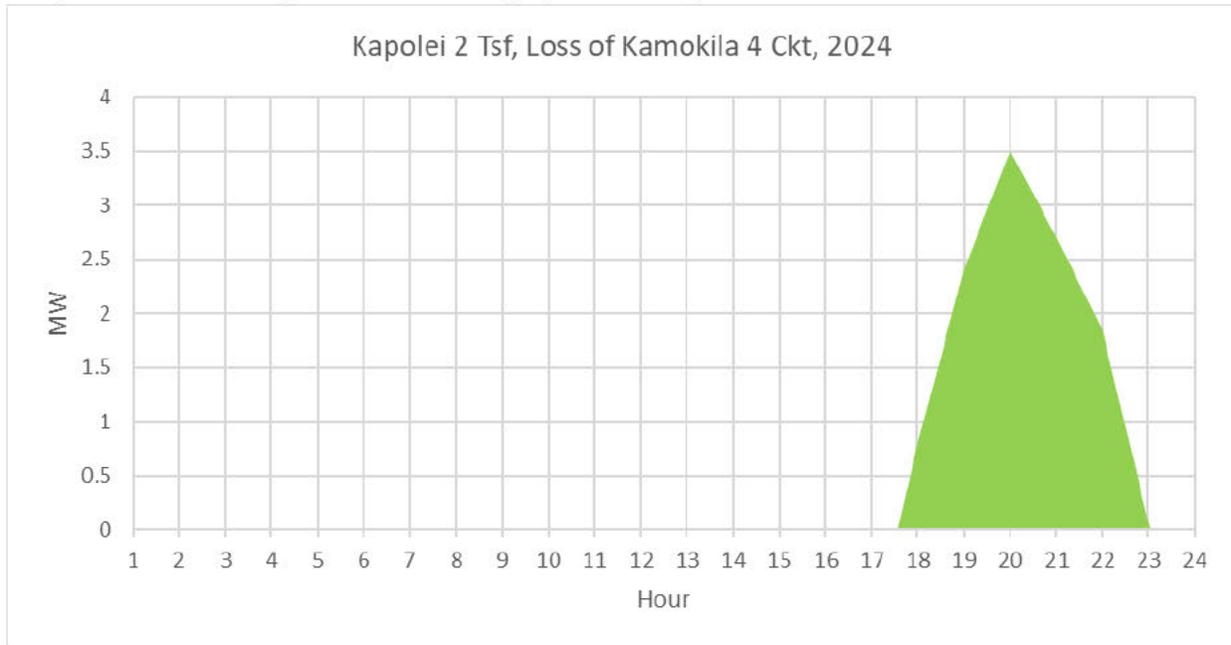
All identified overloads listed for each deferral opportunity must be met through the Reliability Service in order to defer the distribution investment.

Table 11: Summary of Contingency Overloads

Deferral Opportunity	Equipment	MW Peak	Operational Date	Delivery Months	Delivery Hours	Duration (Hr)	Max # of Days	MWH
Kapolei 4 Ckt Extension	Kapolei 2 Tsf	3.5	Jan 2022	Jan - Dec	5PM - 11PM	6	365	11.4

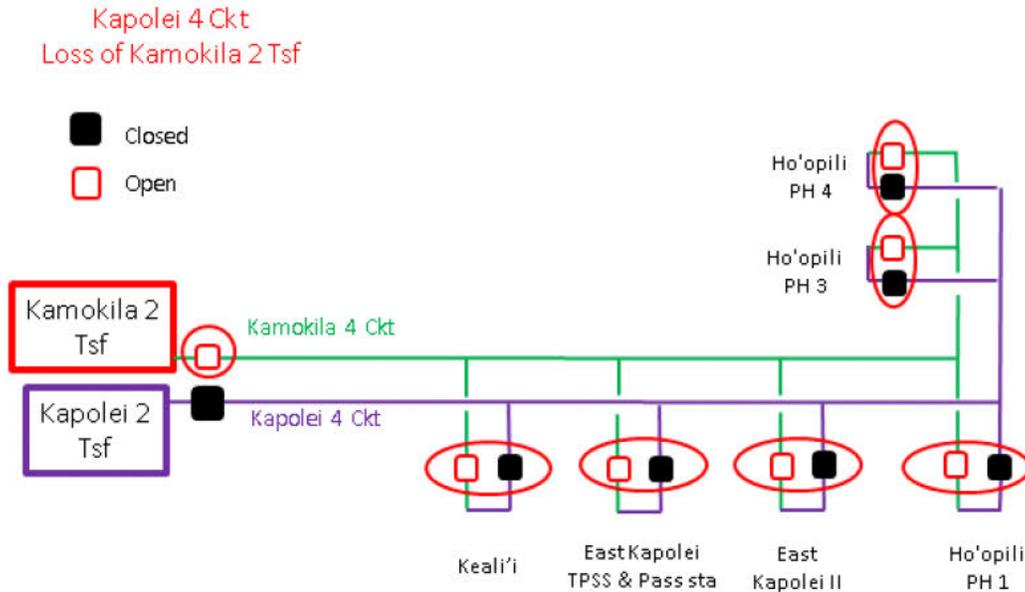
The following section provide additional details for each identified need in Table 11.

Projected East Kapolei Reliability (Back-Tie) Service Needs in 2024



Equipment	MW Peak	Delivery Months	Delivery Hours	Duration (Hr)	Max # of Days	MWH
Kapolei 2 Tsf	3.5	Jan - Dec	5PM - 11PM	6	365	11.4

Supply and Demand Reduction NWA: Kapolei 4 Circuit
 Demand Reduction NWA: Kamokila 4 Circuit



Hawaiian Electric Company

Ho'opili Area Study

Prepared By:

Distribution Planning Department

Transmission and Distribution and Interconnection Planning Division

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1 Executive Summary

The objective of the Ho'opili Area Study is to analyze the forecasted loads in the Ho'opili area, identify grid needs, and determine the best wires solution. Note that the Non-wire alternatives (NWA) for this area are being assessed as part of the Integrated Grid Planning (IGP) process soft launch. This study identifies the grid requirements for both wires and non-wires alternatives. The NWA solution will be evaluated based on the deferred cost of the recommended wires solution.

Ho'opili is a mixed-use master-planned community in west O'ahu located north of Ewa Beach and east of Kapolei, developed by D.R. Horton. The plans for this new community include: 11,750 new residential homes, 7 community and recreation centers, over 200 acres of commercial farms and community gardens, up to 3 million square feet of commercial space, and 5 Department of Education public schools. In addition to Ho'opili, there are currently over 20 Hawaiian Electric customer service requests in the area with completion dates within the next few years. (See maps of the study area in Appendix B.)

An equipment loading analysis was performed to determine if the existing electrical infrastructure has adequate distribution and subtransmission capacity to serve the projected load growth of the Kapolei and Ho'opili area. The study identified the location, magnitude, duration, and frequency of planning criteria violations for every year from 2019 to 2030. Based on the latest energization schedule provided by D.R. Horton (see Appendix C), overloads due to contingency conditions are forecasted to occur in February 2022. Increasing overloads under normal and contingency conditions are forecasted beyond 2022 as loads increase.

Three options were identified and evaluated to alleviate the overload conditions and to provide adequate capacity for future loads. These options include the following:

- Option 1: Develop a new system Ho'opili substation within the Ho'opili development with provisions for four 46-12 kV, 10/12.5 MVA distribution transformers. Initially, install one 46-12 kV, 10/12.5 MVA distribution transformer, two 46 kV circuits, and two 12 kV circuits.
- Option 2: Install one additional 46-12 kV, 10/12.5 MVA distribution transformer at the existing Kaloii substation, one additional 46 kV circuit, and two 12 kV circuits.
- Option 3: Install one additional 46-12 kV, 10/12.5 MVA distribution transformer at the existing Ewa Nui substation, one additional 138-46 kV, 48/80 MVA subtransmission transformer, and two 12 kV circuits.

Based on the analysis of all the options, Option 1: Developing and installing one new system 46-12 kV, 10/12.5 MVA distribution transformer at the proposed Ho'opili substation site is the recommended solution for the following reasons:

- It resolves all distribution transformer and circuit normal and contingency conditions.
- It increases distributed energy resource (DER) hosting capacity in the East Kapolei area.
- It provides initial capacity to serve the Ho'opili area until future transformer capacity or NWAs are required for the area.
- It would be located near the load center, minimizing costs to install distribution circuits .
- It would be located near 46-kV circuits, minimizing costs to install subtransmission circuits.
- It is the most cost effective option.

2 Introduction

Hawaiian Electric Company (Hawaiian Electric) forecasts significant load growth in west O’ahu from 2019 to 2030. The forecasted load growth totals 83.4 MVA, the majority of which is for the new Ho’opili subdivision. The objective of this study is to analyze how the forecasted loads in the area impact the existing distribution system grid, identify any planning criteria violations caused by the forecasted loads, and determine the best option for accommodating the forecasted new load on the system, considering traditional wires solutions. Non-wires alternatives (NWA) are being assessed as part of the Integrated Grid Planning (IGP) soft launch.

2.1 Background

In March 2006, D.R. Horton acquired approximately 1,550 acres of former sugar cane lands in west O’ahu from the James Campbell Estate. In May 2015, the Honolulu City Council approved the development of the Ho’opili subdivision (the project). The project broke ground in September 2016. Some homes have already been constructed. The entire project will be built out in 19 phases ending in 2030. The total electrical demand for the project is over 63 MVA.

The majority of new load in the Ho’opili area is residential. Figure 1 shows the amount of each load type (residential, commercial, industrial, or school) for the project. The type of load affects the load forecasts since different types consume energy at different times of day (see Appendix E).

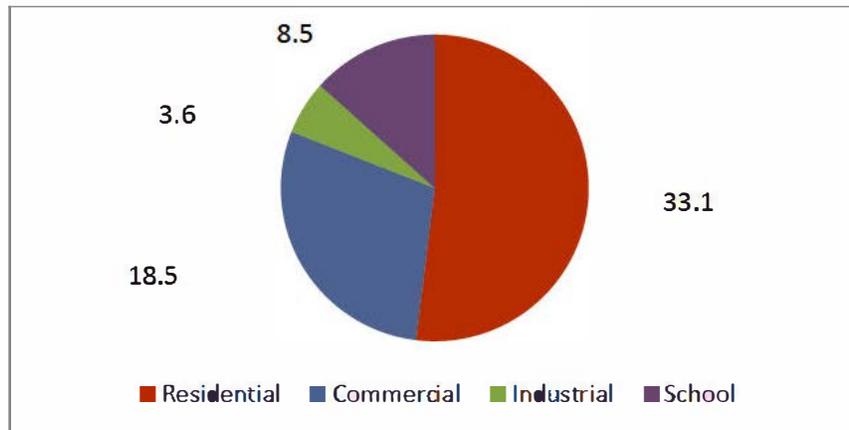


Figure 1 Composition of Ho'opili new load (in MVA)

The Ho’opili project load increases every year from 2018 to 2030, with the largest increases in load additions between 2021 and 2023 (see Figure 2). By 2031, the load for the project will be over 63 MVA.

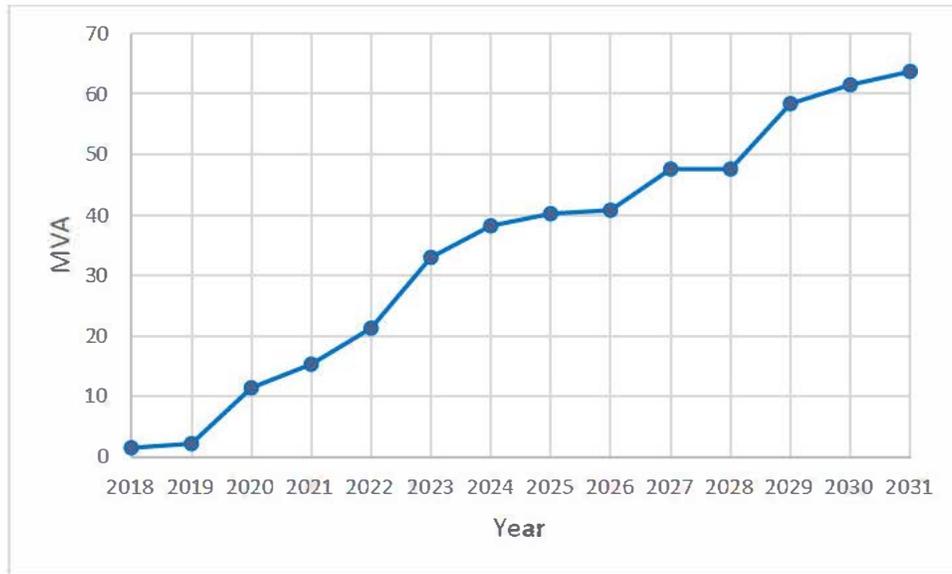


Figure 2 Ho'opili cumulative load

In addition to the Ho'opili project, there are also over 20 other future projects planned for completion in the next few years. These projects total approximately 20.6 MVA of new load growth. (See Appendix A for the list of additional projects.) Throughout this study, the term *Ho'opili area* is used to discuss the area containing the Ho'opili subdivision and the immediate surrounding area which will be impacted by the additional projects. (See maps of the study area in Appendix B.)

