



March 30, 2020

The Honorable Chair and Members of  
the Hawai'i Public Utilities Commission  
465 South King Street, #103  
Honolulu, Hawai'i 96813

Dear Commissioners:

Subject: Docket No. 2018-0163  
Instituting a Proceeding to Investigate Establishment of a  
Microgrid Services Tariff  
Hawaiian Electric's Transmittal of a Draft Microgrid Services Tariff

In accordance with Order No. 36514, filed on September 16, 2019, in the above subject proceeding, Hawaiian Electric<sup>1</sup> herein encloses the following documents:

- Attachment 1: Company's Draft Microgrid Services Tariff – clean;
- Attachment 2: Redlined document showing modifications between the Working Group's draft Microgrid Services Tariff and the Company's Draft Microgrid Services Tariff;
- Attachment 3: Company's Draft Microgrid Services Tariff Appendix I Hybrid Microgrid Operator Disclosure Checklist;
- Attachment 4: Company's Draft Microgrid Services Tariff Appendix II Hybrid Microgrid Operator Interconnection Agreement;
- Attachment 5: Company's Draft modification to Rule No. 24 to be reflected in various existing DER Tariffs;
- Attachment 6: Redlined document showing modifications between the Working Group's draft of revisions to Rule No. 24 and the Company's draft of revisions to Rule No. 24; and
- Attachment 7: Matrix identifying the sections in the various existing DER tariffs that the Company's Draft modifications (if accepted) would be reflected.

The Company notes the following structural changes to the Working Group Report's attachments:

- In order to modify necessary documents only, the Company has removed changes in Rule 14H that were indicated in prior drafts and has transferred necessary changes to the

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<sup>1</sup> Hawaiian Electric Company, Inc., Maui Electric Company, Limited, and Hawai'i Electric Light Company, Inc. are each doing business as "Hawaiian Electric" and have jointly registered "Hawaiian Electric" as a trade name with the State of Hawai'i Department of Commerce and Consumer Affairs, as evidenced by Certificate of Registration No. 4235929, dated December 20, 2019.

The Honorable Chair and Members  
of the Hawai'i Public Utilities Commission  
March 30, 2020  
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Microgrid Services Tariff – in particular, Section H (Microgrid Operation) of the Draft  
Microgrid Services Tariff.

Sincerely,

/s/ Kevin M. Katsura

Kevin M. Katsura  
Director  
Regulatory Non-Rate Proceedings

c: Service List (via e-mail)

RULE NO. XX

Microgrid Services

A. GENERAL

The Microgrid Services Tariff is intended to encourage and facilitate the development and use of new microgrids throughout Hawai'i, except Kauai, to improve energy resiliency, in light of extreme weather events or other disasters as identified in Act 200 of the 2018 Legislative Session. The Microgrid Service Tariff is not intended to affect existing microgrids and other facilities with microgrid capabilities (e.g., Distributed Generation Facilities, generators), which are interconnected to the Company System by means of a Customer Interconnection Agreement or other agreements with the Company, subject to the terms and conditions set forth in the Company's Rule 14, Section H ("Rule 14H") and other applicable Company rules, at the time of the initial effective date of this tariff, [insert date].

This Tariff shall be reviewed no later than five years from the effective date.

1. Definitions

- a. "AC" means alternating current.
- b. "Applicant" means the Microgrid Operator applying under the Microgrid Services Tariff.
- c. "Application" or "Hybrid Microgrid Application" means the form by which the Applicant provides a description of the planned Hybrid Microgrid and applies to the Company to be a Hybrid Microgrid Operator.
- d. "Commission" means the Public Utilities Commission of the State of Hawai'i.
- e. "Company" means [Hawaiian Electric Company, Inc., Maui Electric Company, Ltd., Hawaii Electric Light Company, Inc.].
- f. "Company System" means all electrical wires, equipment and other facilities owned or provided by the Company, through which the Company provides electrical service to its Customers.
- g. "Customer" or "Customers" used herein is as defined in Company Rule No. 1.
- h. "Customer Interconnection Agreement" means the applicable interconnection agreement for a non-utility Generating Facility.

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- i. "Customer Microgrid" is a Microgrid that uses non-utility infrastructure beyond the Point of Common Coupling<sup>1</sup>, including distribution lines and related equipment, to meet its interconnected loads.
- j. "Disclosure Checklist" means the Hybrid Microgrid Operator Disclosure Checklist attached hereto as, Appendix I.
- k. "Distributed Generation Facility" is as defined in Rule No. 14.
- l. "Distribution Level" is defined as Interconnection to electrical wires, equipment, and other facilities at the distribution voltage levels (such as 25kV (Oahu only), 12kV, or 4kV) owned or provided by the Company, through which the Company provides electrical service to its Customers.
- m. "Emergency Events" means, as determined by Company in its reasonable discretion, a condition or situation requiring prompt action by Company (a) to maintain the reliable operation of the Company System; (b) to prevent or limit the loss of load or generation; (c) to maintain public safety or the safety of Company's personnel; or (d) to protect Company, Customer, or third-party property; or as a Scheduled Island Mode Operation as a pre-emptive action ahead of impending weather events or natural disasters or in response to other unusual conditions.
- n. "Generating Facility" means Customer or utility-owned electrical power generation that is Interconnected to the Company System.
- o. "Grid-Connected Mode" means a mode of operation when the Microgrid is Interconnected to and operating in parallel with the Company System, is not operating in Island Mode, and the Company maintains operational coordination of the delivery of electric service..
- p. "Hybrid Microgrid" is a Microgrid that uses utility and non-utility infrastructure beyond the PCC, including distribution lines, Generating Facilities, and related equipment, to meet its interconnected loads.
- q. "Hybrid Microgrid Facility" means the facilities and equipment needed to create and operate a Hybrid Microgrid, including the generation, breakers, protective and associated equipment, improvements, and other tangible assets, contract rights, easements, rights of way, surface use agreements and other interests or rights in real estate reasonably necessary for the construction, operation, and maintenance of the Hybrid Microgrid subject to this Tariff.
- r. "Interconnect" or "Interconnected" or "Interconnection" means the physical connection(s) between the utility electric grid (i.e., the Company System) and the Microgrid at a designated PCC.

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<sup>1</sup> For Customer Microgrids, there may be instances where the Point of Common Coupling (e.g., utility meter) is located on the low side of Customer electrical equipment.

- s. "Interconnection Agreement" means the Hybrid Microgrid Interconnection Agreement attached hereto as, Appendix II.
- t. "Interconnection Requirements Study" or "IRS" means pursuant to Rule 14H, Appendix III, Section 4, a study to establish the requirements for Interconnection with the Company System.
- u. "Island Mode" means a mode of operation when a Microgrid that normally operates in Grid-Connected Mode is disconnected from the Company System at PCC, and the Microgrid is generating or producing energy to provide electric service within the Microgrid under the operational coordination of the Microgrid Operator.
- v. "Microgrid," means a group of interconnected loads and distributed energy resources within clearly defined electrical boundaries that acts as a single self-governing controllable entity with respect to the utility's electrical grid and is connected to a public utility's electrical grid at the PCC to operate in Grid-Connected Mode and can disconnect from the utility's electrical grid to operate in Island Mode only during Emergency Events, and that: (1) is subject to this Microgrid Services Tariff; and (2) generates or produces energy.
- w. "Microgrid Participant" or "Participant" means the Customer that has executed the appropriate documents with the Microgrid Operator to participate in the Hybrid Microgrid in which the Customer is located.
- x. "Microgrid Operator" means the operator of a Customer Microgrid or Hybrid Microgrid.
- y. "MW" means megawatt.
- z. "Network System" means an electrical system in which two or more Company feeder sources are electrically tied together on the primary or secondary voltage level to form one power source for one or more Customers. The network system is designed to provide higher reliability for Customers connected to it.
- aa. "Point of Common Coupling" or "PCC" is the point at which the Company and Microgrid interface.
- bb. "Point of Interconnection" or "POI" is the point at which the Company and the Customer interface, including the Generating Facility, occurs.
- cc. "Supervisory Control" or "SCADA" means remote monitoring and/or control of a Generating Facility's power output and interrupting device status by means of a communication channel that is acceptable to the Company.
- dd. "Scheduled Island Mode Operation" means a Microgrid operating in Island Mode that is scheduled and coordinated between the Microgrid Operator and the Company, as more particularly described in Section H, below.

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- ee. "Total Rated Capacity" means the aggregate total of all Generating Facilities that intend to supply power to the Hybrid Microgrid during Island Mode as defined in Section 7 of Exhibit A to the Interconnection Agreement.
- ff. "Unscheduled Island Mode Operation" means a Microgrid operating in Island Mode that is not scheduled or coordinated between the Microgrid Operator and the Company in response to an unplanned event on the Company System, as more particularly described in Section H, below.

B. AVAILABILITY

1. The Microgrid Services Tariff is available to a Microgrid that also meets the following criteria:
  - a. The Microgrid will serve as a Customer Microgrid; or
  - b. The Microgrid will serve as a Hybrid Microgrid, and
    - i. the Hybrid Microgrid Operator establishes an account with the Company; and
    - ii. each Microgrid Participant must be interconnected to the Company System and have a current account with the Company.
  - c. Microgrid Operator must be currently authorized to do business in the State of Hawai'i and be in good standing.
2. Microgrids not Interconnected to the Company System in Grid-Connected Mode are not eligible for this Tariff.
3. For Customer Microgrids and Hybrid Microgrids, existing tariffs and programs shall also be applicable.
4. A Microgrid Operator or Microgrid Participant with existing or future agreements to provide grid services to the Company are obligated to meet such requirements (e.g., availability, capacity, etc.) when such services are called. Participation in a Microgrid service whereby the operation of that Microgrid precludes the Customer (whether a Microgrid Operator or Microgrid Participant) from delivering services (e.g., because the Microgrid is in Island Mode) in accordance with said grid services contract or tariff shall not absolve a Microgrid Operator or Microgrid Participant from such contractual or tariff obligations and inability to deliver services.
5. Microgrids shall, at minimum, meet the requirements of all Hawaii Laws and Regulations governing generating resources.
6. Microgrids operating in Island Mode shall not be included in the calculation of the Company's Renewable Portfolio Standards.

C. RESPONSIBILITIES AMONG THE PARTIES

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1. A Microgrid Operator of a Customer Microgrid shall at all times indemnify, defend and hold harmless Company from any and all damages, losses, claims and actions, including, without limitation, reasonable attorneys' fees and costs, and all expenses incidental to such losses, damages, claims or actions, based upon or arising out of damage to property or injuries to persons (including death) in any way arising out of or related to the Customer Microgrid, except to the extent that such damages, losses, claims, or actions were directly caused by the negligence or willful misconduct of the Company.
2. A Microgrid Operator of a Hybrid Microgrid shall at all times indemnify, defend and hold harmless Company from any and all damages, losses, claims and actions, including, without limitation, reasonable attorneys' fees and costs, and all expenses incidental to such losses, damages, claims or actions, based upon or arising out of damage to property or injuries to persons (including death) in any way arising out of or related to the Hybrid Microgrid Facility, Microgrid Operator's performance of its obligations under the Interconnection Agreement, the operation or maintenance of the Hybrid Microgrid during Island Mode, and/or Company's actions taken in accordance with the Interconnection Agreement, except to the extent that such damages, losses, claims, or actions were directly caused by the negligence or willful misconduct of the Company.
3. Limitation of Liability - Customer Microgrids. The Company shall not be responsible for claims and/or damages arising out of or related to the Customer Microgrid, except to the extent directly caused by the negligence or wilfull misconduct of Company.
4. Limitation of Liability - Hybrid Microgrids. The Company shall not be responsible for any claims or damages of any Participant or Microgrid Operator arising out of or related to (a) the Hybrid Microgrid Facility and/or the operation or maintenance of the Hybrid Microgrid occurring during Island Mode, and/or (b) Company's exercise of rights and obligations with respect to any Generating Facility and/or Customer within the Hybrid Microgrid, whether in Grid-Connected or Island Mode.

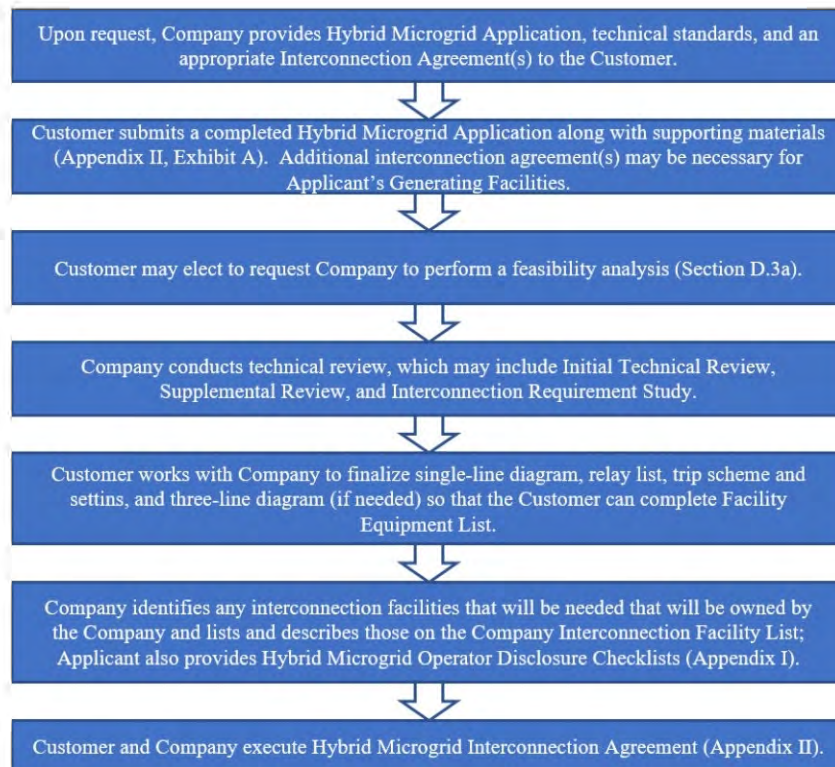
D. INTERCONNECTION

1. Each Microgrid shall be designed to Interconnect and operate in Grid-Connected and Island Mode with the Company System without adversely affecting the operations of the connected electric grid or the operations of its Microgrid Participants and without presenting safety hazards to the Company's or other Customers' personnel. The Microgrid facilities and the interconnection systems shall be in compliance with all applicable safety and performance standards of the National Electric Code (NEC), National Fire Protection Association (NFPA) codes and standards, the Institute of Electrical and Electronics Engineers (IEEE), the Company's interconnection standards and procedures provided in Rule 14H, as amended from time to time, and also subject to any other requirements as may be specified in the Interconnection Agreement or Customer Interconnection Agreement. The foregoing requirements shall apply to each of the following:
  - a. Customer Microgrids are subject to the applicable program or Rule, for which it is seeking Interconnection.