2.2 Study Area

There are four transformers and six associated circuits that serve the load in the Ho'opili area under normal conditions. If there is a contingency condition and one of those transformers is out of service, the load is picked up by one of two nearby transformers. Table 1 lists the transformers analyzed in this study.

Table 1 Transformers and circuits studied

Transformer	Circuit	Conditions Served	
Ewa Nui 2	Ewa Nui 2	Normal and contingency	
	Ewa Nui 3 (SB)		
Kaloi 1	Kaloi 1		
	Kaloi 2 (SB)		
Kaloi 2	Kaloi 3 (SB)		
	Kaloi 4 (SB)†		
Kamokila 2	Kamokila 3†		
	Kamokila 4		
Ewa Nui 1	Ewa Nui 1		Contingency only
	Ewa Nui 2 (SB)†		
Kapolei 2	Kapolei 3†		
	Kapolei 4		

*SB = Standby (not currently in use)
 †Outside of the Ho'opili area

Four of the circuits (marked in Table 1) are outside of the Ho'opili area. These circuits were included in load forecasting to account for the entire load growth on their associated transformers. However, those circuits were not considered in determining the grid requirements to serve new growth in the area since they serve other areas.

Figure 3 shows a simplified configuration of the distribution transformers and circuits currently serving the Ho'opili area. The large boxes represent transformers and the colored lines indicate circuits that serve various phases of development.

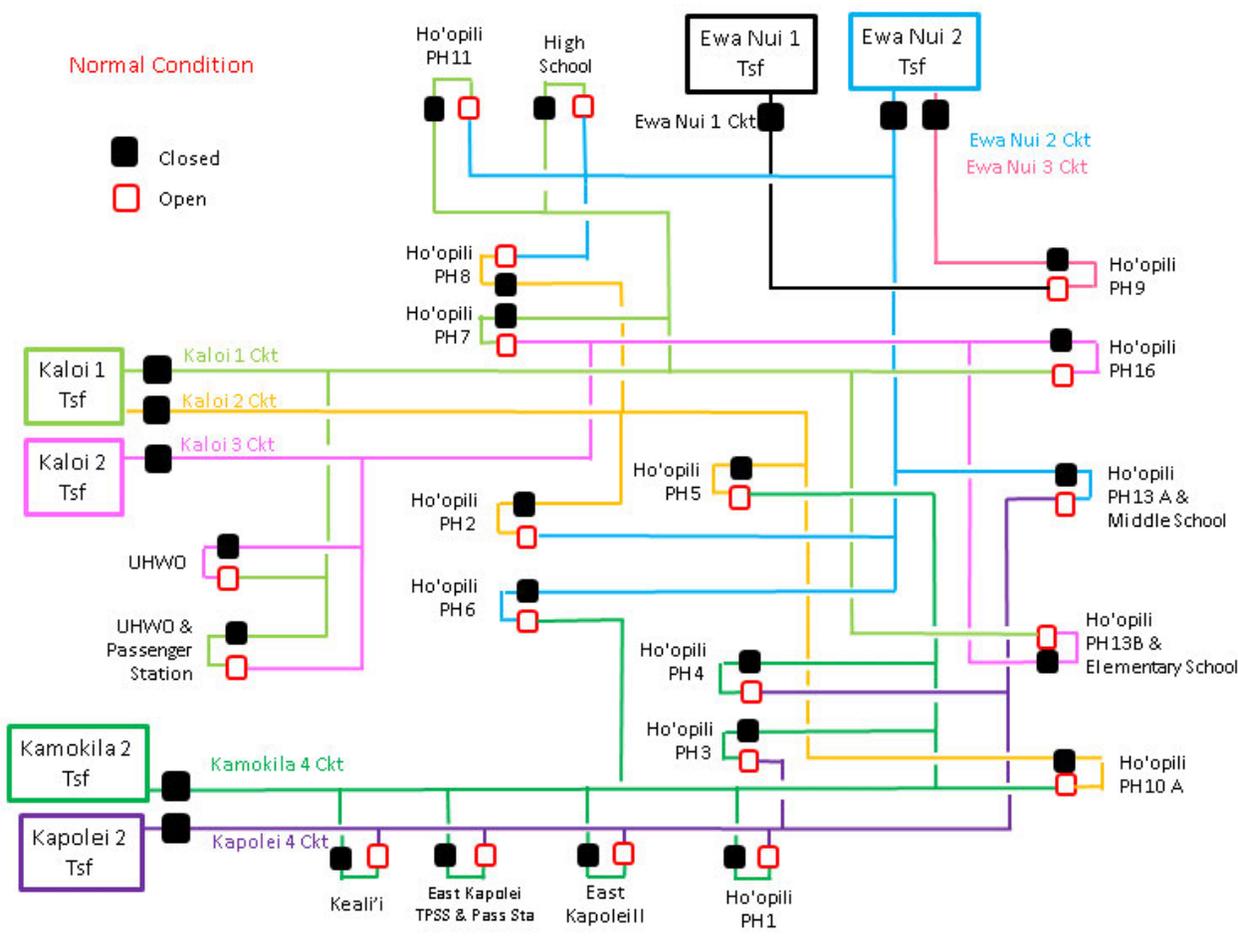


Figure 3 Ho'opili area transformer and circuit configuration

2.3 Assumptions

This study is based on the following assumptions:

- Per HECO Engineering Standard Practice V-D-11.5, subtransmission transformer loading limitations are based on 0% loss-of-life for normal conditions and 1% loss-of-life for contingency conditions.

- Per HECO Engineering Standard Practice V-E-11.1, the normal loading limit on a distribution substation transformer shall be its 0% loss-of-life KVA rating, when available. Otherwise, the highest nameplate (OA/FA) KVA rating shall be used.
- Per HECO Engineering Standard Practice V-E-11.1, the contingency loading limit on a distribution substation transformer shall be its 1% loss-of-life KVA rating, when available. Otherwise, the highest nameplate (OA/FA) or (OA/FA/FOA) KVA rating, where applicable, shall be used.
- Distribution and subtransmission circuit loading limitations are based on Hawaiian Electric Overhead and Underground Standards.
- There is adequate capacity at the bulk generation and 138-kV transmission levels to serve the forecasted loads.

3 Study Methodology

This study forecasts loads in the Ho‘opili area, then compares those forecasts against equipment ratings to identify equipment overloads. Potential overload mitigations are assessed to determine the best solution. Figure 4 illustrates the methodology used in this study.



Figure 4 Study methodology

The following sections describe each step in detail.

3.1 Load Forecasting

Load forecasting is the process of predicting future electrical demand for the grid. Comparing anticipated future growth to existing capacity identifies when and where the system cannot support expected future growth.

In traditional planning, annual forecasts are represented by a single number: the annual peak load. Annual peak load refers to the highest load on a piece of equipment at any point throughout an entire year. Traditional planning methods are based on ensuring that the grid has the capacity to accommodate the peak-case scenario over the course of a year.

However, with the addition of non-wires alternatives (NWAs) such as batteries and rooftop solar to the grid, energy flows both from the grid to customers, and from customers back onto the grid. Energy can be added to or removed from the grid at any time of day, affecting when and how much energy is used throughout the day. This makes predicting energy use much more complex. As a result, the modern planning process uses much more granular forecasts which account for the variations in energy use from hour to hour, month to month, and season to season.

The result is that the annual peak load has been replaced by an 8,760 hourly load profile as the mechanism for forecasting future loads. The 8,760 load profile is named for the number of data points it

contains: one for every hour of every day of the year (24 x 365 = 8,760). While traditional planning used one value to plan for a year, modern planning uses the set of 8,760 data points.

To manage forecasting with large data sets, the company uses LoadSEER software. LoadSEER uses historical data to generate forecasts which, when combined with knowledge of a specific area, create a more granular picture of an area’s future loads.

To create the 8,760 load profile, LoadSEER takes one weekday and one weekend day of each month in each year to determine the 576 hourly load profile [(weekday 24 hours + weekend 24 hours) x 12 months]. Each day of every month in a year is then assigned a weekday or weekend load profile applicable for the particular month. These load profiles have one data point for each hour of each year.

Annual forecasts were generated for each circuit and transformer, under both normal and contingency conditions.

3.2 Area Review

The purpose of a distribution area review is to determine if the existing system can accommodate all forecasted loads under both normal and contingency conditions. If the system can’t accommodate forecasted loads, a set of solution requirements is described in technology-neutral terms.

To evaluate the ability of the existing circuits and transformers to handle forecasted loads, forecasts are applied to a model of the existing distribution system. That model is then compared against standard planning criteria under normal and contingency conditions to see if any loading violations occur. Overloads are evaluated in terms of magnitude, location, and duration. Table 2 describes normal and contingency overloads which are defined by the HECO Engineering Standard Practice Distribution Planning Criteria.

Table 2 Normal and contingency overloads

Term	Defintion
Normal overload	Load that exceeds the normal equipment rating of distribution substation transformers or circuits under normal conditions. Normal overloads are identified by comparing the forecasted load with the equipment normal rating.
Contingency overload	Load that exceeds the emergency equipment ratings of a piece of equipment due to other equipment failure or other equipment being out for maintenance. Emergency overloads are identified by performing contingency reviews. When a transformer or circuit is taken out of service—either for maintenance or due to equipment failure—the remaining distribution system must be able to back up the loads being served by the transformer or circuit that is out of service without becoming overloaded. Therefore, the failure of each transformer and circuit within the project area was simulated separately to see if there were emergency overloads.

Using the data generated by LoadSEER, we can create an overload profile, which is a daily profile of a piece of equipment. The overload profile graphs forecasted equipment loads and the equipment limits. Figure 5 shows an example overload profile. The blue line represents the loading limit for a specific piece of equipment (for example, a circuit). The orange line represents the amount of load forecasted

for each hour of a particular day. Any time the orange line is above the blue line, the equipment is overloaded. The overload duration is the amount of hours that the orange line is above the blue line. In this example, the equipment is overloaded from 9 a.m. to 11 p.m. with a maximum overload of about 6 MVA at 7 p.m.

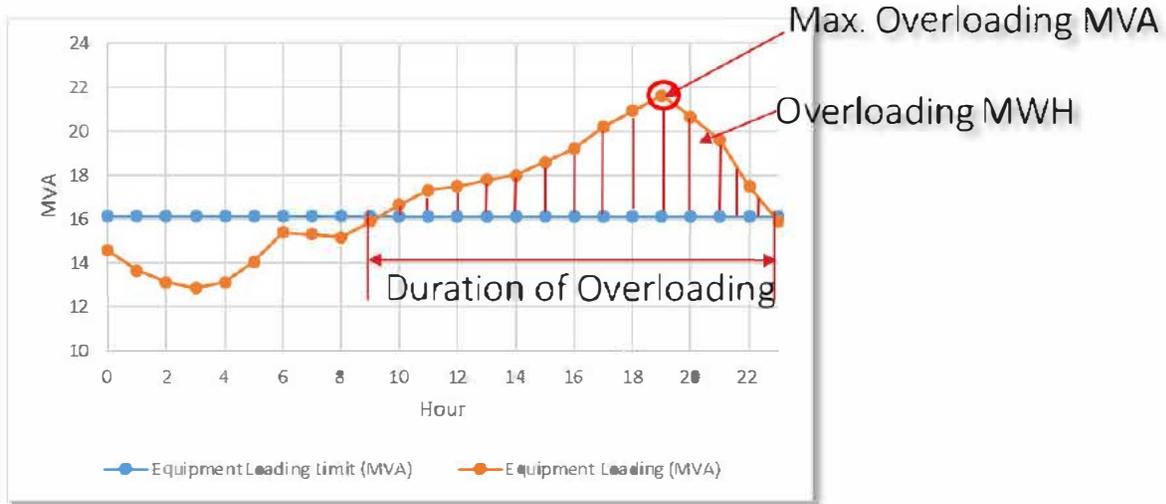
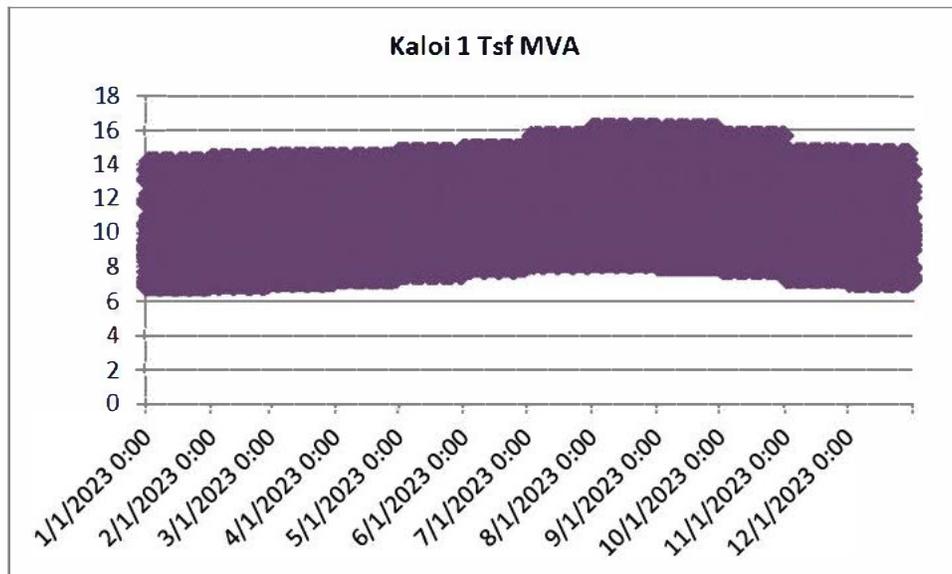


Figure 5 Overload profile

While traditional planning only accounted for the peak load on the day of the year with the highest load, overload profiles show the amount of overload and the times of day when it occurs. The 8,760 load profiles then provide an hourly forecast for every hour of every day of the year.