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- b. Hybrid Microgrids will require an Interconnection Agreement with the Company, subject to the terms and conditions set forth in Rule 14H and other applicable Company rules.
  - c. A Microgrid under this tariff shall be Interconnected at the Distribution Level and shall follow the applicable Rule 14H Interconnection process at the time of Interconnection.
    - a. Hybrid Microgrids seeking Interconnection to the Company's Distribution Level Network System (i.e., spot or grid network) will not be allowed.
2. The Total Rated Capacity of the Hybrid Microgrid cannot exceed 3 MW (AC) on Oahu, 1 MW (AC) on Maui Island, or 1 MW (AC) on Hawaii Island. A Microgrid with Generating Facilities with a Total Rated Capacity greater than the specified limits are not eligible under this tariff.
3. Hybrid Microgrid Interconnection Process



- a. Upon submittal of the Hybrid Microgrid Application (Section F.1), the Applicant may choose to request that the Company perform a feasibility analysis for each Hybrid Microgrid submitted, taking into account any design considerations described by the Applicant that impact the feasibility or classification of the Microgrid. The feasibility analysis will include a preliminary assessment of the required electrical facility additions or upgrades to enable the Microgrid based on the proposed configuration. The feasibility analysis will not include any assessment of the performance of the Hybrid Microgrid in Island Mode.

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- b. If the Applicant chooses to undertake a feasibility analysis, the Applicant shall agree to pay the cost estimate for the feasibility analysis provided by the Company. The Company shall make best efforts to complete the feasibility analysis within one hundred twenty (120) calendar days of the Company's receipt of all of the following: (a) the Applicant's written agreement to move forward with the feasibility analysis; (b) a complete set of data, to the Company's satisfaction, needed to conduct the feasibility analysis; and (c) payment of the feasibility analysis cost.
  - c. The completion of the feasibility analysis may include the Company's proposal to the Applicant of the following: (a) Interconnection requirements and a non-binding, good faith estimate of the Company's portion of the costs to perform the Interconnection requirements; (b) protection and synchronizing relays and settings, protection, synchronizing and control schemes; and/or (c) any other equipment requirements necessary to enable the Hybrid Microgrid.
  - d. The feasibility analysis is intended to inform the Applicant regarding potential Interconnection facilities and costs required to Interconnect the Hybrid Microgrid prior to development of the Microgrid. The feasibility analysis may be used to inform the scope of the Interconnection Requirements Study should one be required pursuant to Rule 14H, Appendix III.
  - e. Additional Interconnection facilities required to enable Microgrids shall be borne by the Applicant.
  - f. Subsequent to the submittal of a Hybrid Microgrid Application and the feasibility analysis, if applicable, and prior to the execution of an Interconnection Agreement, the Applicant may revise the Hybrid Microgrid. Following a complete Hybrid Microgrid Application submittal, the interconnection process as described in Rule 14H will be followed.
- 4. The proposed PCC between a Hybrid Microgrid and the Company System shall be reviewed to ensure the Microgrid boundary is properly defined and can be isolated from the rest of the Company System for the purpose of Island Mode operation. The Company System within a Microgrid boundary shall also be examined to ensure adequate thermal rating is available.
  - 5. Under no circumstances shall a Customer or Microgrid Operator Interconnect and/or operate a Hybrid Microgrid or Customer Microgrid with the Company's System without prior written approval by the Company in the form of a fully executed Interconnection Agreement for Hybrid Microgrids or Customer Interconnection Agreement for Customer Microgrids.

#### E. BILLING AND COMPENSATION

- 1. Compensation for Customer Microgrids.
  - a. For a Customer Microgrid, the Microgrid Operator is a Company Customer and all applicable energy credit rates and compensation under existing applicable programs, Customer tariff(s), and rate schedules will apply to the Microgrid Operator of the Customer Microgrid during Grid-Connected Mode.
- 2. Compensation for Hybrid Microgrid Operator and Participants.

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- a. For a Hybrid Microgrid Operator and all Participants, all applicable energy credit rates and compensation will apply during Grid-Connected Mode and Island Mode. While operating in Island Mode, all existing applicable Customer tariffs and programs shall remain in effect and all energy delivered and sold within the Microgrid during the period will be deemed transacted with the Company pursuant to the tariffs.
  - b. Any Generating Facility with an appropriate Customer Interconnection Agreement executed with the Company and supplying energy to a Hybrid Microgrid during Island Mode, and without an existing means for compensation by the utility (e.g., PPA, tariff), shall be compensated by Energy Credit Rates as defined and outlined in Rule No. 24.
  - c. Customers within a Hybrid Microgrid shall be billed monthly for the energy supplied by the Company, in accordance with Rule No. 8, the applicable rate schedule, and Company's rules filed with the Commission.
3. Compensation for resilience grid services may be compensable under an appropriate resiliency tariff, rate, or rider.
  4. Customer Microgrids shall be subject to Schedule SS (Standby Service), as modified from time to time.

F. HYBRID MICROGRID PARTICIPANTS

1. Nothing in any agreement between the Microgrid Operator and Participant shall be deemed to alter or modify any rate schedule, charge, or condition of service established from time to time by the Commission for electric service provided by the Company. All such rates and charges from the Customer's applicable rate schedule shall apply and remain, subject to change in accordance with Commission rules.
2. The Hybrid Microgrid Operator Disclosure Checklist is attached hereto as Appendix I, which each Microgrid Operator shall complete with each of its Participants. The Microgrid Operator will submit completed Disclosure Checklists from all Participants as part of the Hybrid Microgrid Application process.
3. The Disclosure Checklist is supplemental to and does not replace the disclosure and consumer protection requirements required of any other tariff or program.

G. HYBRID MICROGRID APPLICATION

1. For a Hybrid Microgrid, the proposed Microgrid Operator shall submit a Hybrid Microgrid Application to the Company.
2. The Company shall review each Applicant's Hybrid Microgrid Application and determine whether the Microgrid and Applicant have met the requirements to be eligible under this tariff. The Company shall communicate to the Applicant any deficiencies in its Hybrid Microgrid Application for opportunity to remedy.
3. Hybrid Microgrid Applications may be submitted beginning on the effective date of this Tariff. Hybrid Microgrid Applications deemed complete (providing all information required under this section) shall receive a timestamp, which shall serve as the date of the Applicant's Hybrid Microgrid Application for queue purposes, in the event more than one Applicant is seeking to establish the same

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or partially overlapping microgrid boundaries. Microgrid boundaries will be established on a first come first served basis.

4. If the Applicant's Hybrid Microgrid Application is approved, the Applicant shall execute an Interconnection Agreement with the Company for the duration of the approved Hybrid Microgrid. The Interconnection Agreement, and its Exhibits, shall include information to govern the expected performance and operation of the Hybrid Microgrid during, and leading into, Emergency Events, as well as transitioning to and from Island Mode to Grid-Connected Mode.

#### H. MICROGRID OPERATION

1. Capitalized terms used in this section are as defined in this Rule No. XX, Microgrid Services Tariff, and Rule 14H. In the event of any conflict between capitalized terms used in this section and Rule 14H, defined terms in this Rule shall control.
2. The Company may disconnect the Customer Microgrid or Hybrid Microgrid in the same manner as defined for a Generating Facility in Rule 14H Appendix I, Section 4.a and 4.b.
3. Customer Microgrid Operation: A Customer Microgrid may intentionally enter into and out of Island Mode on a scheduled or unscheduled basis. A Scheduled Island Mode Operation can be initiated through (1) a manual action by the Microgrid Operator of a Customer Microgrid or (2) by other operating dispatch means (e.g., energy management system). The Company may notify the Microgrid Operator that advance notice of Scheduled Island Mode Operation with the Company System may be required in order to assure that a smooth transition is executed and coordinated.

Scheduled Island Mode Operation is normally initiated to test a Customer Microgrid in Island Mode, to permit maintenance, repair or replacement of Microgrid components or facilities, or as a pre-emptive action ahead of impending weather events or natural disasters or in response to other unusual conditions on the Company System.

An Unscheduled Island Mode Operation is in response to abnormal conditions present on the Company System via an autonomous action by the Customer Microgrid to transition from Grid-Connected Mode to Island Mode.

A Customer Microgrid may disconnect from the Company System and transition from Grid-Connected Mode to Island Mode, (1) under any of the Trip or Cease to Energize conditions as required by Rule 14H, Appendix I (e.g., Table 4A-1, Table-4A-4, and Table 4A-5 of Rule 14H, Appendix I) or (2) where anti-islanding conditions are present where the Generating Facility is required to Cease to Energize and Trip within two seconds where an island may be detected on the Company System. In either of these cases, the Customer Microgrid may transition to Island Mode provided that the Customer Microgrid does not energize any part of the Company System.

- a. Transition from Grid-Connected Mode to Island Mode: If the Customer Microgrid transitions from Grid-Connected Mode to Island Mode while the Company System is operating within the Continuous Operating region defined in Rule 14H, Appendix I, Table 4A-1 (Voltage Ride-Through), Table 4A-4 (Frequency Ride-Through for Oahu, Hawaii Island, Maui), and Table

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4A-5 (Frequency Ride-Through for Molokai and Lanai), the act of transitioning shall not cause step or ramp changes in the voltage measured at the PCC or POI exceeding 5% of nominal and exceeding 5% per second averaged over a period of one second. This Frequency Ride-Through requirement (regardless of whether the Company System has a disturbance) also ensures that the act of transitioning does not cause a frequency disturbance on the Company System. These limits also apply to frequent switching of capacitors, frequent tripping or misoperation of the Generating Facility, or frequent energization of transformers.

- i. During a Scheduled Island Mode Operation, the Customer Microgrid shall additionally ramp down or ramp up such that the power export or import, respectively, across the PCC to the utility during the transition from Grid-Connected Mode to Island Mode is zero kW (+/- 1% of the rated power of the Customer Microgrid) at the ramp rate defined in accordance with the Soft-Start Ramp Rate defined in Section 4A of Rule 14H, Appendix I.
  - b. Reconnection of a Customer Microgrid with the Company System: A Customer Microgrid operating in Island Mode may reconnect and transition back to Grid-Connected Mode when the voltage at the PCC or POI satisfies the Return to Service requirements defined in Rule 14H, Appendix I, Section 4A.g, and the system frequency satisfies the enter service criteria found in UL-1741 Supplement SA Standard for Grid Support Utility Interactive Inverters and Converters using the applicable utility Source Requirements Document. Upon reconnecting with the Company System, the requirements for Synchronization defined in Rule 14H, Appendix I, Section 4.c shall be met, and shall not cause step or ramp changes in voltage defined in Section H.3.a, above.
    - i. Reconnection shall be coordinated with the Company to ensure safe and reliable operation of the Company System.
4. Hybrid Microgrid Operation: Operation of a Hybrid Microgrid will be governed by the Interconnection Agreement, including, but not limited to, Exhibit B and Exhibit F, between the Company and the Microgrid Operator of a Hybrid Microgrid. A Hybrid Microgrid's use of the Company System to form a Hybrid Microgrid requires greater operational coordination for public safety and overall Company System operation. A Hybrid Microgrid Operator's request(s) for Scheduled Island Mode Operation pursuant to the agreed upon Interconnection Agreement, will be permitted under specific circumstances with the Company's prior approval. The Interconnection Agreement will also include operational coordination requirements applicable to the unique characteristics of the Hybrid Microgrid and general requirements consistent with relevant provisions of Rule 14H.
5. Hybrid Microgrid Monitoring and Reporting: Each Microgrid by design shall provide means of secure communications and information exchange between the Company SCADA system and the Microgrid controller. The monitoring and reporting shall follow a standard register list for information exchange, which includes (at minimum):
  - a. Status of Generating Facilities within the Microgrid;

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- b. Status of controllable (or automatically operated) distribution assets inside Microgrid, such as switches, circuit breakers, reclosers, load tap changers, voltage regulator, and switched capacitors banks, etc.;
  - c. Voltage and power flow measurements at PCC;
  - d. Reserve capacity of the Microgrid;
  - e. Remaining load serving duration for the Hybrid Microgrid (calculated based on actual load at each reading interval);
  - f. Minimum and maximum voltages across the Hybrid Microgrid;
  - g. Fault detection and isolation, if applicable;
  - h. Modes of operation for the Hybrid Microgrid and Generating Facilities within the Hybrid Microgrid;
  - i. Any alarms, flags, or lockout condition;
  - j. Production level and load demand facilities and Customer loads during Island Mode; and
  - k. Active setting groups for protection relays in the Hybrid Microgrid.
6. Remote control: The Microgrid Operator shall provide a means of remote control for PCC of the Hybrid Microgrid.
7. Adjustable settings: Generating Facilities within a Hybrid Microgrid shall have the ability to adjust protection settings to implement various setting groups for different modes of operation of the Generating Facility and the Hybrid Microgrid.

#### I. HYBRID MICROGRID CAPACITY ALLOCATION

- 1. This capacity allocation applies only to Hybrid Microgrids.
- 2. The Company shall accept Hybrid Microgrid Applications for a period of three years from the effective date of this tariff, or until a program limit based on the aggregated Total Rated Capacity of all Hybrid Microgrids with executed Interconnection Agreements of up to 6 MW on Oahu; 1 MW on Hawaii Island; 1 MW on Maui Island is reached, whichever comes first, or as required by Commission Order.

HAWAIIAN ELECTRIC COMPANY, INC.

~~SHEET NO. XX~~~~Effective XX~~~~Draft Dated: 2/12/20~~

## RULE NO. XX

## Microgrid Services

~~Highlights denote forms to be developed by Hawaiian Electric~~

A. \_\_\_\_\_

## A. GENERAL

The Microgrid Services ~~tariff~~Tariff is intended to encourage and facilitate the development and use of new microgrids throughout ~~Hawaii~~Hawai'i, except Kauai, to improve energy resiliency, in light of extreme weather events or other disasters as identified in Act 200 of the 2018 Legislative Session. The Microgrid Service Tariff is not intended to affect existing microgrids and other facilities with microgrid capabilities (e.g., Distributed Generation Facilities, generators), which are interconnected to the ~~Company's systems~~Company System by means of a ~~Standard~~Customer Interconnection Agreement or other agreements with the Company, subject to the terms and conditions set forth in the Company's Rule 14, Section H ("Rule 14H") and other applicable Company rules, at the time of the initial effective date of this tariff, [insert date].

~~The tariff~~This Tariff shall be reviewed no later than five years from the effective date.

## 1. Definitions

- a. "AC" means alternating current.
- b. "Applicant" means the Microgrid Operator applying under the Microgrid Services Tariff.
- c. "Application" or "Hybrid Microgrid Application" means the form by which the Applicant provides a description of the planned Hybrid Microgrid and applies to the Company to be a Hybrid Microgrid Operator.
- d. "Commission" means the Public Utilities Commission of the State of Hawai'i.
- e. "Company" means [Hawaiian Electric Company, Inc., Maui Electric Company, Ltd., Hawaii Electric Light Company, Inc.].

HAWAIIAN ELECTRIC COMPANY, INC.



- f. "Company System" means all electrical wires, equipment and other facilities owned or provided by the Company, through which the Company provides electrical service to its Customers.
- ~~a.g.~~ "Customer" or "Customers" used herein is as defined in ~~Hawaiian Electric Company~~ Rule No. 1.
- h. "Customer Interconnection Agreement" means the applicable interconnection agreement for a non-utility Generating Facility.
- ~~b.i.~~ "Customer Microgrid" is a Microgrid that uses non-utility infrastructure beyond the ~~PCC~~Point of Common Coupling<sup>1</sup>, including distribution lines and related equipment, to meet its interconnected loads.
- j. "Disclosure Checklist" means the Hybrid Microgrid Operator Disclosure Checklist attached hereto as, Appendix I.
- ~~e.k.~~ "Distributed Generation Facility" ~~is~~ as defined in Rule No. 14.
- ~~d.~~ "Emergency Events" or "Grid Outages" ~~[To be defined by Company]~~
- l. "Distribution Level" is defined as Interconnection to electrical wires, equipment, and other facilities at the distribution voltage levels (such as 25kV (Oahu only), 12kV, or 4kV) owned or provided by the Company, through which the Company provides electrical service to its Customers.
- m. "Emergency Events" means, as determined by Company in its reasonable discretion, a condition or situation requiring prompt action by Company (a) to maintain the reliable operation of the Company System; (b) to prevent or limit the loss of load or generation; (c) to maintain public safety or the safety of Company's personnel; or (d) to protect Company, Customer, or third-party property; or as a Scheduled Island Mode Operation as a pre-emptive action ahead of impending weather events or natural disasters or in response to other unusual conditions.
- n. "Generating Facility" means Customer or utility-owned electrical power generation that is Interconnected to the Company System.
- ~~e.o.~~ "Grid-Connected Mode" means a mode of operation when the ~~microgrid~~ ~~is~~Microgrid is Interconnected to and operating in parallel with the ~~Company's transmission and distribution system and~~Company System, is not operating in ~~island mode~~.Island Mode, and the Company maintains operational coordination of the delivery of electric service..
- ~~f.p.~~ "Hybrid Microgrid" is a Microgrid that uses utility and non-utility infrastructure beyond the PCC, including distribution lines, Generating Facilities, and related equipment, to meet its interconnected loads.

<sup>1</sup> For Customer Microgrids, there may be instances where the Point of Common Coupling (e.g., utility meter) is located on the low side of Customer electrical equipment.



- g. "Hybrid Microgrid Facility" means the facilities and equipment needed to create and operate a Hybrid Microgrid, including the generation, breakers, protective and associated equipment, improvements, and other tangible assets, contract rights, easements, rights of way, surface use agreements and other interests or rights in real estate reasonably necessary for the construction, operation, and maintenance of the Hybrid Microgrid subject to this Tariff.
- g-r. "Interconnect" or "Interconnected" or "Interconnection" means the physical connection(s) between the utility electric grid (i.e., the Company System) and the ~~microgrid~~Microgrid at a designated ~~Point of Common Coupling~~ ("PCC").
- s. "Interconnection Agreement" means the Hybrid Microgrid Interconnection Agreement attached hereto as, Appendix II.
- t. "Interconnection Requirements Study" or "IRS" means pursuant to Rule 14H, Appendix III, Section 4, a study to establish the requirements for Interconnection with the Company System.
- h-u. "Island Mode" means a mode of operation when ~~the microgrid~~a Microgrid that normally operates in Grid-Connected Mode is disconnected from the ~~utility grid~~Company System at PCC, and the Microgrid is generating or producing energy to provide electric service within the ~~microgrid~~Microgrid under the operational coordination of the Microgrid Operator.
- i-v. "Microgrid," means a group of interconnected loads and distributed energy resources within clearly defined electrical boundaries that acts as a single self-governing controllable entity with respect to the utility's electrical grid and is connected to a public utility's electrical grid at the PCC to operate in ~~grid-connected mode~~Grid-Connected Mode and can disconnect from the ~~utility's electrical grid~~ to operate in ~~island mode~~Island Mode only during Emergency Events ~~or Grid Outages~~, and that: (1) is subject to this ~~microgrid services tariff~~Microgrid Services Tariff; and (2) generates or produces energy.
- j-w. "Microgrid Participant" or "Participant" means the Customer ~~within~~ ~~that~~ has executed the appropriate documents with the Microgrid Operator to participate in the Hybrid Microgrid ~~boundary~~in which the Customer is located.
- k-x. "Microgrid Operator" means the operator of a Customer Microgrid or Hybrid Microgrid.
- y. "MW" means megawatt.
- z. "Network System" means an electrical system in which two or more Company feeder sources are electrically tied together on the primary or secondary voltage level to form one power source for one or more Customers. The network system is designed to provide higher reliability for Customers connected to it.

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- ~~i.aa.~~ "Point of Common Coupling" ~~("or "PCC")~~ is ~~at the point in the electrical system where the microgrid is connected to at which the utility. Consistent with IEEE-519, this should be a point which is accessible to both the utilityCompany and the customer or Microgrid Operator for direct measurement interface.~~
- ~~ii.bb.~~ "Point of Interconnection" ~~("or "POI")~~ is the point at which the utilityCompany and the Customer interface, including the Generating Facility, occurs.
- ~~cc. B.~~ "Supervisory Control" or "SCADA" means remote monitoring and/or control of a Generating Facility's power output and interrupting device status by means of a communication channel that is acceptable to the Company.
- ~~dd.~~ "Scheduled Island Mode Operation" means a Microgrid operating in Island Mode that is scheduled and coordinated between the Microgrid Operator and the Company, as more particularly described in Section H, below.
- ~~ee.~~ "Total Rated Capacity" means the aggregate total of all Generating Facilities that intend to supply power to the Hybrid Microgrid during Island Mode as defined in Section 7 of Exhibit A to the Interconnection Agreement.
- ~~ff.~~ "Unscheduled Island Mode Operation" means a Microgrid operating in Island Mode that is not scheduled or coordinated between the Microgrid Operator and the Company in response to an unplanned event on the Company System, as more particularly described in Section H, below.

## B. AVAILABILITY

1. The Microgrid Services Tariff is available to a Microgrid that also meets the following criteria:
  - ~~a. For The Microgrid will serve as a Customer Microgrid, existing tariffs and programs shall be applicable.; or~~
  - ~~b. For a HybridThe Microgrid, this tariff is available to~~ will serve as a Hybrid Microgrid, and
    - ~~i. the Hybrid Microgrid Operator who establishes an account with the Company. Each participating Customer within the defined electrical boundary of a Hybrid Microgrid; and~~
    - ~~i.ii.~~ each Microgrid Participant must be interconnected to the Company's system Company System and have a current electricity account with the Company.
  - ~~b. Microgrids not interconnected to the Company's electric system in Grid-Connected Mode are not eligible for this tariff.~~

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- c. ~~If the Microgrid Operator is a foreign entity, confirmation from the State of Hawai'i Department of Commerce and Consumer Affairs that the Applicant is~~ Microgrid Operator must be currently authorized to do business in the State of Hawai'i ~~as of the date of submittal~~ and be in good standing.
2. Microgrids not Interconnected to the Company System in Grid-Connected Mode are not eligible for this Tariff.
3. For Customer Microgrids and Hybrid Microgrids, existing tariffs and programs shall also be applicable.
- 2.4. A Microgrid Operator or Microgrid Participant with existing or future agreements to provide grid services to the ~~Utility~~Company are obligated to meet such requirements (e.g., availability, capacity, etc.) when such services are called. Participation in a ~~microgrid~~Microgrid service whereby the operation of that ~~microgrid~~Microgrid precludes the ~~customer~~Customer (whether a Microgrid Operator or Microgrid Participant) from delivering services (e.g., because the Microgrid is in Island Mode) in accordance with said grid services contract or tariff shall not absolve a Microgrid Operator or Microgrid Participant from such contractual or tariff obligations and inability to deliver services.
5. ~~C.~~ Microgrids shall, at minimum, meet the requirements of all Hawaii Laws and Regulations governing generating resources.
6. Microgrids operating in Island Mode shall not be included in the calculation of the Company's Renewable Portfolio Standards.

#### C. RESPONSIBILITIES AMONG THE PARTIES

1. A Microgrid Operator of a Customer Microgrid shall at all times indemnify, defend and hold harmless Company from any and all damages, losses, claims and actions, including, without limitation, reasonable attorneys' fees and costs, and all expenses incidental to such losses, damages, claims or actions, based upon or arising out of damage to property or injuries to persons (including death) in any way arising out of or related to the Customer Microgrid, except to the extent that such damages, losses, claims, or actions were directly caused by the negligence or willful misconduct of the Company.
2. A Microgrid Operator of a Hybrid Microgrid shall at all times indemnify, defend and hold harmless Company from any and all damages, losses, claims and actions, including, without limitation, reasonable attorneys' fees and costs, and all expenses incidental to such losses, damages, claims or actions, based upon or arising out of damage to property or injuries to persons (including death) in any way arising out of or related to the Hybrid Microgrid Facility, Microgrid Operator's performance of its obligations under the Interconnection Agreement, the operation or maintenance of the Hybrid Microgrid during Island Mode, and/or Company's actions taken in accordance with the Interconnection Agreement, except to the extent that such damages, losses, claims, or actions were directly caused by the negligence or willful misconduct of the Company.
3. Limitation of Liability - Customer Microgrids. The Company shall not be responsible for claims and/or damages arising out of or related to the Customer

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Microgrid, except to the extent directly caused by the negligence or wilfull misconduct of Company.

4. Limitation of Liability - Hybrid Microgrids. The Company shall not be responsible for any claims or damages of any Participant or Microgrid Operator arising out of or related to (a) the Hybrid Microgrid Facility and/or the operation or maintenance of the Hybrid Microgrid occurring during Island Mode, and/or (b) Company's exercise of rights and obligations with respect to any Generating Facility and/or Customer within the Hybrid Microgrid, whether in Grid-Connected or Island Mode.

C.D.