Capacity under normal conditions is assessed by comparing the forecasted load against the normal equipment rating (see Appendix D). To assess contingency conditions, a single contingency failure of one transformer is simulated in LoadSEER. When that transformer is taken out of service, the loads on its

circuits are moved onto adjacent circuits. For example, for each circuit, the normally closed switch is changed to open and the normally open switch is changed to closed.

For each circuit, the forecasted loading is compared against the capacity limits of the circuit .

3.3 Solution Options

The purpose of this step is to identify potential solutions for enabling the grid to accommodate the projected future load. If overload conditions are projected to occur, solution requirements are defined in technology-neutral terms such as the amounts of energy, time(s) of day, and days of year. Once solution requirements are defined, a list of potential solutions is compiled. Considerations typically include traditional wired solutions (such as adding circuits or transformers to increase capacity), non-wires alternative (NWA) solutions (such as rooftop solar and batteries to add energy or reduce load), and combinations of solutions. However, for this study, only wires solutions are considered because NWA solutions are being evaluated as part of the Integrated Grid Planning (IGP) process soft launch.

The solution requirements must be defined by the set of specifications described in Table 3.

Table 3 Requirement specifications

Specification	Defintion
MW/MVA Size	The amount of power required to mitigate the year’s peak scenario.
Daily Duration (hr)	The year’s longest daily duration of energy required.
Delivery Month(s)	The month(s) when the planning criteria violations occur.
Delivery Day(s)	The day(s) of the year when the planning criteria violations occur. Requires all weekdays of a week if an overload occurs on any weekday in a week. Requires all weekend days of a week if an overload occurs on a weekend day or a holiday in a week.
Maximum Number of Calls Per Year	The total number of days requiring mitigation of overloads. If mitigation is only required for either weekdays or weekend days, then at least one month’s worth of that type of day is required.

3.4 Solutions Evaluation

In this step, each potential solution is assessed against a set of criteria by assigning a value (red, yellow, green) to key criteria (for example, cost, timeframe). For example, a low-cost option would be marked green for the cost criteria, while an expensive option would be marked red. Unique pros and cons for each option are also noted if applicable.

After each solution’s criteria have been assigned a value, all of the solution options are compared against each other to determine the recommended solution . The recommended solution is determined based on a holistic assessment of the rated criteria and the unique pros and cons of each option.

4 Forecasting and Analysis

4.1 Load Forecasting

Load forecasting was performed to determine the projected loads each year from 2019 to 2030. The forecasts were based on the combination of:

- **New loads:** New load estimates were provided from developers for the Ho’opili project (see Appendix C) and the additional Ho’opili area projects listed in Appendix A. These loads were added to LoadSEER as residential, commercial, or industrial load types. If the type of load was not provided, it was given a flat (constant) load profile, meaning that the load did not vary over the course of a day.
- **Load growth:** Load growth is the company’s projected growth of the system’s existing load. This includes the growth on circuits outside the area, since the outside area growth contributes to the overall growth on a given transformer. The historical loads on each of the circuits incorporate all the distributed energy resources (DER), demand-side management (DSM), and demand response (DR) that has been implemented to date. A total of 7.477 MW of distributed energy resources are currently in use in the Ho’opili area (see Table 4).

Table 4 Total existing DER in study area in 2018

Equipment	DER (MW)
Ewa Nui 2 Circuit	2.937
Ewa Nui 3 Circuit	–
Ewa Nui 2 Transformer	2.937
Kalo 1 Circuit	0.544
Kalo 2 Circuit	–
Kalo 1 Transformer	0.544
Kalo 3 Circuit	–
Kalo 4 Circuit	–
Kalo 2 Transformer	–
Kamokila 3 Circuit	0.830
Kamokila 4 Circuit	1.884
Kamokila 2 Transformer	2.714
Kapolei 3 Circuit	–
Kapolei 4 Circuit	1.282
Kapolei 2 Transformer	1.282
Total	7.477

Based on the forecasted growth and new loads, we created hourly load profile forecasts for each circuit and transformer to produce a forecast for each day of each year. Forecasts were generated by taking the historic peak load for the initial base year (2018) and forecasting the electrical load for the distribution transformer and circuits through 2030 to capture each year of development in the Ho’opili project. Load growth is a small fraction of the forecast compared to the new loads added to the circuits in the Ho’opili area.

The following assumptions apply to the forecasts in this study:

- Forecasts do not include forecasts of future DER adoption.¹
- Forecasts were created for both normal and contingency conditions as defined in Table 3, creating two sets of forecasts for each circuit and transformer.
- Forecasts are specified in kVA. It is assumed that power factor of the load on circuit is 0.95 inductive before correction, and 0.92 inductive seen at the primary side of transformer before correction during the process of generating the annual 8,760 load profile.
- Each day in every studied year is categorized as either a weekday or a weekend day. All federal holidays and Hawaii state holidays are considered weekend days. Twenty-four hour load profiles were created for each day, taking into account the month and whether the day was a week day or a weekend day.
- LoadSEER can create load forecasts under different weather assumptions: the hottest weather of 1 day in 10 years, the hottest weather of 1 day in 2 years, the coldest weather of 1 day in 10 years, and the coldest weather of 1 day in 2 years. For this study, load forecasts used the hottest weather of 1 day in 2 years.²
- Contingency conditions can happen at any time on any day of the year.
- Load forecasting uses the 2018 sun irradiance hourly profile for each year studied.
- A 5 MVA photovoltaic (PV) project on the Kapolei 4 circuit has been approved for the Feed-In Tariff (FIT) program and is scheduled to be fully commissioned by the end of 2019. Contribution of this project's generation has been included into the forecast and analysis of all scenarios involving the Kapolei 4 circuit. The project's generation follows a year-length sun irradiance hourly profile for every year from 2020 to 2030.

Table 5 lists the forecasted load growth in the Ho'opili area from 2019 to 2030. This includes new load from the Ho'opili project, new load from other projects combined, and the growth of the system's existing load. A total of 83.4 MVA is expected by 2030.

Table 5 New load growth by 2030

Transformer	Distribution Circuit	Ho'opili Project New Load (MVA)	Other Projects' New Load (MVA)	Load Growth (MVA)	Total New Load Growth (MVA)
Ewa Nui 2	Ewa Nui 2	20.2	–	–	20.2
	Ewa Nui 3	7.5	–	–	7.5
Kaloi 1	Kaloi 1	8.5	1.3	0.04	9.84
	Kaloi 2	11.4	–	0.02	11.42
Kaloi 2	Kaloi 3	9	–	0.02	9.02

¹ The Integrated Grid Planning process will integrate future circuit level DER forecasts. The forecast methodology and process is part of on-going stakeholder working group discussion as well as integrating those features with the LoadSEER tool. Additionally, to date, only 10% of existing Ho'opili customers have adopted DER under current program offerings.

² The standard amongst the utility industry is to use a more conservative 1 day in 10 year load forecast.

Transformer	Distribution Circuit	Ho'opili Project New Load (MVA)	Other Projects' New Load (MVA)	Load Growth (MVA)	Total New Load Growth (MVA)
	Kaloi 4*	–	–	–	–
Kamokila 2	Kamokila 3*	–	1.5	0.4	1.9
	Kamokila 4	3.9	3.9	0.22	8.02
Ewa Nui 1	Ewa Nui 1	–	4.6	0.7	5.3
	Ewa Nui 2 (SB)*	–	–	–	–
Kapolei 2	Kapolei 3*	–	3.0	0.7	3.7
	Kapolei 4	–	6.3	0.2	6.5
Total		60.5	20.6	2.3	83.4

*Outside the Ho'opili area

4.2 Distribution Area Review

The area review analysis determines if the existing distribution and subtransmission infrastructure (substations, transformers, and circuits) is adequate to serve the projected new loads.

Hourly normal and contingency forecasted loads were compared against each circuit and transformer's normal and emergency ratings (see Appendix D) to determine if overload conditions existed.

Yearly maximum overloads for normal conditions from 2022 to 2025 are shown for transformers and circuits (Tables 6-10). Overload conditions start in 2023.

Table 6 Yearly maximum overload MVA for transformers (normal conditions)

Equipment	Yearly Max. Overload (in MVA)			
	2022	2023	2024	2025
Ewa Nui 2 Transformer	–	–	–	–
Ewa Nui 2 Circuit	–	–	–	–
Ewa Nui 3 circuit	–	–	–	–
Kaloi 1 Transformer	–	3.03	5.12	5.12
Kaloi 1 Circuit	–	1.49	1.49	1.49
Kaloi 2 Circuit	–	–	–	–
Kaloi 2 Transformer	–	–	–	–
Kaloi 3 Circuit	–	–	0.29	0.29
Kaloi 4 Circuit	–	–	–	–
Kamokila 2 Transformer	–	–	–	–
Kamokila 3 Circuit	–	–	–	–
Kamokila 4 Circuit	–	–	–	1.33

Table 7 Yearly maximum overload percent for transformers (normal conditions)

Equipment	Yearly Max. Overload (in %)			
	2022	2023	2024	2025
Ewa Nui 2 Transformer	–	–	–	–

Equipment	Yearly Max. Overload (in %)			
	2022	2023	2024	2025
Ewa Nui 2 Circuit	–	–	–	–
Ewa Nui 3 Circuit	–	–	–	–
Kaloi 1 Transformer	–	123.2	139.1	139.1
Kaloi 1 Circuit	–	117.4	117.4	117.4
Kaloi 2 Circuit	–	–	–	–
Kaloi 2 Transformer	–	–	–	–
Kaloi 3 Circuit	–	–	103.4	103.4
Kaloi 4 Circuit	–	–	–	–
Kamokila 2 Transformer	–	–	–	–
Kamokila 3 Circuit	–	–	–	–
Kamokila 4 Circuit	–	–	–	119.1

Table 8 Yearly maximum overload MWh for transformers (normal conditions)

Equipment	Yearly Max. Overload (in MWh)			
	2022	2023	2024	2025
Ewa Nui 2 Transformer	–	–	–	–
Ewa Nui 2 Circuit	–	–	–	–
Ewa Nui 3 Circuit	–	–	–	–
Kaloi 1 Transformer	–	9.25	21.49	21.49
Kaloi 1 Circuit	–	4.99	4.99	4.99
Kaloi 2 Circuit	–	–	–	–
Kaloi 2 Transformer	–	–	–	–
Kaloi 3 Circuit	–	–	0.39	0.39
Kaloi 4 Circuit	–	–	–	–
Kamokila 2 Transformer	–	–	–	–
Kamokila 3 Circuit	–	–	–	–
Kamokila 4 Circuit	–	–	–	5.21

Table 9 Yearly maximum overload duration hours for transformers (normal conditions)

Equipment	Yearly Max. Overload Duration (Hour)			
	2022	2023	2024	2025
Ewa Nui 2 Transformer	–	–	–	–
Ewa Nui 2 Circuit	–	–	–	–
Ewa Nui 3 Circuit	–	–	–	–
Kaloi 1 Transformer	–	5	10	10
Kaloi 1 Circuit	–	7	7	7
Kaloi 2 Circuit	–	–	–	–
Kaloi 2 Transformer	–	–	–	–
Kaloi 3 Circuit	–	–	2	2
Kaloi 4 Circuit	–	–	–	–
Kamokila 2 Transformer	–	–	–	–

Equipment	Yearly Max. Overload Duration (Hour)			
Kamokila 3 Circuit	–	–	–	–
Kamokila 4 Circuit	–	–	–	6

Table 10 Yearly overloaded days for transformers (normal conditions)

Equipment	Yearly Overloaded Days			
	2022	2023	2024	2025
Ewa Nui 2 Transformer	–	–	–	–
Ewa Nui 2 Circuit	–	–	–	–
Ewa Nui 3 Circuit	–	–	–	–
Kaloi 1 Transformer	–	365	365	365
Kaloi 1 Circuit	–	335	337	337
Kaloi 2 Circuit	–	–	–	–
Kaloi 2 Transformer	–	–	–	–
Kaloi 3 Circuit	–	–	69	69
Kaloi 4 Circuit	–	–	–	–
Kamokila 2 Transformer	–	–	–	–
Kamokila 3 Circuit	–	–	–	–
Kamokila 4 Circuit	–	–	–	365

This study evaluated how load would be transferred in the event that a transformer is out of service due to maintenance or other emergency condition. Table 11 describes the contingency scenario for each of the four transformers serving the Ho’opili area.

Table 11 Contingency scenarios evaluated in the study

#	Contingency Scenario	Result of Scenario
1	Loss of Ewa Nui 2 transformer	The load is transferred to: <ul style="list-style-type: none"> • Kapolei 2 transformer via the Kapolei 4 circuit • Kamokila 2 transformer via the Kamokila 4 circuit
2	Loss of Kaloi 1 transformer	The load is transferred to: <ul style="list-style-type: none"> • Kaloi 2 transformer via the Kaloi 3 circuit • Ewa Nui 2 transformer via the Ewa Nui 2 circuit • Kamokila 2 transformer via the Kamokila 4 circuit
3	Loss of Kaloi 2 transformer	The load is transferred to the Kaloi 1 transformer via the Kaloi 1 circuit.
4	Loss of Kamokila 2 transformer	The load is transferred to the Kapolei 2 transformer via the Kapolei 4 circuit.

Table 12 and Table 13 shows the yearly maximum overload (in MVA and percent) for contingency conditions from 2022 to 2024. It indicates which circuits and transformers experience overloads due to loss of a transformer. Overload conditions occur for one circuit in 2022, and in 2023 to 2025, there are significant overloads on most circuits and transformers.

Table 12 Yearly maximum overload (in MVA) for transformers and circuits (contingency conditions)

Transformer Lost in Contingency	Overloaded Transformer or Circuit	Yearly Max. Overload (in MVA)			
		2022	2023	2024	2025
Ewa Nui 2	Kamokila 2 Transformer	–	–	–	0.71
	Kamokila 4 Circuit	–	–	0.01	2.00
	Kapolei 2 Transformer	–	–	0.42	0.42
	Kapolei 4 Circuit	–	–	0.16	0.16
Kalo 1	Ewa Nui 2 Transformer	–	0.10	3.51	3.66
	Ewa Nui 2 Circuit	–	2.01	5.41	5.57
	Kalo 2 Transformer	–	–	–	–
	Kalo 3 Circuit	–	1.43	2.75	2.75
	Kamokila 2 Transformer	–	–	–	1.71
	Kamokila 4 Circuit	–	1.04	1.01	3.01
Kalo 2	Kalo 1 Transformer	–	7.22	10.63	10.63
	Kalo 1 Circuit	–	6.85	8.17	8.17
Kamokila 2	Kapolei 2 Transformer	2.34	3.59	3.82	5.78
	Kapolei 4 Circuit	2.08	3.32	3.55	5.52
Kapolei 2	Kamokila 2 Transformer	–	–	–	1.69
	Kamokila 4 Circuit	–	0.75	0.96	2.93

Table 13 Yearly maximum overload (in %) for transformers and circuits (contingency conditions)

Transformer Lost in Contingency	Overloaded Transformer or Circuit	Yearly Max. Overload (in %)			
		2022	2023	2024	2025
Ewa Nui 2	Kamokila 2 Transformer	–	–	–	104.4
	Kamokila 4 Circuit	–	–	100.1	122.0
	Kapolei 2 Transformer	–	–	102.6	102.6
	Kapolei 4 Circuit	–	–	101.5	101.5
Kalo 1	Ewa Nui 2 Transformer	–	100.6	121.7	122.7
	Ewa Nui 2 Circuit	–	118.8	150.7	152.2
	Kalo 2 Transformer	–	–	–	–
	Kalo 3 Circuit	–	113.4	125.7	125.7
	Kamokila 2 Transformer	–	–	–	110.6
	Kamokila 4 Circuit	–	111.4	111.1	133.1
Kalo 2	Kalo 1 Transformer	–	144.7	165.8	165.8
	Kalo 1 Circuit	–	164.2	176.6	176.6
Kamokila 2	Kapolei 2 Transformer	114.5	122.2	123.6	132.8
	Kapolei 4 Circuit	119.5	131.2	133.3	151.7
Kapolei 2	Kamokila 2 Transformer	–	–	–	110.5
	Kamokila 4 Circuit	–	108.3	110.5	132.2

The maximum single day overload in MWh is summarized in Table 14.

Table 14 Maximum single day overload mwh for transformers and circuits in contingency conditions

Transformer Lost in Contingency	Overloaded Transformer or Circuit	Yearly Max. Overload (in MWh)			
		2022	2023	2024	2025
Ewa Nui 2	Kamokila 2 Transformer	–	–	–	0.94
	Kamokila 4 Circuit	–	–	0.01	7.85
	Kapolei 2 Transformer	–	–	0.40	0.40
	Kapolei 4 Circuit	–	–	0.15	0.15
Kaloi 1	Ewa Nui 2 Transformer	–	0.09	12.77	13.64
	Ewa Nui 2 Circuit	–	5.96	30.93	32.37
	Kaloi 2 Transformer	–	–	–	–
	Kaloi 3 Circuit	–	3.43	8.51	8.51
	Kamokila 2 Transformer	–	–	–	4.03
	Kamokila 4 Circuit	–	3.06	2.94	13.87
Kaloi 2	Kaloi 1 Transformer	–	28.94	62.78	62.78
	Kaloi 1 Circuit	–	42.16	64.81	64.81
Kamokila 2	Kapolei 2 Transformer	4.96	10.31	11.37	25.26
	Kapolei 4 Circuit	5.41	10.67	11.84	26.90
Kapolei 2	Kamokila 2 Transformer	–	–	–	4.18
	Kamokila 4 Circuit	–	1.84	2.62	13.48

The maximum single day overload duration in hours is summarized in Table 15.

Table 15 Maximum single day overload duration under contingency condition

Transformer Lost in Contingency	Overloaded Transformer or Circuit	Yearly Max. Overload Duration (Hour)			
		2022	2023	2024	2025
Ewa Nui 2	Kamokila 2 Transformer	–	–	–	2
	Kamokila 4 Circuit	–	–	1	6
	Kapolei 2 Transformer	–	–	1	1
	Kapolei 4 Circuit	–	–	1	1
Kaloi 1	Ewa Nui 2 Transformer	–	1	7	7
	Ewa Nui 2 Circuit	–	5	13	13
	Kaloi 2 Transformer	–	–	–	–
	Kaloi 3 Circuit	–	4	6	6
	Kamokila 2 Transformer	–	–	–	4
	Kamokila 4 Circuit	–	5	5	8
Kaloi 2	Kaloi 1 Transformer	–	8	17	17
	Kaloi 1 Circuit	–	17	20	20
Kamokila 2	Kapolei 2 Transformer	4	5	6	9
	Kapolei 4 Circuit	5	6	6	10
Kapolei 2	Kamokila 2 Transformer	–	–	–	4
	Kamokila 4 Circuit	–	4	5	8

The yearly overloaded days is summarized in Table 16.

Table 16 Overloaded days under contingency condition

Transformer Lost in Contingency	Overloaded Transformer or Circuit	Yearly Overloaded days			
		2022	2023	2024	2025
Ewa Nui 2	Kamokila 2 Transformer	–	–	–	114
	Kamokila 4 Circuit	–	–	10	365
	Kapolei 2 Transformer	–	–	64	64
	Kapolei 4 Circuit	–	–	41	41
Kaloi 1	Ewa Nui 2 Transformer	–	42	325	345
	Ewa Nui 2 Circuit	–	286	365	365
	Kaloi 2 Transformer	–	–	–	–
	Kaloi 3 Circuit	–	258	365	365
	Kamokila 2 Transformer	–	–	–	174
	Kamokila 4 Circuit	–	225	225	365
Kaloi 2	Kaloi 1 Transformer	–	365	365	365
	Kaloi 1 Circuit	–	365	365	365
Kamokila 2	Kapolei 2 Transformer	297	365	365	365
	Kapolei 4 Circuit	365	365	365	365
Kapolei 2	Kamokila 2 Transformer	–	–	–	192
	Kamokila 4 Circuit	–	145	226	365

In summary, transformers and circuits begin overloading under contingency conditions from 2022 and under normal conditions from 2023. Comparing the overloads observed in 2022 and 2023, both overload magnitude and duration increase significantly in 2023. This significant change is mainly due to the large load increase from 2022 to 2023 which can be found in Figure 2.

Figure 6 through Figure 10 show transformer 24-hour loading curves generated by LoadSEER. The loading curves plot the peak load day for each month, representing the peak overloading scenarios.

Figure 6 and Figure 7 show the peak transformer overload profiles under normal conditions from 2022 to 2024.

Figure 6 shows the Kaloi 1 transformer overload profiles under normal conditions in 2023. The maximum projected overloading is over 3 MVA and lasts 5 hours (from 5 p.m. to 10 p.m.).

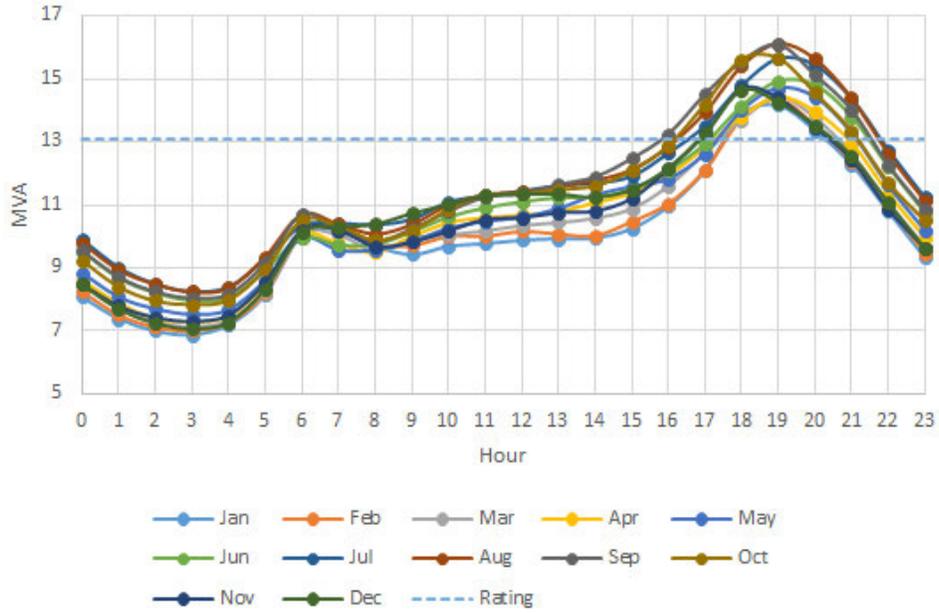


Figure 6 Monthly peak day loading curve of Kalo 1 transformer in 2023, normal conditions

Figure 7 shows the Kalo 1 transformer overload profiles under normal conditions in 2024. The maximum projected overloading is over 5 MVA and lasts 10 hours (1 p.m. to 11 p.m.).

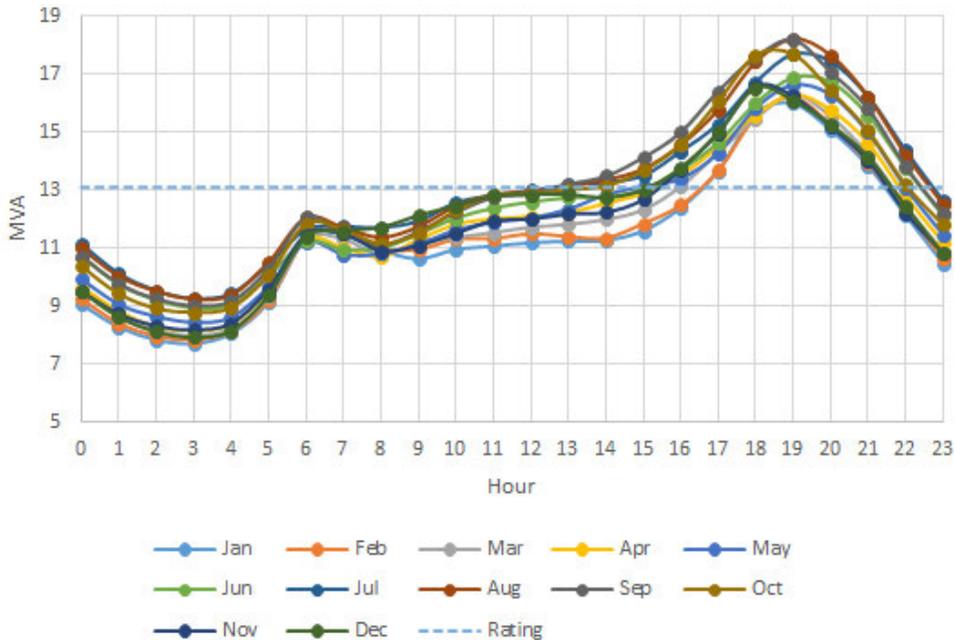


Figure 7 Monthly peak day loading curve of Kalo 1 transformer in 2024, normal conditions

Figure 8 through Figure 10 show the peak transformer overload profiles under contingency conditions from 2022 to 2024.