#### INTERCONNECTION

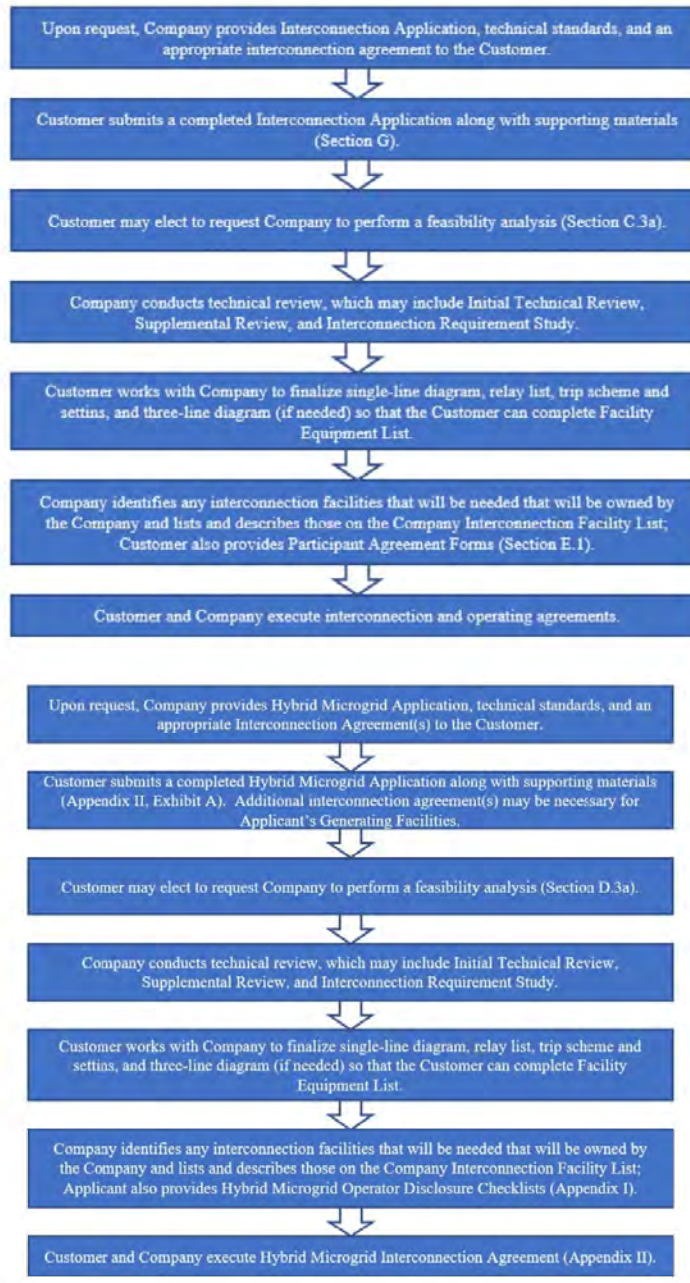
1. Each Microgrid shall be designed to ~~interconnect~~Interconnect and operate in Grid-Connected and Island Mode with the ~~Company's system~~Company System without adversely affecting ~~the operations of the connected electric grid or the~~ operations of its Microgrid Participants and without presenting safety hazards to the Company's or other ~~customers'~~Customers' personnel. ~~Such Facilities~~The Microgrid facilities and the interconnection systems shall be in compliance with all applicable safety and performance standards of the National Electric Code (NEC), National Fire Protection Association (NFPA) codes and standards, the Institute of Electrical and Electronics Engineers (IEEE), the Company's interconnection standards and procedures provided in Rule ~~No. 14H, and Rule No. 19~~, as amended from time to time, and also subject to any other requirements as may be specified in the ~~applicable~~Interconnection Agreement or Customer Interconnection Agreement. The foregoing requirements shall apply to each of the following:
  - a. Customer Microgrids are subject to the applicable program or Rule, for which it is seeking ~~interconnection~~Interconnection.
  - b. Hybrid Microgrids will require an ~~interconnection agreement~~Interconnection Agreement with the Company, subject to the terms and conditions set forth in ~~the Company's Rule 14, Section H14H~~ and other applicable Company rules.
  - c. A Microgrid ~~interconnected~~under this tariff shall be Interconnected at the Distribution Level<sup>2</sup> ~~and shall follow the applicable Rule No. 14H~~ interconnectionInterconnection process at the time of ~~interconnection~~Interconnection.
  - d. ~~A Microgrid interconnecting at the Sub-Transmission and Transmission levels shall follow the interconnection process applicable to their Facilities at the time of interconnection.~~
    - a. Hybrid Microgrids seeking Interconnection to the Company's Distribution Level Network System (i.e., spot or grid network) will not be allowed.

<sup>2</sup>~~Distribution system (Level) is defined as interconnection to electrical wires, equipment, and other facilities at the distribution voltage levels (such as 25kV (Hawaiian Electric only), 12kV, or 4kV) owned or provided by the Company, through which the utility provides electrical service to its customers.~~

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2. The ~~aggregate Generating Facility size~~ Total Rated Capacity of the Hybrid Microgrid cannot exceed 3 MW (AC) ~~on Oahu, 1 MW (AC) on Maui Island, or 1 MW (AC) on Hawaii Island.~~ A Microgrid with ~~Generation~~ Generating Facilities with a Total Rated Capacity greater than ~~3 MW~~ the specified limits are not eligible under this tariff.
3. Hybrid Microgrid Interconnection Process ~~(adapted from Rule 14H sht. 34D-2)~~



- a. Upon submittal of the Hybrid Microgrid Application, ~~(Section F.1), the applicant~~ Applicant may choose to request that the Company perform a feasibility analysis for each Hybrid Microgrid submitted, taking into

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account any design considerations described by the ~~Microgrid-OperatorApplicant~~ that impact the feasibility or classification of the Microgrid. The feasibility analysis will include a preliminary assessment of the required electrical facility additions or upgrades to enable the Microgrid based on the proposed configuration. The feasibility analysis will not include any assessment of the performance of the Hybrid Microgrid in Island Mode.

- b. If the Applicant chooses to undertake a feasibility analysis, the Applicant shall agree to pay the cost estimate for the feasibility analysis provided by the Company. The Company shall make best efforts to complete the feasibility analysis within one hundred twenty (120) calendar days of the Company's receipt of all of the following: (a) the Applicant's written agreement to move forward with the feasibility analysis; ~~;~~ (b) a complete set of data-submittal, to the Company's satisfaction; ~~satisfactionsatisfaction,~~ needed to conduct the feasibility analysis, ~~;~~ and (c) payment of the feasibility analysis cost-is received.
  - c. The completion of the feasibility analysis ~~shall~~may include the Company's proposal to the ~~CustomerApplicant~~ of the following: (a) ~~interconnection~~Interconnection requirements and a non-binding, good faith estimate of the Company's portion of the costs to perform the ~~interconnection~~Interconnection requirements; ~~and~~ (b) protection and synchronizing relays and settings, protection, synchronizing and control schemes, ~~;~~ and/or (c) any other equipment and/or performance requirements necessary to ~~meet~~enable the ~~IRS requirements~~Hybrid Microgrid.
  - d. The feasibility analysis is intended to inform the Applicant ~~regarding~~regarding potential ~~interconnection~~Interconnection facilities and costs required to ~~interconnect~~Interconnect the Hybrid Microgrid prior to development of the ~~Microgrid and submittal of the Microgrid Agreement application.~~ The feasibility analysis may be used to inform the scope of the Interconnection Requirements Study should one be required pursuant to Rule ~~No. 14~~14H, Appendix III.
  - e. Additional ~~interconnection~~Interconnection facilities required to enable ~~microgrids~~Microgrids shall be borne by the ~~applicant~~Applicant.
  - f. Subsequent to the submittal of a Hybrid Microgrid Application and the feasibility analysis, if applicable, and prior to the execution of an Interconnection Agreement, the Applicant may revise the Hybrid Microgrid. Following a complete Hybrid Microgrid Application submittal, the interconnection process as described in Rule 14H will be followed.
4. The ~~D.~~ proposed PCC between a Hybrid Microgrid and the Company System shall be reviewed to ensure the Microgrid boundary is properly defined and can be isolated from the rest of the Company System for the purpose of Island Mode operation. The Company System within a Microgrid boundary shall also be examined to ensure adequate thermal rating is available.
  5. Under no circumstances shall a Customer or Microgrid Operator Interconnect and/or operate a Hybrid Microgrid or Customer Microgrid with the Company's System without prior written approval by the Company in the form of a fully executed Interconnection Agreement for Hybrid Microgrids or Customer Interconnection Agreement for Customer Microgrids.

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~~D.E.~~~~BILLING AND COMPENSATION.~~1. Compensation for Customer Microgrids.           

- a. For a Customer Microgrid, the ~~Eligible~~ Microgrid Operator is ~~the~~ a Company Customer, and all applicable energy credit rates and compensation under existing applicable programs, Customer tariff(s), and rate schedules will apply to the ~~Eligible~~ Microgrid Operator of the Customer Microgrid during Grid-Connected Mode.

2. Compensation for Hybrid Microgrid ~~Operators and Customers within the~~ Microgrid Operator and Participants.

- a. For a Hybrid Microgrid Operator and all ~~Customers within a Hybrid~~ Microgrid Participants, all applicable energy credit rates and compensation will apply during Grid-Connected Mode and Island Mode. While operating in Island Mode, all existing ~~customer applicable~~ Customer tariffs and programs shall remain in effect and all energy delivered and sold within the Microgrid during the period will be deemed transacted with the Company pursuant to the tariffs.
- b. ~~Hybrid Microgrid Operators~~ Any Generating Facility with an appropriate Customer Interconnection Agreement executed with the Company and supplying energy with its generating resources to a Hybrid Microgrid during islanded mode Island Mode, and without an existing means for compensation by the utility (e.g., PPA, tariff), ~~shall be compensated by Energy Credit Rates as defined and~~ outlined in Rule No. 24.

- c. Customers within a Hybrid Microgrid shall be billed monthly for the energy supplied by the Company, in accordance with Rule No. 8, the applicable rate schedule, and Company's rules filed with the Commission.

3. Compensation for ~~Resilience Grid Service shall be compensated~~ resilience grid services may be compensable under ~~a~~ an appropriate resiliency tariff, rate, or rider.4. ~~E.~~ Customer Microgrids shall be subject to Schedule SS (Standby Service), as modified from time to time.~~E.F.~~~~HYBRID MICROGRID CUSTOMER~~~~PARTICIPATION~~ PARTICIPANTS

1. A Customer in a proposed Hybrid Microgrid shall submit a Hybrid Microgrid Participant Agreement Form ("Agreement Form") to the Microgrid Operator, who will include the Agreement Form as part of the application to the Company.
2. The Agreement Form shall contain standard information and provisions that ensure transparency and proper consumer protections ("Disclosures"), including ~~or be supplemented by, at minimum, the following elements:~~
- a. ~~The entity name, business address, website URL, phone number, and email address of the Microgrid Operator~~
  - b. ~~The Customer name, address, phone number, and email address (if available)~~

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- ~~e. The Customer's account number~~
- ~~d. The electrical boundaries of the Microgrid~~
- ~~e. The expected activation date of the Microgrid~~

~~3.1. Nothing in the Agreement Form~~ Nothing in any agreement between the Microgrid Operator and Participant shall be deemed to alter or modify any rate schedule, charge, or condition of service established from time to time by the Commission for electric service provided by the Company. All such rates and charges from the Customer's applicable rate schedule shall apply and remain, subject to change in accordance with Commission rules.

~~f. The method for the Customer to discontinue or transfer Authorization~~  
~~Any financial penalties or impacts of a Customer's decision to discontinue or transfer Authorization.~~ Hybrid Microgrid Operator

~~4.2. The standard form~~ Disclosure Checklist is attached hereto as Appendix XXI, which each Microgrid Operator shall complete with each ~~participating Customer within the electric boundaries of its Participants~~. The Microgrid Operator will submit completed Disclosure Checklists from all Participants as part of the Hybrid Microgrid Application process.

~~5.3. The Disclosures provided in this section, or in the Disclosure Checklist,~~  
~~are is~~ supplemental, ~~to~~ and ~~does~~ not replace, the disclosure and consumer protection requirements required of any other tariff or program.

#### ~~F. CREDIT RATE AND FEES.~~

~~e.a. Customers within a Hybrid Microgrid shall be billed monthly for the energy supplied by the Company, in accordance with the Company's Rule No. 8, the applicable rate schedule, and Company's rules filed with the Commission.~~

~~1. Customer Microgrid Customers are subject to their applicable tariff(s) and rate schedule.~~

#### ~~F.G.~~ G. HYBRID MICROGRID OPERATOR PARTICIPATION APPLICATION

1. For a Hybrid Microgrid, Athe proposed Microgrid Operator shall submit a Hybrid Microgrid Application to the Company, ~~which shall include the following in order to be considered a complete application:~~

- ~~a. Microgrid Operator company name, contact information, and address;~~
- ~~b. Microgrid Operator contact person name, contact information, and address;~~
- ~~c. Proposed electrical boundaries of the Microgrid~~
- ~~d. Estimated activation date of the Microgrid~~
- ~~e. Microgrid system nameplate direct current (DC) capacity, AC output (inverter nameplate), mount location, tracker type, azimuth, and tilt of all solar photovoltaic generating resources within the electrical boundary and expected to be used during islanding operations;~~
- ~~f. Microgrid system nameplate direct current (DC) capacity, AC output (inverter nameplate), energy capacity (kWh) of any energy storage~~

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- ~~resources within the electrical boundary and expected to be used during islanding operations;~~
- ~~g. Microgrid nameplate capacity (AC) and generating characteristics of all generation resources located within the electrical boundaries of the Microgrid.~~
  - ~~h. Microgrid nameplate capacity (AC) of all backup generation resources located behind a customer's meter within the electric boundaries of the Microgrid that will not export power during Grid-Connected Mode, and may be used during islanding operations;~~
  - ~~i. Microgrid proposed load reduction or load shifting capability during islanding operations;~~
  - ~~j. A list of customers names, addresses, and account numbers, along with completed Hybrid Microgrid Participant Agreement Forms, where applicable, within the electric boundaries of the Microgrid;~~
  - ~~k. Any known additional electrical facilities requested by the Microgrid Operator to be located on the Company distribution system;~~
  - ~~l. Any Microgrid design considerations that impact the Company's evaluation or classification of the Microgrid;~~
  - ~~m. If the Applicant is a foreign entity, confirmation from the State of Hawai'i Department of Commerce and Consumer Affairs that the Applicant is currently authorized to do business in the State of Hawai'i as of the date of submittal.~~
  - ~~n. A Certificate of Good Standing for the Microgrid Operator obtained from the State of Hawai'i Department of Commerce and Consumer Affairs dated no earlier than thirty (3) days prior to submittal by the Microgrid Operator;~~
2. The Company shall review each ~~Microgrid Operator's Applicant's~~ Hybrid Microgrid Application and determine whether the Microgrid and ~~Microgrid Operator Applicant~~ have met the requirements to be eligible under this tariff. The Company shall communicate to the ~~Microgrid Operator Applicant~~ any deficiencies in its Hybrid Microgrid Application for opportunity to remedy.
  3. Hybrid Microgrid Applications ~~shall~~may be ~~accepted~~submitted beginning on the effective date of ~~the tariff.~~ this Tariff. Hybrid Microgrid Applications deemed complete (providing all information required under this ~~Section~~section) shall receive a timestamp, which shall serve as the date of the Applicant's ~~application~~Hybrid Microgrid Application for queue purposes, ~~to~~in the ~~extentevent~~ more than one ~~applicant~~Applicant is seeking to establish the same or partially overlapping microgrid boundaries. Microgrid boundaries will be established on a first come first served basis.

#### ~~H. HYBRID MICROGRID SERVICES OPERATING AGREEMENTS~~

- ~~1. The Company shall enter into a~~ If the Applicant's Hybrid Microgrid Services Operating Application is approved, the Applicant shall execute an Interconnection Agreement ("Operating Agreement") with the ~~Microgrid Operator of a Hybrid Microgrid Company~~ for the duration of the approved Hybrid

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Microgrid. The ~~Operating~~ Interconnection Agreement, and its Exhibits, shall include information to govern the expected performance and operation of the Hybrid Microgrid during, and leading into, ~~islanding events and include, at a minimum, the following:~~

- ~~a. Processes for entering into and out of island mode, including manual Emergency Events, as well as transitioning to and automated processes;~~
- ~~b. Communication equipment and protocols between the Company and the Microgrid Operator;~~
- ~~c. Any limitations or restrictions on load, generation resources, or other system protection requirements during island mode;~~
- 4. ~~Any requirements regarding reconnecting to the grid and returning from Island Mode to Grid-Connected Mode;~~ —.

#### H. The MICROGRID OPERATION

- 1. Capitalized terms and conditions, including the terms and schedule used in this section are as defined in this Rule No. XX, Microgrid Services Tariff, and Rule 14H. In the event of any payments to or from conflict between capitalized terms used in this section and Rule 14H, defined terms in this Rule shall control.
- 2. The Company may disconnect the Customer Microgrid or Hybrid Microgrid in the same manner as defined for a Generating Facility in Rule 14H Appendix I, Section 4.a and 4.b.
- 3. Customer Microgrid Operation: A Customer Microgrid may intentionally enter into and out of Island Mode on a scheduled or unscheduled basis. A Scheduled Island Mode Operation can be initiated through (1) a manual action by the Microgrid Operator of a Customer Microgrid or (2) by other operating dispatch means (e.g., energy management system). The Company may notify the Microgrid Operator that advance notice of Scheduled Island Mode Operation with the Company System may be required in order to assure that a smooth transition is executed and coordinated.

Scheduled Island Mode Operation is normally initiated to test a Customer Microgrid in Island Mode, to permit maintenance, repair or replacement of Microgrid components or facilities, or as a pre-emptive action ahead of impending weather events or natural disasters or in response to other unusual conditions on the Company System.

An Unscheduled Island Mode Operation is in response to abnormal conditions present on the Company System via an autonomous action by the Customer Microgrid to transition from Grid-Connected Mode to Island Mode.

A Customer Microgrid may disconnect from the Company System and transition from Grid-Connected Mode to Island Mode, (1) under any of the Trip or Cease to Energize conditions as required by Rule 14H, Appendix I (e.g., Table 4A-1, Table-4A-4, and Table 4A-5 of Rule 14H, Appendix I) or (2) where anti-islanding conditions are present where the Generating Facility is required to Cease to Energize and Trip within two seconds where an island may be detected on the Company System. In either of these cases, the Customer Microgrid may transition to Island Mode provided that the Customer Microgrid

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does not energize any part of the Company System.

a. Transition from Grid-Connected Mode to Island Mode: If the Customer Microgrid transitions from Grid-Connected Mode to Island Mode while the Company System is operating within the Continuous Operating region defined in Rule 14H, Appendix I, Table 4A-1 (Voltage Ride-Through), Table 4A-4 (Frequency Ride-Through for Oahu, Hawaii Island, Maui), and Table 4A-5 (Frequency Ride-Through for Molokai and Lanai), the act of transitioning shall not cause step or ramp changes in the voltage measured at the PCC or POI exceeding 5% of nominal and exceeding 5% per second averaged over a period of one second. This Frequency Ride-Through requirement (regardless of whether the Company System has a disturbance) also ensures that the act of transitioning does not cause a frequency disturbance on the Company System. These limits also apply to frequent switching of capacitors, frequent tripping or misoperation of the Generating Facility, or frequent energization of transformers.

i. During a Scheduled Island Mode Operation, the Customer Microgrid shall additionally ramp down or ramp up such that the power export or import, respectively, across the PCC to the utility during the transition from Grid-Connected Mode to Island Mode is zero kW (+/- 1% of the rated power of the Customer Microgrid) at the ramp rate defined in accordance with the Soft-Start Ramp Rate defined in Section 4A of Rule 14H, Appendix I.

b. Reconnection of a Customer Microgrid with the Company System: A Customer Microgrid operating in Island Mode may reconnect and transition back to Grid-Connected Mode when the voltage at the PCC or POI satisfies the Return to Service requirements defined in Rule 14H, Appendix I, Section 4A.g, and the system frequency satisfies the enter service criteria found in UL-1741 Supplement SA Standard for Grid Support Utility Interactive Inverters and Converters using the applicable utility Source Requirements Document. Upon reconnecting with the Company System, the requirements for Synchronization defined in Rule 14H, Appendix I, Section 4.c shall be met, and shall not cause step or ramp changes in voltage defined in Section H.3.a, above.

i. Reconnection shall be coordinated with the Company to ensure safe and reliable operation of the Company System.

4. Hybrid Microgrid Operation: Operation of a Hybrid Microgrid will be governed by the Interconnection Agreement, including, but not limited to, Exhibit B and Exhibit F, between the Company and the Microgrid Operator ~~and the method for the~~ of a Hybrid Microgrid. A Hybrid Microgrid's use of the Company System to form a Hybrid Microgrid requires greater operational coordination for public safety and overall Company System operation. A Hybrid Microgrid Operator's request(s) for Scheduled Island Mode Operation pursuant to the agreed upon Interconnection Agreement, will be permitted under specific circumstances with the Company's prior approval. The Interconnection Agreement will also include operational coordination requirements applicable to the unique characteristics of the Hybrid Microgrid and general requirements consistent with relevant provisions of Rule 14H.

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5. Hybrid Microgrid Monitoring and Reporting: Each Microgrid by design shall provide means of secure communications and information exchange between the Company SCADA system and the Microgrid controller. The monitoring and reporting shall follow a standard register list for information exchange, which includes (at minimum):
- a. Status of Generating Facilities within the Microgrid;
  - b. Status of controllable (or automatically operated) distribution assets inside Microgrid, such as switches, circuit breakers, reclosers, load tap changers, voltage regulator, and switched capacitors banks, etc.;
  - c. Voltage and power flow measurements at PCC;
  - d. Reserve capacity of the Microgrid;
  - e. Remaining load serving duration for the Hybrid Microgrid (calculated based on actual load at each reading interval);
  - f. Minimum and maximum voltages across the Hybrid Microgrid;
  - g. Fault detection and isolation, if applicable;
  - h. Modes of operation for the Hybrid Microgrid and Generating Facilities within the Hybrid Microgrid;
  - i. Any alarms, flags, or lockout condition;
  - j. Production level and load demand facilities and Customer loads during Island Mode; and
  - k. Active setting groups for protection relays in the Hybrid Microgrid.
- ~~1.6. Remote control: The Microgrid Operator to exit the terms of the Operating Agreement;~~ shall provide a means of remote control for PCC of the Hybrid Microgrid.
- ~~1.7.~~
7. Adjustable settings: Generating Facilities within a Hybrid Microgrid shall have the ability to adjust protection settings to implement various setting groups for different modes of operation of the Generating Facility and the Hybrid Microgrid.

G.I.HYBRID MICROGRID CAPACITYALLOCATION

1. This capacity allocation applies only to Hybrid Microgrids.
2. The Company shall accept ~~applications for Hybrid Microgrids up to 6 MW on Oahu; 1 MW on Big Island; 1 MW on Maui or~~ Hybrid Microgrid Applications for a period of three years from the effective date of this tariff, or until a program limit based on the aggregated Total Rated Capacity of all Hybrid Microgrids with executed Interconnection Agreements of up to 6 MW on Oahu; 1 MW on Hawaii Island; 1 MW on Maui Island is reached, whichever comes first, or as required by Commission Order.

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Appendix I  
Disclosure Checklist

**Hybrid Microgrid Services Program**  
**Hybrid Microgrid Operator Disclosure Checklist<sup>1</sup>**

The undersigned ("Participant") has agreed to participate in the following Hybrid Microgrid Project:

**Hybrid Microgrid Project Name:**

\_\_\_\_\_

**Hybrid Microgrid Project Address:**

\_\_\_\_\_

\_\_\_\_\_

**Electrical Boundaries of the Hybrid Microgrid:**

\_\_\_\_\_

\_\_\_\_\_

**Expected Activation Date of the Hybrid Microgrid:**

\_\_\_\_\_

**Microgrid Operator:**

\_\_\_\_\_

**Hybrid Microgrid Operator contact information  
for Participant questions and complaints:  
Address (if different from above):**

\_\_\_\_\_

\_\_\_\_\_

Telephone number:

\_\_\_\_\_

Email address:

\_\_\_\_\_

Web Site URL:

\_\_\_\_\_

Fax:

\_\_\_\_\_

**Participant Name:**

\_\_\_\_\_

**Participant Service Address where receiving  
electrical service from [Hawaiian Electric  
Company]:**

\_\_\_\_\_

\_\_\_\_\_

**Participant's Account Number with [Hawaiian  
Electric Company]:**

\_\_\_\_\_

\_\_\_\_\_

**Participant Mailing Address (if different from  
above:**

\_\_\_\_\_

<sup>1</sup> Unless otherwise defined herein, capitalized terms shall have the same meaning ascribed to them in the Microgrid Services Tariff Hybrid Microgrid Interconnection Agreement.

This Disclosure Checklist is intended to enable potential Participants in the service territories of Hawaiian Electric, Maui Electric, and/or Hawai'i Electric Light to clearly understand where (and whether) a given Microgrid Operator ("Microgrid Operator") discloses the below-listed relevant terms and conditions in the contract between you, the Participant, and the Microgrid Operator ("Participant Agreement") as required by the Microgrid Services Tariff.<sup>2</sup>

Each Microgrid Operator shall complete this Disclosure Checklist with the page number and/or section reference in its Participant Agreement indicating where the stated disclosure or disclaimer is found in the Participant Agreement. Microgrid Operator's initial beside each Disclosure described in this Checklist shall serve as the Microgrid Operator's warranty to the Participant that the subject of the Disclosure is present in the Participant Agreement.

Microgrid Operator Initials	Disclosure Description	Page # in Agreement	Participant Confirmed Initials
<b>DISCLOSURES BY THE MICROGRID OPERATOR TO THE PARTICIPANT</b>			
	Detailed description of what is a Microgrid, how this Microgrid will operate, and how Participant fits into the Microgrid		
	Detailed description of the rights and obligations of the Participant		
	Detailed description of the rights and obligations of the Microgrid Operator		
	Terms and conditions of Service		
	All nonrecurring (i.e., one-time) charges to be collected from Participant by the Microgrid Operator		
	All recurring charges to be collected from Participant by the Microgrid Operator		
<b>Microgrid Operator Initials</b>	<b>Disclosure Description</b>	<b>Page # in Agreement</b>	<b>Participant Confirmed Initials</b>
	Will any recurring charges increase during the Term, and if so, how much advance notice is provided to the Participant		
	Whether the Participant is required to sign a		



	term contract		
	Terms and conditions to leave the Microgrid		
	Any penalties that the Microgrid Operator may charge to the Participant, including but not limited to discontinuing or transferring authorization of Microgrid services		
	The process for selling and/or transferring the Participant's underlying property that is part of the Microgrid and any associated costs related thereto		
	The process for discontinuing or transferring authorization of Microgrid services and any associated costs		
	Impact of Microgrid on the other utility programs that Participant is or may be involved in.		
	Explanation of number of Participants and cost per Participant.		
	Explanation regarding Non-Participants on the Microgrid, if any, their effect on Participant and whether such Non-Participants will benefit from the Microgrid.		
	Explanation and disclosure of any rates and charges charged by the Microgrid Operator that do not fall under the jurisdiction and oversight of the State of Hawai'i Public Utilities Commission ("Commission")		
	The terms and conditions of the Microgrid Participant Agreement shall not alter or modify any rate schedule, charge, or condition of service established from time to time by the Commission for electric service provided by the Company.		
<b>Microgrid Operator Initials</b>	<b>Disclosure Description</b>	<b>Page # in Agreement</b>	<b>Participant Confirmed Initials</b>
	Explanation of how the Microgrid will affect Participant's existing or future agreements to provide grid services to the Company and Participant's obligation to meet such requirements (e.g., availability, capacity, etc.) when such services are called upon by		