Figure 8 shows the Kapolei 2 transformer overload profiles under contingency conditions (loss of Kamokila 2 Transformer) in 2022. The maximum projected overloading is over 2 MVA and lasts 4 hours (from 6 p.m. to 10 p.m.).

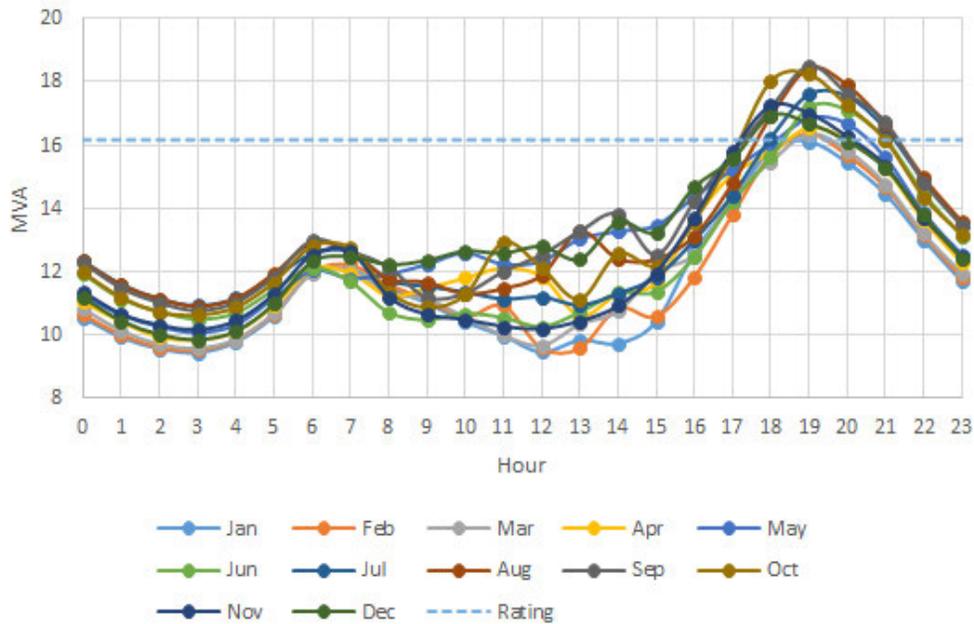


Figure 8 Monthly peak day loading curve of Kapolei 2 transformer in 2022, contingency conditions

Figure 9 shows the Kaloi 1 transformer overload profiles under contingency conditions (loss of Kaloi 2 Transformer) in 2023. The maximum projected overloading is over 7 MVA and lasts 8 hours (from 4 p.m. to 12 a.m.).

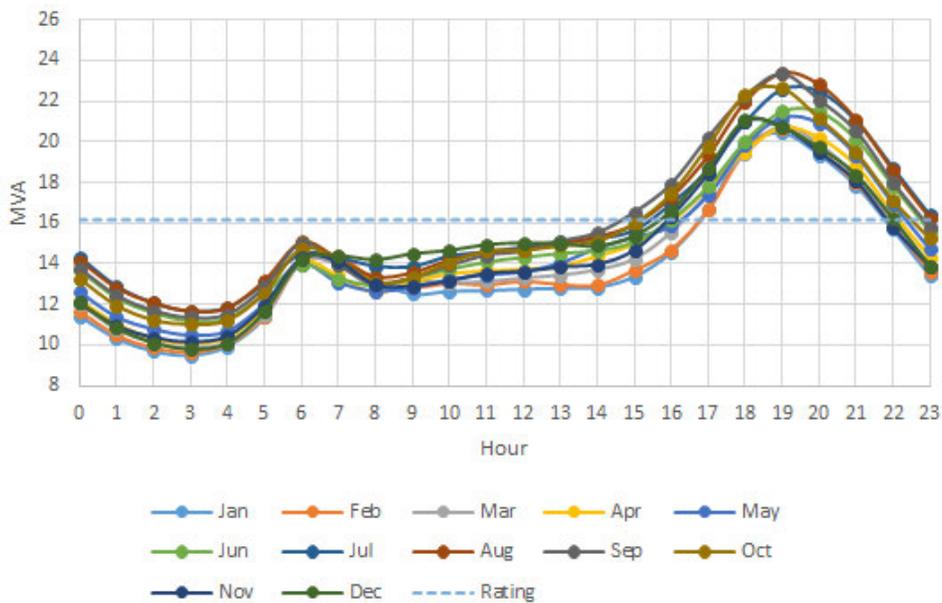


Figure 9 Monthly peak day loading curve of Kaloi 1 transformer in 2023, contingency conditions

Figure 10 shows the Kaloi 1 transformer overload profiles under contingency conditions (loss of Kaloi 2 Transformer) in 2024. The maximum projected overloading is over 10 MVA and lasts 17 hours (from 6 a.m. to 8 a.m. and 9 a.m. to 12 a.m.).

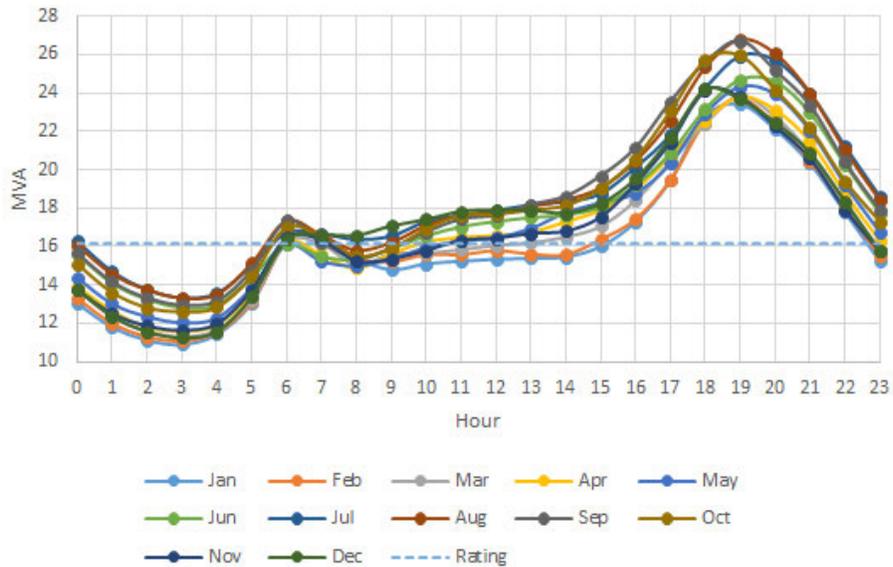


Figure 10 Monthly peak day loading curve of Kaloi 1 transformer in 2024, contingency condition

Analysis of the overload profiles show that the MVA magnitude, energy (MWH), duration (hours per day), and frequency (number of days), overloading starts in 2022 and increases significantly in 2023. Appendix F includes the peak day load profile with the peak overloading conditions for every year between 2022 and 2024.

4.3 Solution Requirements and Options

This section focuses on wires solutions to solve the needs through 2024, as additional investments may be required to meet the forecated incremental load growth starting in 2025. The Company will continue to evaluate the Ho’opili area on an annual basis as the developer plans become more certain.

4.3.1 Distribution Grid Services

As part of the Integrated Grid Planning, Distribution Planning Working Group the Company worked with stakeholders to define the first set of grid services related to the distribution system for which new technologies may provide.³ The two distribution grid services currently defined are:

³ See, https://www.hawaiianelectric.com/documents/clean_energy_hawaii/integrated_grid_planning/stakeholder_engagement/working_groups/distribution_planning/20190717_dpwg_meeting_presentation.pdf

Distribution Capacity Service – A supply and/or a load modifying service that DERs provide as required via the dispatch of power output for generators and electric storage, and/or reduction in load that is capable of reliably and consistently reducing net loading on desired distribution infrastructure. Distribution Capacity service can be provided by a single DER resource and/or an aggregated set of DER resources that reduce the net loading on a specific distribution infrastructure location coincident with the identified operational need in response to a control signal from the utility.

Reliability (Back-Tie) Service – A supply and/or load modifying service capable of improving local distribution reliability under abnormal conditions. Specifically, this service reduces contingent loading of grid infrastructure to enable operational flexibility to safely and reliably reconfigure the distribution system to restore customers.

4.3.2 Requirements and Options

Table 17 lists the solution requirements which, if solved, will solve all overload conditions identified through 2024. The capacity that needs to be addressed start in February 2022 at about 6 hours per day. In 2023 and 2024, the capacity is needed every day of the year.

Table 17 Solution Requirements

	Equipment	MW Peak	Operational Date	Delivery Months	Delivery Hours	Duration (Hr)	Max # of Days	MWH
Normal	Kaloi 1 Tsf	4.7	Jan 2023	Jan - Dec	1PM – 11AM	10	365	21.5
	Kaloi 3 Ckt	0.3	Aug 2023	Aug - Oct	7PM - 9PM	2	69	0.4

	Equipment	MW Peak	Operational Date	Delivery Months	Delivery Hours	Duration (Hr)	Max # of Days	MWH
Contingency	Kapolei 2 Tsf	3.5	Feb 2022	Jan - Dec	5PM - 11PM	6	365	11.4
	Ewa Nui 2 Ckt	5.1	Jan 2023	Jan - Dec	11AM - 12AM	13	365	30.9
	Kaloi 1 Tsf ¹	9.7	Jan 2023	Jan - Dec	6AM - 8AM, 9AM - 12AM	17	365	62.8
	Kaloi 3 Ckt ¹	2.6	Jan 2023	Jan - Dec	5PM - 11PM	6	365	8.5
	Kamokila 4 Ckt	1.0	May 2023	Jan - Dec	5PM - 10PM	5	226	2.9

¹ If the Reliability (back-tie) Service is scheduled dispatch (i.e., dispatched each day specified in the “Max # of Days” column) then the normal overload need will also be met.

For an NWA solution the following must be considered. During a contingency event, inverter-based resources will trip and remain offline until voltage and frequency are restored and remain stable for five minutes.⁴ Under a contingency event where a circuit trips and its loads transfer to a backup circuit, the transferred loads will momentarily lose power and the inverter-based resources connected to those loads will trip on under-voltage until voltage is restored and remains stable for five minutes. In other words, if inverter-based resources are being transferred to the back-up circuit the back-up circuit will experience unacceptable overloading for at least a 5-minute duration. For the loads on the circuit(s) that experience the momentary outage, only demand reduction solutions are capable of maintaining load reduction during the contingency event. Both demand reduction solutions and supply (inverter-based) solutions that are capable of maintaining load reduction for the backup circuit(s) (until the inverter-based resource can reconnect to the grid) that accept the loads from the circuit(s) that experience the outage during the contingency event.

Reducing the 5-minute reconnection time for inverters that have the capability may be viable to allow use of inverter-based resources for transferred loads.

Table 18 summarizes the wires solution options for mitigating distribution substation and circuit overloads from 2022 to 2024 in the Ho’opili area. In 2025, additional capacity may be needed to solve overloads.

Table 18 Summary of Solution Options

Option	Name	Summary
1	Ho’opili Substation	<ul style="list-style-type: none"> • Develop a new system Ho’opili substation within the Ho’opili development with provisions for four 46-12 kV, 10/12.5 MVA distribution transformers. • Extend two 46kV circuits to the substation site • Initially, install one 46-12 kV, 10/12.5 MVA distribution transformer. • Install two 12.47kV circuits
2	Kaloi Substation	<ul style="list-style-type: none"> • Install one additional 46-12 kV, 10/12.5 MVA distribution transformer at the existing Kaloi substation. • Extend one 46kV circuit to the substation site • Extend two 12.47kV circuits
3	Ewa Nui Substation	<ul style="list-style-type: none"> • Install one additional 46-12 kV, 10/12.5 MVA distribution transformer at the existing Ewa Nui substation. • Install one 138-46kV, 48/80 MVA sub-transmission transformer • Extend two 12.47kV circuits.

Each option is described in greater detail in the following sections.

⁴ Reference IEEE 1547-2018 standard, section 4.10.3 (Performance during entering service).

4.3.3 Option 1: Ho’opili Substation

D.R. Horton identified and reserved space within their development that is adequately sized for a Hawaiian Electric distribution substation. In this option, Hawaiian Electric would install one 46-12 kV, 10/12.5 MVA distribution substation transformer, extend two 46 kV circuits to the site, and install two 12 kV circuits.⁵

The Ho’opili Substation option includes extending the existing Ewa Nui 42 46 kV circuit that is along Farrington Highway and Waiau-Steel Mill 46 kV circuit that is along Kualakai parkway to the substation.

4.3.4 Option 2: Kaloι Substation

The Kaloι Substation has two existing 46-12kV, 10/12.5 MVA distribution transformers. This option would install one additional 46-12 kV, 10/12.5 MVA distribution substation transformer at the existing Kaloι Substation, extend one 46 kV circuit from Farrington Hwy, and install two 12 kV circuits.