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	Company. Participation in a microgrid service whereby the operation of that microgrid precludes the Participant from delivering services (e.g., Island Mode) in accordance with the Company's contract or tariff shall not absolve Participant from such contractual or tariff obligations and inability to deliver services.		
	Character or quality of electrical service during Island Mode and any guarantees, if any, of Microgrid Operator as to such character and quality of electric service during such time.		
	Assurances that all installations, upgrades and repairs will be under direct supervision of a qualified professional and that maintenance will be performed according to industry standards, including the recommendation of the manufacturers of operational components		
	Definition of underperformance and a description of the compensation to be paid by the Microgrid Operator to Participant for any underperformance (e.g., an output guarantee, power quality guarantee, etc.) while in Island Mode		
	Disclosure of the type and level of insurance, and what insurance benefits (if any) protect Participants		
	Disclosure of any compensation to the Microgrid Operator for Resiliency Grid Services paid by the Company		
<b>Microgrid Operator Initials</b>	<b>Disclosure Description</b>	<b>Page # in Agreement</b>	<b>Participant Confirmed Initials</b>
	Microgrid Operator contact information for questions and complaints and agreement to update and notify the Participant if Hybrid Microgrid ownership changes hands		
	Proof and description of a long-term maintenance plan including which services the plan includes for the Microgrid		
	Microgrid Operator contact information for		

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	questions and complaints and agreement to update and notify the Participant if ownership changes hands		
<b>DISCLAIMERS AND RESPONSIBILITIES</b>			
	What data of Participant will be stored by Microgrid Operator and disclosure of the data security measures and data privacy policies of Microgrid Operator		
	Description of circumstances and method of notice Participants will be issued when the Microgrid is in Island Mode, and when it is in Grid-Connected Mode		
	Microgrid Operator is responsible for providing electrical service during Island Mode. Accordingly, during Island Mode, the Commission and the Company make no warranty or representation concerning the character or quality of electric service during Island Mode.		
	Microgrid Operator statement regarding allocation of recovery of costs relating to non-Participants on the Hybrid Microgrid (Free riders)		
	Statement that Microgrid Operator is solely responsible for resolving any disputes between Participant and Microgrid Operator while in Island Mode and for any charges by Microgrid Operator.		
<b>Microgrid Operator Initials</b>	<b>Disclosure Description</b>	<b>Page # in Agreement</b>	<b>Participant Confirmed Initials</b>
	Statement that Hawaiian Electric is solely responsible for resolving any disputes with the Participant while in Grid-Connected Mode or about the applicable Company rates and charges.		
	Nothing in the Participant Agreement shall be deemed to alter or modify any rate schedule, charge, or condition of service established from time to time by the Commission for electric service provided by the Company. All such rates and charges		

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	from the Customer's applicable rate schedule shall apply and remain, subject to change in accordance with Commission rules.		
	Statement that Disclosures provided in this section, or in the Disclosure Checklist, are supplemental, and do not replace, the disclosure and consumer protection requirements required of any other tariff or program.		
	Statement that the Commission and Hawaiian Electric, Maui Electric, or Hawai'i Electric Light (as applicable) make no warranty or representation concerning potential implications, if any, of federal or state tax, securities, or other laws.		
<b>PROGAM DESCRIPTIONS</b>			
	Participants will pay for such services to the Company at regular customary rates for service. Company will compensate the Microgrid Operator as provided in its agreement with Company, consistent with the Microgrid Tariff.		
	The Company is responsible for providing electric service during Grid-Connected Mode. All Company's tariff and rules apply to the electric service provided by the Company as approved by the Commission.		
<b>Microgrid Operator Initials</b>	<b>Disclosure Description</b>	<b>Page # in Agreement</b>	<b>Participant Confirmed Initials</b>
	How to obtain a copy of the Microgrid Operator's Operating Agreement with Hawaiian Electric for the Microgrid Tariff		
<b>PARTICIPANT AGREEMENT REQUIREMENTS</b>			
	The Customer name, address, phone number, and email address (if available)		
	The Customer's account number		
	The electrical boundaries of the Microgrid		
	Tax and Securities Disclosure or Disclaimer		

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	The expected activation date of the Microgrid		
	The method for the Customer to discontinue or transfer Authorization		
	Transparency of all Costs and Contractual Requirements		
	Any financial penalties or impacts of a Customer's decision to discontinue or transfer Authorization		
	Microgrid limitations (i.e., maximum and minimum kW per Participant)		
	Microgrid Operator notification requirements to Participants regarding project changes, development status, and operational updates		
<b>MICROGRID PARTICIPANT BILL OF RIGHTS</b>			
	Covenant by Microgrid Operator to Participant that it will adhere to the "Microgrid Participant Bill of Rights" and provide a copy of such to the Participant, when an approved version is available.		

The Participant, by executing below, hereby acknowledges and represents that it has agreed with the Microgrid Operator to participate in the above Hybrid Microgrid Project and has reviewed the items in this Disclosure Checklist to Participant's satisfaction.

Participant's Name: \_\_\_\_\_

Participant's Signature: \_\_\_\_\_

Print or Type name and  
Title of signatory if  
Participant is a corporation  
or unit of government: \_\_\_\_\_

Date: \_\_\_\_\_

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**APPENDIX II**  
**MICROGRID SERVICES TARIFF – HYBRID MICROGRID**  
**INTERCONNECTION AGREEMENT**  
**(3 MW or less)**

This Microgrid Services Tariff - Hybrid Microgrid Interconnection Agreement (3 MW or less), including all Exhibits and Schedules attached hereto, (this “Agreement” or “Interconnection Agreement”) is made by and between [Hawaiian Electric Company, Inc., Maui Electric Company, Ltd., Hawai‘i Electric Light Company, Inc.] (“Company”), and \_\_\_\_\_ (“Microgrid Operator”), and is made, effective and binding as of \_\_\_\_\_ (“Effective Date”). Company and Microgrid Operator may be referred to individually as a “Party” and collectively as the “Parties.” Defined terms are in Exhibit G.

WHEREAS, Company is an operating electric public utility subject to the Hawai‘i Public Utilities law, Hawaii Revised Statutes, Chapter 269, and the rules and regulations of the Hawai‘i Public Utilities Commission;

WHEREAS, Microgrid Operator is an approved “Microgrid Operator” as defined in the Company’s Microgrid Services Tariff (“Microgrid Services Tariff”), and intends to construct a Hybrid Microgrid (as defined in Section 4 below), that qualifies for the Company’s Microgrid Services program (“Microgrid Services Program”), and desires to be able to operate, upon Company’s direction, in Island Mode disconnected from the Company’s System;

WHEREAS, the Hybrid Microgrid is intended to enable the Microgrid Operator to enter into Island-Mode during Emergency Events;

WHEREAS, the purpose of this Agreement is to ensure that the operation of the Hybrid Microgrid, whose Total Rated Capacity of the Generating Facilities within the Hybrid Microgrid is three (3) megawatts (“MW”) or less, does not adversely affect the safety and reliability of or otherwise interfere with the Company’s operations;

WHEREAS, for clarity purposes, any Generating Facility owned by a Microgrid Operator or other Customer must have its own Customer Interconnection Agreement; and

WHEREAS, unless otherwise defined herein, capitalized terms shall have the meaning ascribed to them in the Microgrid Services Tariff, such definitions being transcribed herein as Exhibit G (Definitions to Microgrid Services Tariff – Hybrid Microgrid Interconnection Agreement), as the same may be amended from time to time.

NOW, THEREFORE, in consideration of the premises and the respective promises herein, the Company and the Microgrid Operator hereby agree as follows:

1. **Notice and Disclaimer Regarding Future Rate and Tariff Modifications.** This Agreement shall, at all times, be subject to modification by the Commission as said Commission may, from time to time, direct in the exercise of its jurisdiction. Without limiting the foregoing, Microgrid Operator expressly acknowledges the following:
  - (a) The Microgrid Services Tariff is subject to modification by the Commission.
  - (b) Your Agreement and Hybrid Microgrid shall be subject to any future modifications ordered by the Commission. You agree to pay for any costs related to such Commission-ordered modifications.

**BY SIGNING BELOW, YOU ACKNOWLEDGE THAT YOU HAVE READ, UNDERSTAND  
AND AGREE TO THE ABOVE NOTICE AND DISCLAIMER.**

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2. **Term and Termination.** The Term of this Agreement shall commence on the Effective Date and shall end five (5) years after the Commercial Operations Date. This Agreement may be terminated prior to the end of the Term as follows:
- (a) The Parties agree in writing to terminate the Agreement;
  - (b) The Microgrid Operator may terminate this Agreement:
    - (i) Prior to the Commercial Operations Date of the Hybrid Microgrid, by giving written notice to the Company of such termination; or
    - (ii) On or after the Commercial Operations Date, effective 30 calendar days after written notice to the Company of such termination;
  - (c) The Company may terminate this Agreement:
    - (i) Effective 30 calendar days after written notice to the Microgrid Operator if the Commercial Operation Date does not occur within 18 months of the Effective Date;
    - (ii) Effective 30 calendar days after written notice to the Microgrid Operator that there is a material change in an applicable statute, rule or tariff and Company reasonably concludes that the Microgrid Services Program cannot be continued;
    - (iii) Upon written notice to the Microgrid Operator if the Microgrid Operator becomes insolvent, or makes an assignment for the benefit of creditors; or shall have an order for relief in an involuntary case under the bankruptcy laws as now or hereafter constituted entered against it, or shall commence a voluntary case under the bankruptcy laws as now or hereafter constituted, or shall file any petition or answer seeking for itself any arrangement, composition, adjustment, liquidation, dissolution or similar relief to which it may be entitled under any present or future law; or seeks or consents to or acquiesces in the appointment of or taking possession by, any custodian, trustee, receiver or liquidator of it or of all or a substantial part of its properties or assets; or takes action looking to its dissolution or liquidation, and Microgrid Operator is unable to remedy such actions within thirty (30) calendar days of the occurrence of such breach or default;
    - (iv) If, Microgrid Operator, by act or omission, materially breaches or defaults on any material covenant, condition or other provision of this Agreement, if such breach or default is not cured within thirty (30) calendar days of such written notice to the Microgrid Operator, unless a different timeframe is specified in such notice.
  - (d) **Microgrid Operator Obligations Upon Termination.** Upon termination of this Agreement, whether by expiration of the Term or by termination by either party, Microgrid Operator shall, as of the date of termination:
    - (i) Disconnect and remove the Hybrid Microgrid Facility from the Company System so that it is no longer capable of operating in parallel with the Company System, subject to Company's confirmation of such disconnection and removal;
    - (ii) Provide written evidence to Company that Microgrid Operator has terminated all Participation Agreements with its Participants; and
    - (iii) Cooperate with Company to complete any other required procedures and tasks to complete the disconnection and removal of the Hybrid Microgrid Facility from the Company System.
3. **Hybrid Microgrid Description.** The Hybrid Microgrid shall at no time expand beyond the electrical boundaries as shown in Exhibit A (Description of Hybrid Microgrid) and Exhibit B (Microgrid Operator-Owned



Generating Facility and Interconnection Facilities) without prior written consent of the Company, which the Company may withhold in its sole and absolute discretion.

4. **Scope of Agreement.** The Parties understand and agree that this Agreement applies only to the operation of the Hybrid Microgrid described in Exhibit A.
5. **Microgrid Operation.** The Company shall allow Microgrid Operator to Interconnect and operate the Hybrid Microgrid and disconnect with the Company System in accordance with the terms and conditions of this Agreement, Exhibit F, and Company Rule 14H, provided that the Company determines that all applicable requirements and conditions of this Agreement, the Microgrid Services Tariff, and Rule 14H have been satisfied. The additional provisions in Exhibit B to this Agreement shall also apply. To the extent the provisions of Exhibit B conflict with Rule 14H or other provisions in this Agreement, the provisions of Exhibit B shall control.
6. **Permits and Licenses.** Microgrid Operator shall be responsible for the design, installation, operation, and maintenance of the Hybrid Microgrid and shall obtain, at its expense, and maintain any required governmental authorizations and/or permits for the construction and operation of the Hybrid Microgrid.
7. **Installation.**
  - (a) Design, installation, operation and maintenance of the Hybrid Microgrid shall include control and protection equipment as specified by the Company.
  - (b) The Company may enter premises where the Hybrid Microgrid is located, as permitted by law or tariff, for the following purposes: (1) to inspect Hybrid Microgrid's protective devices, microgrid controllers, and read or test meter(s); and (2) to disconnect the Hybrid Microgrid and/or service to Microgrid Operator or its Participants, whenever in Company's sole opinion, a hazardous condition exists and such immediate action is necessary to protect persons, Company's facilities, or property of others from damage or interference caused by the Hybrid Microgrid, or the absence or failure of properly operating protective device.
  - (c) Under no circumstances shall a Microgrid Operator Interconnect, disconnect, and/or operate the Hybrid Microgrid with the Company System without prior approval by the Company.
  - (d) Once the Hybrid Microgrid is Interconnected to the Company System, the Company reserves the right to require the installation of, or modifications to, equipment determined by the Company to be necessary to facilitate the delivery of reliable electric service to its Customers, subject to the requirement that such installation or modification be consistent with applicable Interconnection standards (e.g., Rule 14H). The Company shall provide a written explanation of the need for such installation or modification.
  - (e) If the Hybrid Microgrid is a facility Interconnecting at the Distribution Level, the Hybrid Microgrid shall follow the applicable Rule 14H interconnection process at the time of Interconnection. Notwithstanding the foregoing, Hybrid Microgrids seeking Interconnection to the Company's Distribution Level Network System (i.e., spot or grid network) shall not be allowed.
  - (f) The Hybrid Microgrid must comply with the Microgrid operation requirements set forth in Section H of the Microgrid Services Tariff, and Exhibit F to this Agreement.
8. **Interconnection Facilities.**
  - (a) Microgrid Operator-Owned Interconnection Facilities.

- (1) Pursuant to Company Rule 14H, Appendix I and Section 6.c (Review of Design Drawings), the Company must review and approve Microgrid Operator's single-line and three-line diagrams prior to Microgrid Operator constructing the Hybrid Microgrid Interconnection Facilities.
  - (2) Maximum Capacity. The Hybrid Microgrid shall not have Generating Facilities with an aggregate nameplate capacity in excess of Total Rated Capacity. Notwithstanding anything to the contrary, in no event shall the aggregate nameplate generation of all Generating Facilities (i.e., Total Rated Capacity) of the Hybrid Microgrid exceed 3 MW (AC) gross for Oahu, 1 MW (AC) gross for Maui Island, or 1 MW (AC) gross for Hawaii Island.
  - (3) The Microgrid Operator agrees to test the Hybrid Microgrid, to maintain operating records, and to follow such operating procedures, as may be specified by the Company to protect the Company System from damages resulting from the operation of the Hybrid Microgrid, including such testing, records and operating procedures as more fully described in Exhibit C attached hereto, and as also specified in Exhibit E and Exhibit F, attached hereto.
  - (4) The Company may inspect the Hybrid Microgrid and Microgrid Operator Interconnection Facilities from time to time.
- (b) Company Interconnection Facilities.
- (1) All Company Interconnection Facilities shall be the property of the Company. Where portions of the Company Interconnection Facilities are located on the Microgrid Operator's premises, the Microgrid Operator shall provide, at no expense to the Company, a suitable location for and access to all such equipment. If a 120/240 Volt power source or sources are required, the Microgrid Operator shall provide these at no expense to the Company.
  - (2) The Microgrid Operator agrees to pay to the Company a non-refundable contribution for the Company's investment in the Company Interconnection Facilities described in Exhibit C (Company-Owned Interconnection Facilities), subject to the terms and conditions included in Exhibit C and to pay for other Interconnection costs. The Interconnection costs will not include the cost of an initial technical screening of the impact of the Hybrid Microgrid on the Company System.
- The Microgrid Operator shall provide Security and replenish the Security amount to the level required under this Agreement within fifteen (15) business days after any draw on the Security by Company or any reduction in the value of Security below the required level for any other reason. In addition to any other remedy available to it, Company may, before or after termination of this Agreement, draw from the Security such amounts as are necessary to recover amounts Company is owed pursuant to this Agreement and/or pursuant to any other obligation of Microgrid Operator to Company under the Company's applicable electric service tariff, the Microgrid Services Tariff or any other applicable law, regulation, rule, ordinance or regulatory order. Any failure to draw upon the Security or other security for any amounts due Company shall not prejudice Company's rights to recover such amounts in any other manner.
- If the letter of credit is not renewed or extended at least thirty (30) calendar days prior to its expiration or earlier termination, Company shall have the right to draw immediately upon the full amount of the letter of credit and the right (but not the obligation) to place the L/C Proceeds, at Microgrid Operator's cost, in an escrow account until and unless Microgrid Operator provides a satisfactory substitute letter of credit. If it so chooses, the Company will place the L/C Proceeds in an escrow account with Escrow Agent. Thereafter, the Company shall have the right to apply the L/C Proceeds as necessary to recover amounts Company is owed. Company shall have the sole authority to draw from the account and Microgrid

Operator shall have no rights to the L/C Proceeds. Upon full satisfaction of Microgrid Operator's obligations under this Agreement, including recovery by Company of amounts owed to it, Company shall instruct the Escrow Agent to remit to the bank that issued the letter of credit that was the source of the L/C Proceeds the remaining balance (if any) of the L/C Proceeds. Any failure to draw upon the L/C Proceeds for any amounts due Company shall not prejudice Company's rights to recover such amounts in any other manner.

Promptly following the Commercial Operations Date, and the complete performance of all of Microgrid Operator's obligations under this Agreement, including but not limited to the obligation to pay any and all amounts owed by Microgrid Operator to Company, Company shall release the Security (including any accumulated interest, if applicable) to Microgrid Operator.

(c) Generating Facilities within the Hybrid Microgrid

- (1) In order to be used by the Microgrid Operator, all Generating Facilities and their owners supplying power to the Hybrid Microgrid must have:
  - i. Executed a Customer Interconnection Agreement with the Company and comply with all of the terms and conditions of that Customer Interconnection Agreement;
  - ii. Agreed to properly maintain adequate levels of protection and control schemes and corresponding settings - as defined in the applicable Customer Interconnection Agreement - associated with detecting and clearing short circuit faults on the Company System or those required for properly responding to abnormal system conditions (such as voltage and frequency ride-through requirements), as applicable to the Generating Facility, either included in external intelligent electronic devices (protection relays and controllers) or residing in power conversion systems (generators or inverters) of the facility;
  - iii. Agreed to provide reports or electronic setting files for all protection and control schemes and settings of the Hybrid Microgrid and its Generating Facility(ies) upon the request of the Company;
- (2) The Microgrid Operator agrees that the Company may perform tests on the Generating Facilities as the Company deems appropriate.

9. **Meters.** As necessary, Company shall purchase, own, install and maintain a metering package suitable for measuring the electric energy to and from the Microgrid. If a metering package is required, (a) the metering point shall be as close as possible to the PCC as allowed by Company, (b) Microgrid Operator shall make available a mutually agreeable location for the metering package, (c) Microgrid Operator shall install, own and maintain the infrastructure and other related equipment associated with the metering package, including but not limited to all enclosures (meter cabinets, meter pedestals, meter sockets, pull boxes, and junction boxes, along with their grounding/bonding connections), CT/PT mounting structures, conduits and ductlines, enclosure support structures, ground buses, pads, test switches, terminal blocks, isolation relays, telephone surge suppressors, and analog phone lines (one per meter), subject to Company's review and approval, as described in Section 1(d) (Certain Specifications for the Hybrid Microgrid Facility) of Exhibit B (Microgrid Operator-Owned Generating Facility and Interconnection Facilities), (d) the Microgrid Operator shall install this infrastructure such that it meets the requirements set forth in Chapter Six (IPP Metering) of the latest edition of the Company's Electric Service Installation Manual (ESIM), (e) Company shall test such meter prior to installation and shall test such meter every fifth (5th) year, and (f) Microgrid Operator shall reimburse Company for all reasonably incurred costs for the procurement, installation, maintenance (including maintenance replacements) and testing work associated with the metering package.

Company shall provide at least twenty-four (24) hours' notice to Microgrid Operator prior to any test it may perform on the meters or metering equipment. Microgrid Operator shall have the right to have a representative

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present during each such test. Microgrid Operator may request, and Company shall perform, if requested, tests in addition to the every fifth-year test and Microgrid Operator shall pay the cost of such tests. Company may, in its sole discretion, perform tests in addition to the fifth-year test and Company shall pay the cost of such tests. Appropriate adjustments may be made, as mutually agreed by the parties, in the event of any material inaccuracy of the tested meters.

10. **Continuity of Service.** The Company may disable the operation of the Hybrid Microgrid and/or require the Microgrid Operator to disconnect the Hybrid Microgrid from the Company System and/or operate the Hybrid Microgrid in Island Mode:
  - (a) When necessary in order for the Company to construct, install, maintain, repair, replace, remove, investigate, test or inspect any of its equipment or any part of the Company System including, but not limited to, Generating Facilities within the Hybrid Microgrid, accommodating the installation and/or testing of non-utility owned facilities to the Company System; or if the Company determines that such disabling of Hybrid Microgrid Operation and/or operation in Island Mode is necessary because of emergency conditions<sup>1</sup>, operating conditions on its system; or if either the Hybrid Microgrid does not operate in compliance with good engineering and operating practices or connection with the Hybrid Microgrid by the Company would require the Company to operate the Company System outside of good engineering and operating practices, and any situation that the Company System operator determines, at his or her sole discretion, could place in jeopardy system reliability.
  - (b) When Company determines that disabling of operation of the Hybrid Microgrid in Grid-Connected Mode or operation in Island Mode becomes necessary for engineering and/or operating reasons that are directly attributable to the Hybrid Microgrid, or Company System conditions exist that require disabling of operation of the Hybrid Microgrid in Grid-Connected Mode or operation in Island Mode for reliability and/or stability reasons.
11. **Personnel and System Safety.** Effective upon the Commercial Operations Date, the Hybrid Microgrid may Interconnect and operate in Grid-Connected and/or Island Mode with the Company System provided the Hybrid Microgrid does not adversely affect the operations of the connected electric grid or the operations of the Hybrid Microgrid Participants and does not present safety hazards to the Company's or Customers' equipment and/or personnel. If at any time, the Company determines, in its sole discretion, that the continued operation of the Hybrid Microgrid may endanger any person or property, the Company System, or have an adverse effect on the safety or power quality of Customers, the Company shall have the right to (a) disable Hybrid Microgrid operation remotely or otherwise, and/or (b) shutdown/de-energize the Generating Facilities part of the Hybrid Microgrid. The Hybrid Microgrid shall remain disabled and/or de-energized until such time as the Company is satisfied that the endangering or power quality condition(s) has been corrected. The Company reserves the right to inspect the Hybrid Microgrid Facility as necessary to assure the safety and reliability of the Company System at any time during the Term, and for an additional period of one (1) year thereafter.
12. **Prevention of Interference.** Whether in Grid-Connected Mode or Island Mode, the Microgrid Operator shall not operate equipment that superimposes a voltage or current upon the Company System that interferes with the Company's operations, service to the Company's Customers, or the Company's communication facilities. Such interference shall include, but not be limited to, overcurrent, voltage imbalance, and abnormal waveforms. If

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<sup>1</sup> Emergency conditions refer to the need for immediate action in response to a situation that has caused injury, loss of life or property damage. Emergency conditions include, but are not limited to: a system emergency or forced outage; a potential hazard to Company personnel or the general public; a hazardous condition relating to the generating facility; the Hybrid Microgrid or any of its Generating Facilities is interfering with the Company's equipment or equipment belonging to other Customers (including non-utility generating equipment); the Hybrid Microgrid or any of its Generating Facility's protective devices have been tampered with by the Customer and/or owner and/or operator of the Hybrid Microgrid of any of its Generating Facilities; or a need for immediate action in response to a situation that has caused (or has the potential to cause) injury, loss of life or property damage.

such interference occurs, the Microgrid Operator must diligently pursue and take corrective action at its own expense after being given notice and reasonable time to do so by the Company. If the Microgrid Operator does not take timely corrective action, or continues to operate the equipment causing interference without restriction or limit, the Company may, without liability, (a) disable Hybrid Microgrid operation, (b) shutdown/de-energize the Generating Facilities part of the Hybrid Microgrid, and/or (c) disconnect the Microgrid Operator's equipment from the Hybrid Microgrid and/or the Company System.

**13. Limitation of Liability; Indemnification.**

**(a) Limitation of Liability**

- (i) Company shall bear no liability and shall have no responsibility to Microgrid Operator or any Hybrid Microgrid Participant for any action(s) taken by Company in accordance with this Agreement, including without limitation, Section 10 (Continuity of Service) or Section 11 (Personnel and System Safety), or in accordance with Company's Customer Interconnection Agreement with respect to any Generating Facility within the Hybrid Microgrid.
- (ii) Notwithstanding any other provision in this Agreement to the contrary, with respect to Company's provision of electric service to any Customer including the Microgrid Operator, any Company liability to such Customer shall be limited as set forth in the Company's tariffs and terms and conditions for electric service, and shall not be affected by the terms of this Agreement.

- (b) Indemnification.** Microgrid Operator shall at all times indemnify, defend and hold harmless Company from any and all damages, losses, claims and actions, including, without limitation, reasonable attorneys' fees and costs, and all expenses incidental to such losses, damages, claims or actions, based upon or arising out of damage to property or injuries to persons (including death) in any way arising out of or related to the Hybrid Microgrid Facility, Microgrid Operator's performance of its obligations under the this Agreement, the operation or maintenance of the Hybrid Microgrid during Island Mode, and/or Company's actions taken in accordance with this Agreement, including Section 10 (Continuity of Service) or Section 11 (Personnel and System Safety), except to the extent that such damages, losses, claims, or actions were directly caused by the negligence or willful misconduct of Company.

**14. Microgrid Operator and Hybrid Microgrid Information.** By signing this Agreement, the Microgrid Operator expressly agrees and authorizes the Company to request and obtain from the Microgrid Operator and the Microgrid Operator Agents, at no cost to Company, information related to the Hybrid Microgrid and its Generating Facilities, including but not limited to the requirements specified in the Microgrid Services Tariff, Section H.3, that Company reasonably determines are needed to ensure the safe and reliable operation of the Hybrid Microgrid and/or the Company System. Microgrid Operator expressly agrees and irrevocably authorizes Microgrid Operator Agents to disclose such Microgrid data to Company upon request by Company.

**15. Additional Information.** The Company reserves the right to request additional information from Microgrid Operator relating to the Hybrid Microgrid, where reasonably necessary, to serve the Microgrid Operator under this Agreement or to ensure reliability, safety of operation, and power quality of the Company System.