4.3.5 Option 3: Ewa Nui Substation

The Ewa Nui Substation has two existing 46-12kV, 10/12.5 MVA distribution transformers. This option would install one additional 46-12 kV, 10/12.5 MVA distribution substation transformers at the existing Ewa Nui Substation, install one additional 138-46 kV, 48/80 MVA sub-transmission transformer, and install two 12 kV circuits. This option requires the installation of a new sub-transmission transformer, Ewa Nui B, to provide redundancy to the existing Ewa Nui A sub-transmission transformer so that the Ewa Nui distribution transformers would be served from different sub-transmission transformers. In the event one of the two sub-transmission transformers fails, the Ewa Nui distribution transformers/circuits from the in-service sub-transmission transformer would still be in service to serve loads.

4.4 Comparison of Solution Options

This section compares the solution options. Each option was evaluated based on the following categories: capabilities, resources, economics, and schedule. For some categories, multiple factors were considered.

For each option, each factor was rated as either high (green), medium (yellow), or low (red) in its ability to meet the criterion.

Table 19 Evaluation Matrix

Category	Description	Option 1 New Hoopili Substation with 1 Tsf	Option 2 Expand Existing Kaloι Substation	Option 3 Expand Existing Ewa Nui Substation
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⁵ Two 46kV lines are part of standard substation design, where the outage of one 46kV circuit allows the distribution substations served from that 46kV line to be auto transferred to the back up 46 kV line.

Category	Description	Option 1 New Hoopili Substation with 1 Tsf	Option 2 Expand Existing Kaloi Substation	Option 3 Expand Existing Ewa Nui Substation
Capabilities	Serve Existing Loads	Fully Capable	Fully Capable	Fully Capable
	Future Load Accomodation	All phases of Hoopili	First phases of Hoopili	First phases of Hoopili
	Backup Capability for Contingency Conditions	Fully Capable	Fully Capable	Fully Capable
	Future 100% Renewable Goal	Increases available DER Hosting Capacity	Increases available DER Hosting Capacity	Increases available DER Hosting Capacity
Resources	Locational Value	Minimal distribution circuit installation costs due to locational benefits	High distribution circuit installation costs	High distribution circuit installation costs
	Line Routing	Easements are in place	Easements are in place	Easements are in place
	Land Availability	Substation site has been set aside for HECO	Existing substation site	Existing substaton site
	Expansion Capability	Includes provisions for four 46-12 kV, 10/12.5 MVA distribution Tsf	Installation of one additional Tsf requires installation of a 3rd 46 kV Circuit	Installation of one additional Tsf requires installation of 138-46 kV Tsf
Economics	Project Cost ⁶	\$12.7M*	\$12.7M*	\$13.1M*
Schedule	Service Date meets Need	Meets service date	October 2023 is earliest service date	Meets service date

*In 2019 dollars

Ability to meet criteria:
High
Medium

⁶ For each option, the addition of a substation transformer assumes a 46-12kV, 10/12.5MVA transformer size which is the standard distribution substation transformer that Hawaiian Electric uses.

Ability to meet criteria:

Low

When comparing all three solution options, all three options are able to meet the following criteria (see Table 19):

- Serve existing load
- Have backup capability for contingency conditions
- Increase available DER hosting capacity to meet future 100% renewable goal
- Have easements in place for circuit extensions to serve projected loads
- Have existing or identified substation sites to add transformer capacity

The following is a comparison of how the three options differ in meeting the criterion:

Option 1: The new substation site will be located in the Ho’opili development, east of Kualakai parkway and north of East Kapolei II (see Appendix B), resulting in minimal distribution circuit installation costs due to its location of new loads to serve.

The Ho’opili Substation site will have provisions for four 46-12 kV, 10/12.5 MVA distribution transformers to serve projected loads in the area.

Constructing a new system Ho’opili Substation and installing one 46-12 kV, 10/12.5 MVA transformer and associated 46 kV and 12 kV circuits is the most cost effective option. The sub-transmission and distribution circuit work is minimized due to the location of the substation within the Ho’opili development that is causing the overload conditions. Furthermore, this option includes provisions to expand the substation from one to four transformers, which will allow for future load growth.

The Copmany also considered the installation of a smaller 5/6.25 MVA transformer. This option would be more costly than a 10/12.5 MVA transformer. A 5/6.25 MVA transformer project costs \$13.3M vs \$12.7M for a 10/12.5 MVA transformer project at Ho’opili. The 5 MVA transformer option includes the cost to purchase a spare 5 MVA transformer since we do not currently carry any 5 MVA spare transformers whereas the standard 10 MVA transformer is a common type of spare carried by the company. Training costs for HECO employees on the non-standard transformer are also included.

Option 2: Installing one 46-12 kV, 10/12.5 MVA transformer at the existing Kaloi Substation and associated 46 kV and 12 kV circuits costs more than Option 1 of the traditional wires alternatives. The use of an existing substation has a smaller scope for substation work compared to the new substation option. However, the location of the Kaloi Substation requires far more 12 kV circuit installation work to reach the Ho’opili development than Option 1.

The two new 12 kV circuits from Kaloi Substation would run through the University of Hawaii West Oahu Campus (UHWOC). The installation of one more additional transformers at Kaloi Substation would also require the installation of a third 46 kV circuit from Ewa Nui to the substation to prevent an overload condition on the remaining 46 kV circuit when one sub-transmission 46 kV circuit serving Kaloi substation fails or is out of service.

This option would serve existing loads, provide backup capacity in the event of a contingency condition, and accommodate the forecasted load increases projected for the first phases of the Ho'opili area only. However, the estimated schedule for this option would not meet the required service date due to extensive distribution underground work that is required to bring circuit infrastructure from the Kaloi Substation located in the UH West Oahu area into the Ho'opili area. Transmission and distribution work would not be finished until around October 2023 at the earliest. Additionally, the UH West Oahu area is expected to undergo additional development and load growth in the coming years⁷, which the Kaloi Substation is best suited to serve based on its close proximity to the UH West Oahu area. Significant underground circuit work would not be required if the Kaloi Substation is available to serve the UH West Oahu Area.

Option 3: Installing one 46-12 kV, 10/12.5 MVA transformer at the existing Ewa Nui Substation and one 138-46kV, 48/80MVA sub-transmission transformer will also cost more than Option 1 of the traditional wires alternatives. The use of this existing substation requires the addition of a new sub-transmission transformer. Besides the additional transformer, the location of the Ewa Nui Substation also requires more 12kV circuit installation work to serve the Ho'opili development than Option 1.

4.4.1 Future Considerations

After 2022, Hawaiian Electric expects the loads within the Ho'opili development to significantly increase. According to the developer of Ho'opili, and as provided in Appendix C, future phases beyond 2022 are expected to demand approximately 48 MVA of capacity. Based on a load analysis, looking out to the 2030 timeframe, Hawaiian Electric expects that if the load estimates materialize as forecasted, additional substation transformer capacity or NWA solution opportunity will be needed in 2025. If the loads do not materialize as expected then the additional mitigation requirements will be deferred. Hawaiian Electric will continue to evaluate the distribution system capacity in this area as part of the annual distribution planning analysis.

4.5 Recommendations

Based on the analysis above, this study recommends installation of the new system Ho'opili Substation. The proposed project will allow for the timely installation of critical infrastructure to the electrical system which will provide the necessary capacity to serve projected loads and provide essential reliable power under contingency conditions.

The study specifically recommends:

- The design and construction of a new system Ho'opili distribution substation site, to be sized for ultimately four 10/12.5 MVA distribution transformers.
- The initial installation of one 46-12 kV, 10/12.5 MVA distribution transformer, with two circuit radial 12 kV switchgear.
- The installation of two 12 kV circuits at the new Ho'opili Substation.

⁷ See, http://www.honolulu.gov/rep/site/dppto/d/east_kapolei_docs/East_Kapolei_Exec_Summary_-_Draft.pdf

- To serve Ho'opili Substation by tapping and extending the existing 46 kV Ewa Nui 42 and Waiau-Steel Mill circuits from Farrington Highway and Kualakai Parkway, respectively.

Mitigation for projected overload conditions due to the forecasted loads in the Kapolei and Ho'opili study area is required by February 2022. The installation of one 46-12kV, 10/12.5 MVA distribution transformer at the proposed system Ho'opili Substation site in 2022 is the most desirable option for the following reasons:

- This option alleviates all overload conditions
- This option adequately provides back-up capability in the event of a contingency condition
- Increases DER hosting capacity in the East Kapolei area
- The location of the new Ho'opili Substation near the load growth will minimize the distribution circuit installation cost
- The location of the new Ho'opili Substation near 46kV circuits will minimize the sub-transmission circuit installation cost
- The new Ho'opili Substation will have provisions for four distribution transformers to accommodate a majority of the ultimate projected load in the vicinity
- This option provides initial capacity to most of the Ho'opili development area until future substations are required for the area
- This is the most cost effective option to providing capacity for the Ho'opili study area.

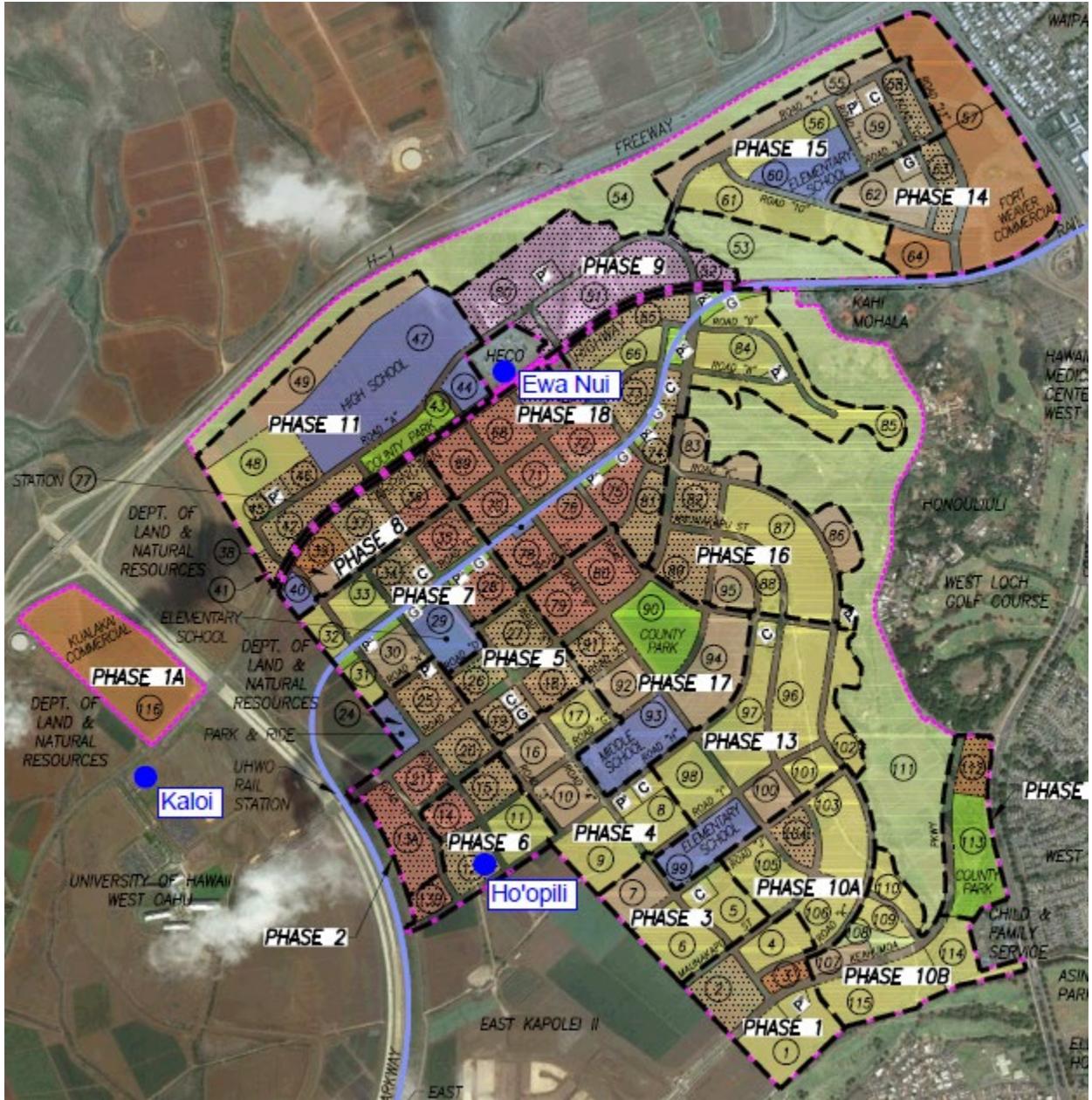
Non-wire alternatives (NWAs) for this area are being assessed as part of the Integrated Grid Planning process soft launch. The Company will be issuing a Request for Proposal (RFP) for potential NWA solutions to solve the projected overloads. The NWA solution will be evaluated based on the deferred cost of the recommended wires solution.

Appendix A Projected Non-Ho‘opili Loads in East Kapolei^a

Customer	Load (MVA)	Load Type	Year	Status
East Kapolei TPSS Initial load	1.5	None (flat)	2019	Under construction
East Kapolei Passenger Station	0.5	None (flat)	2019	Under construction
Ho‘opili TPSS Initial load	2.4	None (flat)	2019	Under construction
Ho‘opili Passenger Station	0.3	None (flat)	2019	Under construction
UHWO Passenger Station	0.6	None (flat)	2019	Under construction
UHWO Creative Media	0.6	Commercial	2019	Under construction
East Kapolei II	3.5	Residential	2019–2022	Partially occupied and subsequent phases under construction
Ho‘opili Offsite Potable Water System	0.7	None (flat)	2019	Under construction
Keali‘i by Gentry	0.3	Residential	2019	In design phase
Ka Makana Ali‘i	1	Commercial	2019	Mostly occupied
FBI Building	1.2	Commercial	2019	Under construction
Kalaeloa HIARNG	2.5	None (flat)	2019	Under construction
Kapolei Mixed Use Ph 1	1.5	Commercial	2019	Under construction
Marriott Residence Inn	0.6	Residential	2019	Under construction
Kaiser Leeward Clinic	0.4	Commercial	2019	Under construction
Kalaeloa Parcels 1, 2, and 3	0.5	Residential	2020	In design phase
Kapolei Mixed Use Ph 2	0.7	Commercial	2020	In design phase
Kalaeloa Parcels 1, 2, and 3	0.6	Residential	2021	In design phase
Kalaeloa Parcels 1, 2, and 3	0.7	Residential	2022	In design phase
US Coast Guard Air Station	2.9	Commercial	2022	In design phase
East Kapolei TPSS Testing	1.2	None (flat)	2023	Under construction
Ho‘opili TPSS Testing	0.9	None (flat)	2024	Under construction

^aThis data is the latest information provided by the developers.

Ho'opili Development Map



Appendix C Projected Loads for Ho’opili Development

Phase	Load (MVA)	Load Type	Use	Units	Sq Ft	Year	Status
1	0.465	Residential	Single Family	155	1,700		Complete
	0.38	Residential	Apartment MU	152	1,200		Complete
	0.687	Commercial	Commercial		269,767	2019	In design phase
2	1.35	Residential	Multi Family	540	1,200	2020	Under construction
	0.743	Commercial	Commercial		297,210	2020	In design phase
3	0.345	Residential	Single Family	115	1,700		Complete
	0.265	Residential	Multi Family	106	1,200		Complete
	0.039	Commercial	Commercial		161,172	2019	In design phase
4	0.378	Residential	Single Family	126	1,700	2020	Under construction
	0.27	Residential	Multi Family	108	1,200	2020	Under construction
	0.033	Commercial	Commercial		139,392	2020	In design phase
6	0.174	Residential	Single Family	58	1,700	2020	In design phase
	2	Residential	Apartment MU	800	1,200	2020	In design phase
	0.673	Commercial	Commercial		149,542	2020	In design phase
5	0.153	Residential	Single Family	51	1,700	2021	In design phase
	1.1375	Residential	Multi Family	455	1,200	2021	In design phase
	0.603	Commercial	Commercial		237,576	2021	In design phase
10A	1.422	Residential	Single Family	474	1,700	2021	In design phase
	0.37	Residential	Multi Family	148	1,200	2021	In design phase
	0.13	Commercial	Commercial		28,924	2021	In design phase
13A	1.221	Residential	Single Family	407	1,700	2022	In design phase
	0.82	Residential	Multi Family	328	1,200	2022	In design phase
	0.024	Commercial	Commercial		60,984	2022	In design phase
	1.5	Commercial	School		666,468	2022	In design phase
9	3.606	Industrial	Industrial		797,039	2020	Master plan
11	0.276	Residential	Single Family	92	1,700	2022	Master plan
	1.2325	Residential	Multi Family	493	1,200	2022	Master plan
	0.437	Commercial	Commercial		620,730	2022	Master plan
	4	Commercial	School		2,064,744	2023	Master plan
13B	1.221	Residential	Single Family	407	1,700	2022	Master plan
	0.82	Residential	Multi Family	328	1,200	2022	Master plan
	0.024	Commercial	Commercial		60,984	2022	Master plan
	1.5	Commercial	School		509,652	2024	Master plan
7	0.276	Residential	Single Family	92	1,700	2023	Master plan
	1.645	Residential	Multi Family	658	1,200	2023	Master plan
	0.644	Commercial	Commercial		489,818	2023	Master plan
16	3.885	Residential	Multi Family	1,554	1,200	2023	Master plan
	1.252	Commercial	Commercial		490,268	2023	Master plan
8	1.05	Residential	Multi Family	420	1,200	2024	Master plan
	1.146	Commercial	Commercial		404,194	2024	Master plan
10B	1.422	Residential	Single Family	474	1,700	2025	Master plan
	0.37	Residential	Multi Family	148	1,200	2025	Master plan
	0.13	Commercial	Commercial		28,924	2025	Master plan
12	0.679	Commercial	Commercial		875,556	2026	Master plan

Phase	Load (MVA)	Load Type	Use	Units	Sq Ft	Year	Status
17	0.834	Residential	Single Family	278	1,700	2027	Master plan
	4.525	Residential	Multi Family	1,810	1,200	2027	Master plan
	1.442	Commercial	Commercial		535,831	2027	Master plan
14	0.609	Residential	Single Family	203	1,700	2029	Master plan
	1.7	Residential	Apartment MU	680	1,200	2029	Master plan
	6.999	Commercial	Commercial		3,325,022	2029	Master plan
	1.5	Commercial	School		553,212	2029	Master plan
15	0.645	Residential	Single Family	215	1,700	2030	Master plan
	1.83	Residential	Multi Family	732	1,200	2030	Master plan
	0.561	Commercial	Commercial		812,394	2030	Master plan
1A	2.239	Commercial	Commercial		497,656	TBD	Master plan

*Master plan = part of D.R. Horton's energization schedule but currently no construction or milestone information available

Appendix D Equipment ratings

The following tables lists the normal and contingency ratings for each transformer and circuit in the study. Any loads that exceed these ratings are considered to be overloaded. Because thermal overloading would be highest at the beginning of a circuit, the ratings are based on the beginning section of each circuit.

Table 21 Transformer equipment ratings

Transformer	Normal Rating (MVA)	Contingency Rating (MVA)
Ewa Nui 2	14.247	16.156
Kaloi 1	13.902	16.156
Kaloi 2	12.500	16.156
Kamokila 2	15.147	16.156
Kapolei 2	14.315	16.156

Table 22 Circuit equipment ratings

Circuit	Normal Rating (MVA)	Contingency Rating (MVA)
Ewa Nui 2	8.531	10.670
Ewa Nui 3	8.531	10.670
Kaloi 1	8.531	10.670
Kaloi 2	8.531	10.670
Kaloi 3	8.531	10.670
Kamokila 4	6.955	9.093
Kapolei 4	8.531	10.670

Appendix E Load Types

The following figures show the load shapes for each type of load. In the graphs, the red lines represent weekend days and the blue lines represent weekdays. Load shapes are generated in the LoadSEER tool based on actual recorded customer class data.

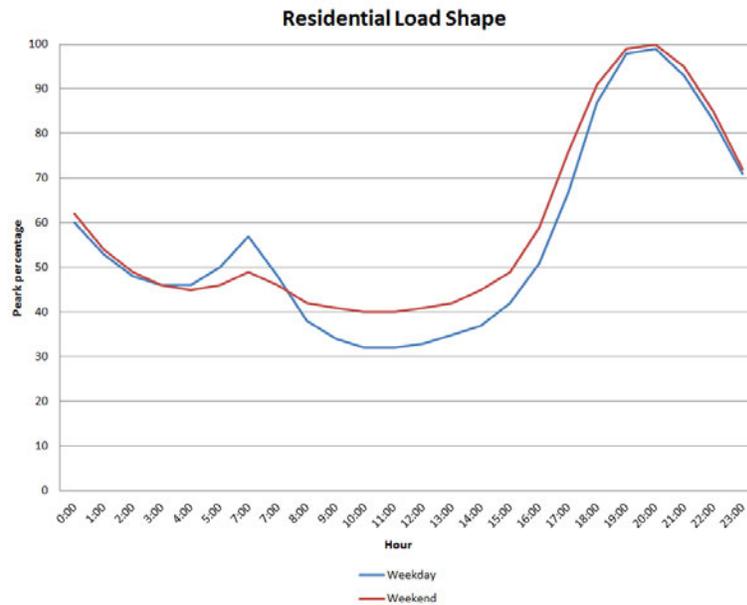


Figure 11 Residential load shape

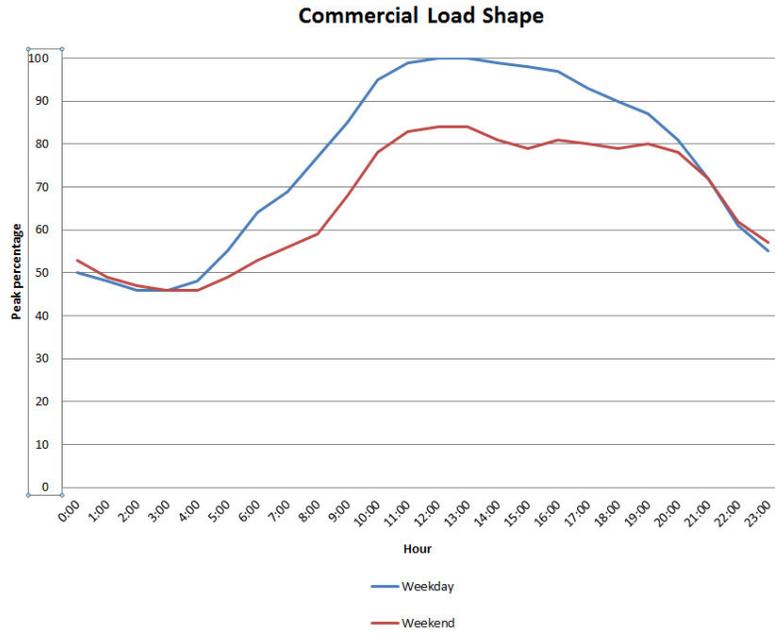


Figure 12 Commercial load shape

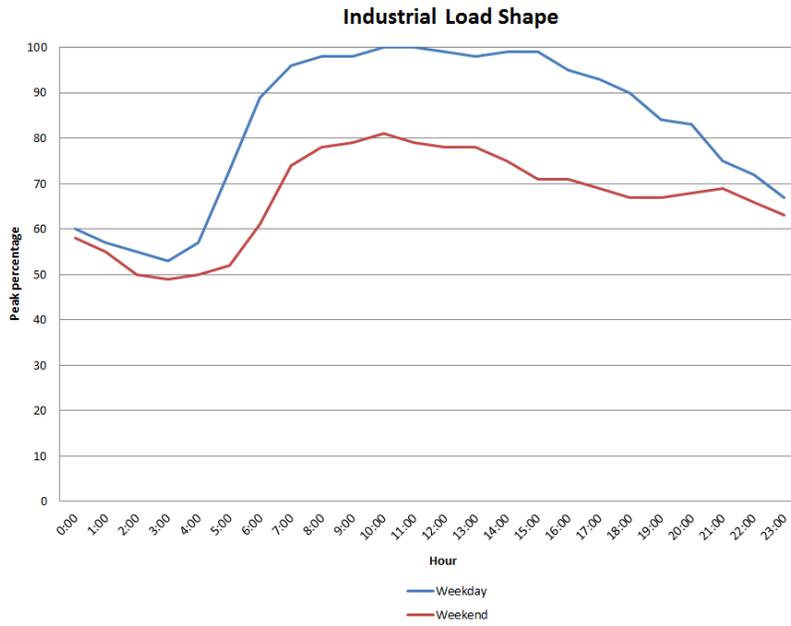


Figure 13 Industrial load shape

Appendix F Peak Load Day Profile For Overloading Scenarios

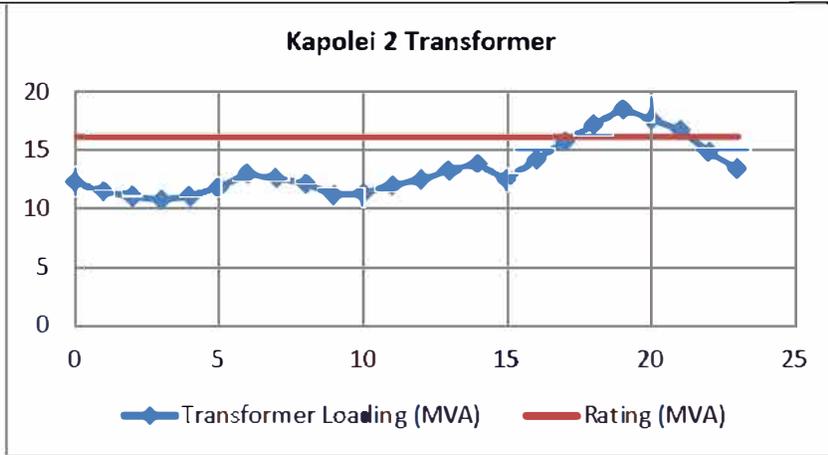


Figure A-14. The Peak Day Overloading Scenario on Transformer in Contingency Condition, in 2022.

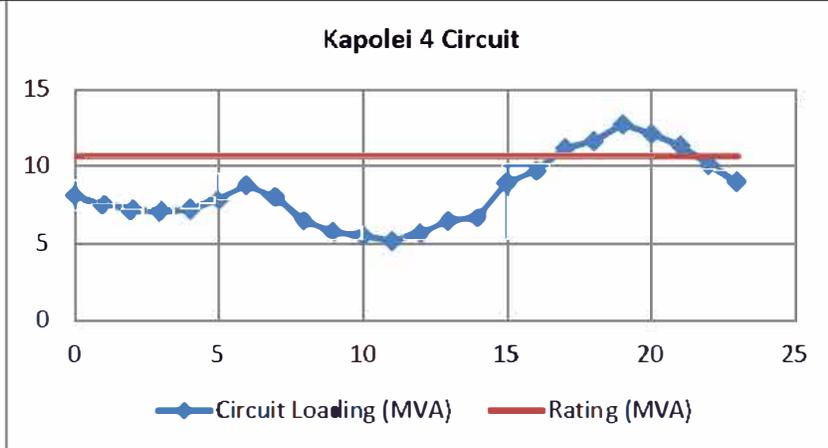


Figure A-15. The Peak Day Overloading Scenario on Circuit in Contingency Condition, in 2022.

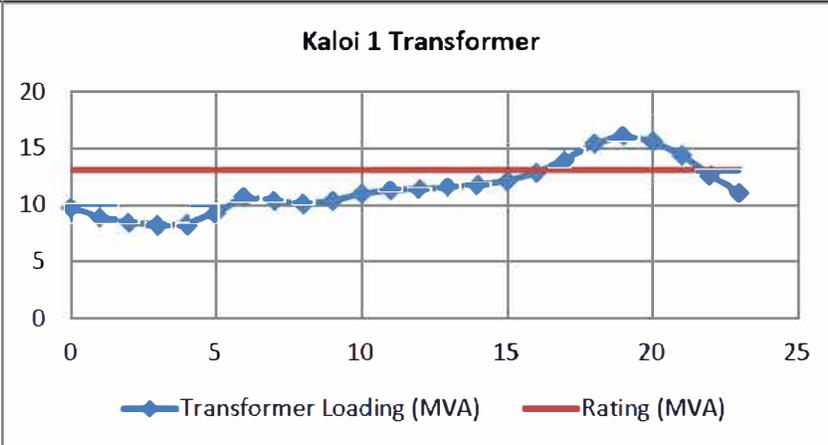


Figure A-3. The Peak Day Overloading Scenario on Transformer in Normal Condition, in 2023.

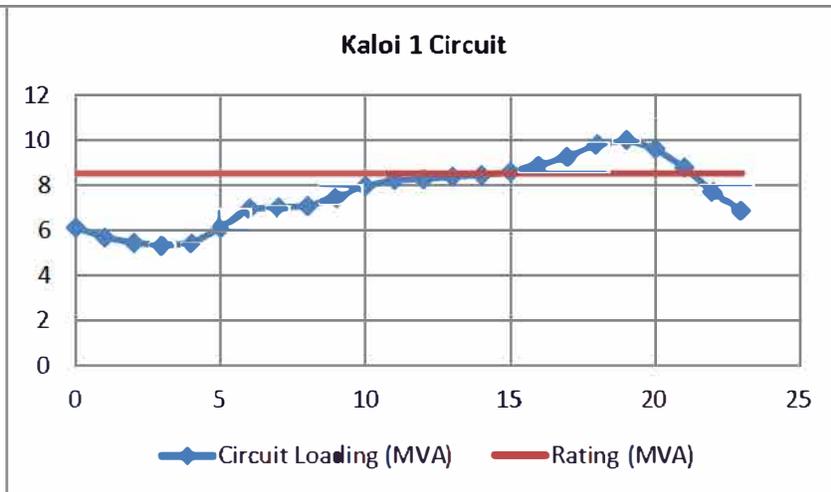


Figure A-4. The Peak Day Overloading Scenario on Circuit in Normal Condition, in 2023.

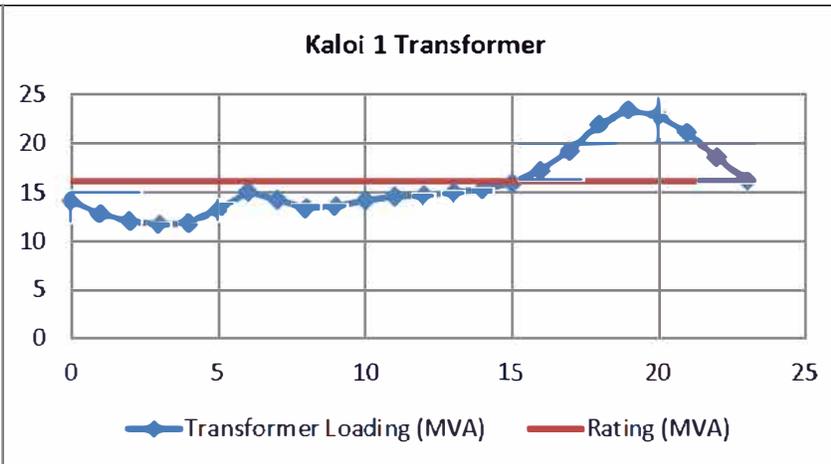


Figure A-16. The Peak Day Overloading Scenario on Transformer in Contingency Condition, in 2023.

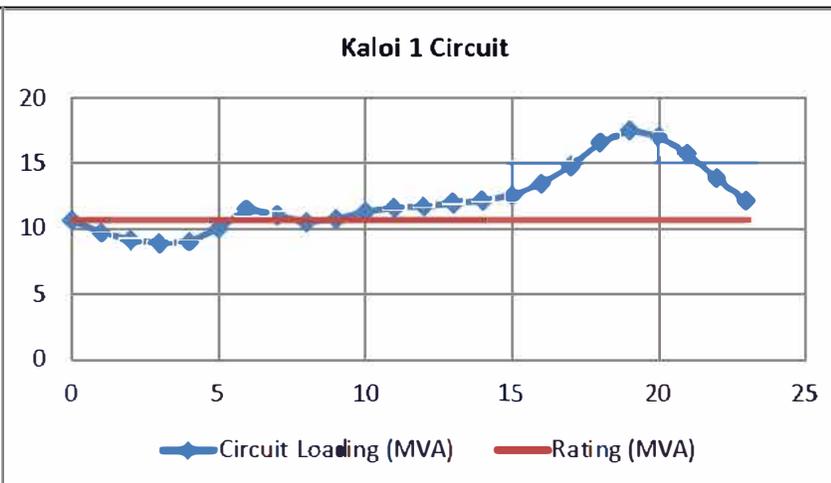


Figure A-17. The Peak Day Overloading Scenario on Circuit in Contingency Condition, in 2023.

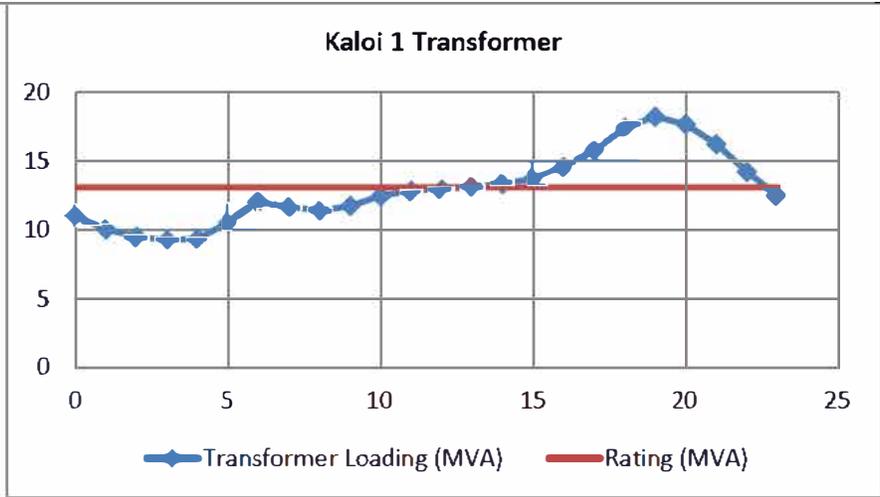


Figure A-18. The Peak Day Overloading Scenario on Transformer in Normal Condition, in 2024.

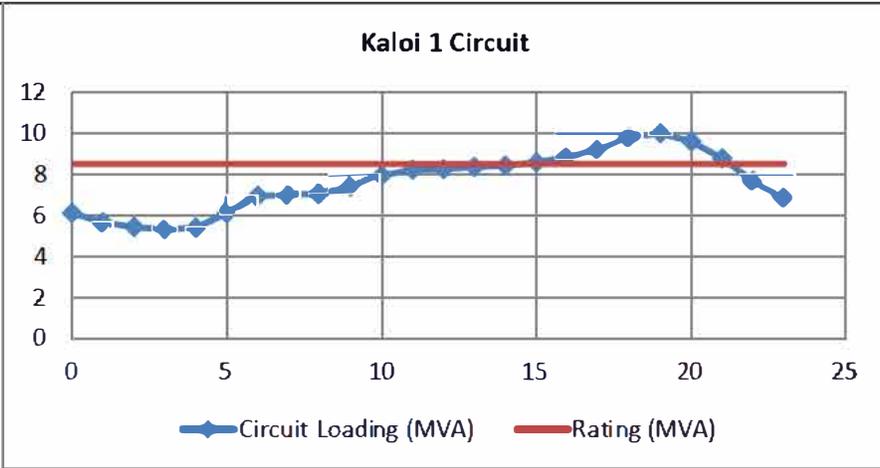


Figure A-19. The Peak Day Overloading Scenario on Circuit in Normal Condition, in 2024.

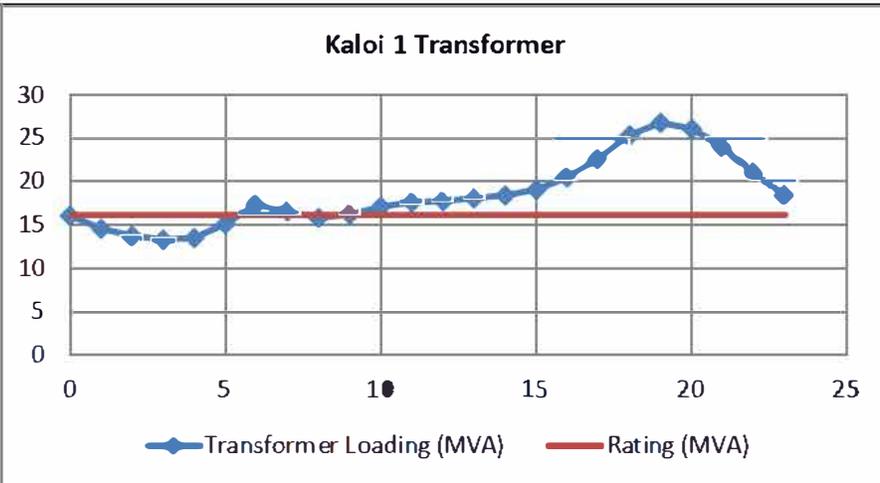


Figure A-20. The Peak Day Overloading Scenario on Transformer in Contingency Condition, in 2024.

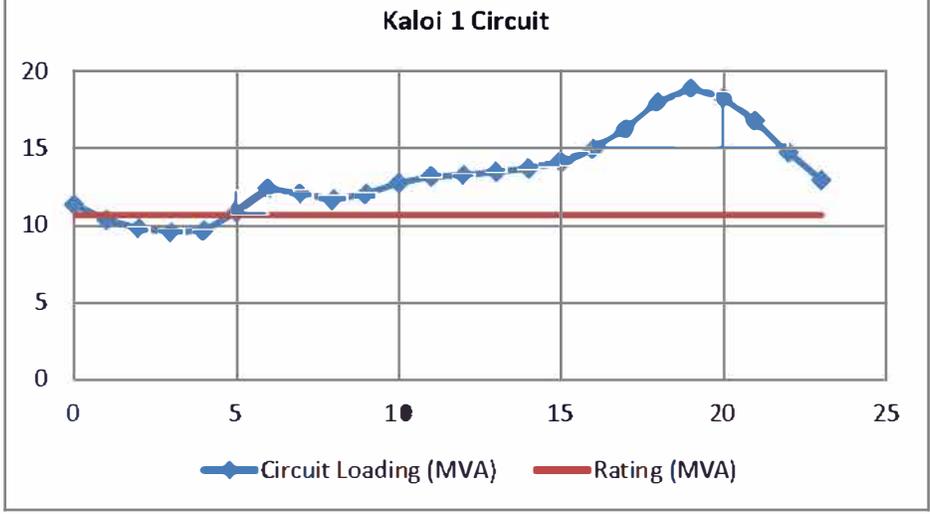


Figure A-21. The Peak Day Overloading Scenario on Circuit in Contingency Condition, in 2024.