**16. Changes to Hybrid Microgrid Prior to Commencement of Construction.** Microgrid Operator may propose revisions to Exhibit A of this Agreement for Company's approval prior to commencement of construction, provided, however, that (i) no such revision to Exhibit A shall change the type of Hybrid Microgrid or equipment deployed at the Hybrid Microgrid; (ii) Microgrid Operator shall be in compliance with all other terms and conditions of this Agreement and the Microgrid Services Tariff; and (iii) such revision(s) shall not change the characteristics of the Hybrid Microgrid equipment or the specifications used in the Interconnection Requirements Study ("IRS") or other technical review process. Any revision to Exhibit A complying with items (i) through (iii) above shall be subject to Company's prior approval, which approval shall not be unreasonably withheld. If Microgrid Operator's proposed revision(s) to Exhibit A otherwise satisfies items (i)

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and (ii) above but not item (iii) such that Company, in its reasonable discretion, determines that a re-study or revision to all or any part of the IRS or other technical review is required to accommodate Microgrid Operator's proposed revision(s), Company may, in its sole and absolute discretion, conditionally approve such revision(s) subject to (a) a satisfactory re-study or revision to the IRS or other technical review and (b) Microgrid Operator's payment and continued obligation to be liable and responsible for all costs and expenses of (1) re-studying or revising such portions of the IRS or other technical review, and (2) modifying the Hybrid Microgrid and/or, the Company Interconnection Facilities based on the results of the re-studies or revisions to the IRS or other technical review. Any changes made to Exhibit A or Exhibit B or the Agreement shall be reflected in a written amendment to the Agreement.

Microgrid Operator understands, acknowledges, and agrees that Company's review and approval of Microgrid Operator's proposed revisions to Exhibit A and any necessary re-studies or revisions to the IRS or other technical review shall be subject to Company's then-existing time and personnel constraints. Company agrees to use commercially reasonable efforts, under such time and personnel constraints, to complete any necessary reviews, approvals and/or re-studies or revisions to the IRS or other technical review process.

Any delay in completing, or failure by Microgrid Operator to meet Commercial Operations Date as a result of any revision by Microgrid Operator (whether requiring a re-study or revision to the IRS or not) shall be borne entirely by Microgrid Operator and Company shall not be responsible or liable for any delay or failure to meet Commercial Operations by Microgrid Operator.

17. **No Material Changes to Hybrid Microgrid After Commencement of Construction.** After commencement of construction and thereafter during the Term, Microgrid Operator agrees that no material changes or additions to the Hybrid Microgrid shall be made without having obtained prior written consent from Company, which consent may be withheld in Company's sole and absolute discretion. Microgrid Operator shall notify Company of any proposed change to the Hybrid Microgrid and provide any further information to Company upon request to determine whether such change will be permitted by Company.
18. **Safety and Performance Compliance/Certification by Licensed Electrical Contractor.** The Hybrid Microgrid, Hybrid Microgrid Facilities, Generating Facilities, and all interconnection systems must comply with all applicable safety and performance standards of the NEC, IEEE, and accredited testing laboratories such as the Underwriters Laboratories (UL), and where applicable, the rules of the Commission, or other applicable governmental laws and regulations, and the Company's interconnection requirements. This requirement shall include, but not be limited to, the interconnection standards and procedures of the Company's Rule 14H, as amended from time to time, as well as any other requirements as may be specified in this Agreement, its exhibits, all as authorized by the Commission. Upon request by Company, Microgrid Operator shall cause a Licensed Electrical Contractor, as agent for Microgrid Operator, to certify that once approved by the Company, the proposed Hybrid Microgrid will be installed to meet all preceding requirement(s).
19. **Good Engineering Practice.**
  - (a) Each Party agrees to install, operate and maintain its respective equipment and facilities and to perform all obligations required to be performed by such Party under this Agreement in accordance with good engineering practice in the electric industry and with applicable laws, rules, orders and tariffs.
  - (b) Wherever in this Agreement and the attached Exhibits the Company has the right to give specifications, determinations or approvals, such specifications, determinations and/or approvals shall be given in accordance with the Company's standard practices, policies and procedures, which may include the Company's Electric Service Installation Manual, the Company's Engineering Standard Practice Manual and the IEEE Guides and Standards for Protective Relaying Systems.
20. **Insurance.** The following insurance provisions are applicable to Hybrid Microgrids:
  - (a) The Microgrid Operator shall, at its own expense and during the term of the Agreement and any other time that the Hybrid Microgrid is Interconnected with the Company System, maintain in effect with a

responsible insurance company authorized to do insurance business in Hawaii and with a rating by A.M. Best Company, Inc. of “A-VII” or better, the following insurance or its equivalent at Company’s discretion that will protect the Microgrid Operator and the Company with respect to the Hybrid Microgrid, the Hybrid Microgrid’s operations, and the Hybrid Microgrid’s Interconnection with the Company System:

A Commercial General Liability policy covering bodily injury and property damage with a combined single limit of liability of at least the following amounts based on the Total Rated Capacity of the generator(s) within the Hybrid Microgrid, for any occurrence. The limits below may be satisfied through the use of umbrella or excess liability insurance sufficient to meet these requirements.

Commercial General Liability Coverage Amount	Total Rated Capacity of the Generating Facility(ies) in the Hybrid Microgrid
\$5,000,000	Greater than 100 kW and less than or equal to 3 MW
\$2,000,000	Less than or equal to 100 kW

- (b) The Microgrid Operator insurance, by endorsement to the policy or policies shall: name the Company, its directors, officers, agents, and employees as additional insured; include contractual liability coverage for written Agreements; include provisions stating that the insurance will respond to claims or suits by additional insureds against the Microgrid Operator or any other insured thereunder; provide that the insurance is primary with respect to the Microgrid Operator and the Company; and provide that the insurance company waives all rights of subrogation which Microgrid Operator or the insurance company may have against Company, its directors, officers, agents, and employees. Any insurance carried by Company will be excess only and not contribute with this insurance.
- (c) The Microgrid Operator insurance, by endorsement to the policy or policies shall provide written notice within 30 calendar days to the Company should the required insurance be cancelled, limited in scope, or not renewed upon expiration. “Claims made” policies are not acceptable, unless the Microgrid Operator agrees to maintain coverage in full effect at all times during the term of this Agreement and for three (3) years thereafter. The adequacy of the coverage afforded by the required insurance shall be subject to review by the Company from time to time, and if it appears in such review that risk exposures require an increase in the coverages and/or limits of this insurance, the Microgrid Operator shall make such increase to that extent and any increased costs shall be borne by the Microgrid Operator. The Microgrid Operator has the responsibility to determine if higher limits are desired and purchased. The Microgrid Operator shall provide certificates of insurance to the Company prior to executing the Agreement and any interconnection. Receipt of any certificate showing less coverage than required shall not operate as a waiver by the Company of the Microgrid Operator’s obligation to fulfill the applicable requirements of this Section 19. The Microgrid Operator’s indemnity and other obligations shall not be limited by the foregoing insurance requirements. Any deductible shall be the responsibility of the Microgrid Operator.
- (d) Alternatively, where the Microgrid Operator is a governmental entity, Microgrid Operator may elect to be self-insured for the amounts set forth above in lieu of obtaining insurance coverage to those levels from an insurance company.

21. **House Power.** The Company will sell House Power to the Microgrid Operator under the rate schedule in force for the class of Customer to which the Microgrid Operator belongs. A separate meter to record energy delivered to the Hybrid Microgrid may be installed by the Company and paid for by the Microgrid Operator at the appropriate tariff rate. The Microgrid Operator shall be solely responsible for arranging retail electric service

exclusively from the Company in accordance with the Company's Electric Rate Book. The Microgrid Operator shall obtain House Power solely through separately metered retail service and shall not obtain House Power through any other means, and waives any regulatory or other legal claim or right to the contrary. The Parties acknowledge and agree that the performance of their respective obligations with respect to House Power shall be separate from this Agreement and shall be interpreted independently of the Parties' respective obligations under this Agreement. Notwithstanding any other provision in this Agreement, nothing with respect to the arrangements for House Power shall alter or modify the Microgrid Operator's or the Company's rights, duties and obligations under this Agreement. This Agreement shall not be construed to create any rights between the Microgrid Operator and the Company with respect to the arrangements for House Power.

22. **Microgrid Services Tariff.**

- (a) Microgrid Operator shall comply with all of the rules stated in the Company's applicable electric tariff rules related to the Microgrid, as the same may be revised from time to time, and this Agreement. In the event of any conflict between the terms of this Agreement and Company's electric tariff rules related to the Microgrid, the provisions of the applicable tariff shall control.
- (b) Microgrid Operator shall require all Participants to execute a Participant Agreement as a precondition to enrollment in the Hybrid Microgrid. The Participant Agreement must satisfy the requirements of the Microgrid Services Tariff, this Agreement and any additional guidance from the Commission. Prior to executing the Participant Agreement, the Microgrid Operator shall make to the Participant the disclosures required under the Disclosure Checklist. A copy of the Disclosure Checklist signed by both the Microgrid Operator and the Participant shall be attached to the executed Participant Agreement. The Microgrid Operator shall also disclose to the Participant that a failure to pay such Participant's monthly retail electric bill that results in Company issuance of a disconnection notice will result in forfeiture of Bill Credits for the duration of such disconnection. For each Participant, a completed and fully-executed Disclosure Checklist must be delivered to the Company prior to the execution of the Hybrid Microgrid Interconnection Agreement, or prior to adding each Participant after Commercial Operations Date.
- (c) **Microgrid Operator Fees.** Microgrid Operator shall pay to Company the following fees:
  - ☐ All applicable Interconnection costs, fees and expenses
  - ☐ \$5/kW AC Program Administration Fee (annually), from the Commercial Operations Date
  - ☐ Such other fees as the Commission may establish for the Microgrid Systems Program payable by Microgrid Operator

Company shall invoice Microgrid Operator for payment to Company of the foregoing fees. Microgrid Operator shall make payment to Company within 15 calendar days of Microgrid Operator's receipt of such invoice.

- (d) **Disclosure of Hybrid Microgrid Information.** The Microgrid Operator acknowledges and agrees that the Company may publicly disclose the Hybrid Microgrid location, scope, Microgrid Operator, nameplate capacity and generation data of the Hybrid Microgrid.
- (e) **Information Requests by Commission.** The Microgrid Operator agrees to fully cooperate with any request for information from the Commission pertaining in any way to the Hybrid Microgrid, and will provide such information upon the Company's request in a timely manner.
- (f) **Fair Disclosure; Disclosure Checklist.** Prior to the time when any person or entity becomes a Participant, the Microgrid Operator will fairly disclose the future costs and benefits of participation and



all other matters specified in the Disclosure Checklist and provide to the potential Participant a copy of this Agreement. The Microgrid Operator shall comply with all other requirements of the Commission and applicable laws with respect to communications with Participants.

- (g) Notwithstanding anything to the contrary, Microgrid Operator is solely responsible for resolving any disputes with the Participant during Island-Mode.
- (h) The Company may periodically provide a bill message to Participants with a statement that questions or concerns related to their participation in the Hybrid Microgrid should be directed to the Microgrid Operator.

**23. Requirements Applicable to the Microgrid Operator's Relationship with its Participants.** The Microgrid Operator must comply with the following:

- (a) Participant Information. The Microgrid Operator shall only allow participation in the Hybrid Microgrid to Participants and provide to the Company the name, account number and service address attributable to each Participant. The Microgrid Operator shall take care to preserve the privacy expectations of the Participants, such as not publicly providing a Participant's account information, or Bill Credits. The Microgrid Operator will not disclose or share such information unless the Participant has provided explicit informed consent or if such disclosure is compelled by law.
- (b) Participant Transfer of premises. In the event a Participant sells or otherwise transfers the premises which is part of the Hybrid Microgrid, there shall be no transfer charge/fee if the meter associated with the account remains unchanged.
- (c) Updating Participant Information. On or before five (5) business days immediately preceding the first Day of each month, the Microgrid Operator shall provide to the Company with any and all changes to the Participant's information. Such data shall include additions, deletions or changes to the listing of Participants in the Hybrid Microgrid, including any changes to the Participant's account number and service address attributable to each Participant.
- (d) Responsibility for Verification. The Microgrid Operator shall verify that each Participant is eligible to be a Participant in the Hybrid Microgrid and that the Microgrid Services Tariff requirements are met.

**24. Microgrid Operator represents, warrants and covenants.** Microgrid Operator represents, warrants, and covenants that:

- (a) Microgrid Operator has obtained all Land Rights necessary for the construction, ownership, operation and maintenance of the Hybrid Microgrid Facility during the Term, and Microgrid Operator shall maintain such Land Rights in effect throughout the Term.
- (b) As of the commencement of construction, Microgrid Operator shall have obtained all permits or approvals from any applicable governmental agency necessary for the construction, ownership, operation and maintenance of the Hybrid Microgrid Facility and all interconnection facilities.
- (c) Microgrid Operator's Hybrid Microgrid: (i) complies with all applicable laws concerning the dissemination of personally identifiable information, and shall continue to be in compliance for the longer of (A) the Term or (B) for as long as Microgrid Operator continues to hold or otherwise have access to any personally identifiable information of Participants or Customers of Company; and (ii) complies with all applicable laws concerning consumer protection, and shall continue to be in compliance for the duration of the Term.

25. **Miscellaneous.**

- (a) **Survival of Obligations.** The termination or expiration of this Agreement shall not relieve the Parties of their respective liabilities and obligations, owed or continuing at the time of termination or expiration.
- (b) **Governing Law; Regulatory Authority; Jurisdiction; Venue.** This Agreement was executed in the State of Hawaii and must in all respects be interpreted, governed, and construed under the laws of the State of Hawaii, without regard to choice of law principles. This Agreement is subject to, and the Parties' obligations hereunder include, operating in full compliance with all valid, applicable federal, state, and local laws or ordinances, and all applicable rules, regulations, orders of, and tariffs approved by, duly constituted regulatory authorities having jurisdiction. Any dispute arising out of this Agreement, however defined, shall be brought in the State of Hawai'i in a court of competent jurisdiction, and each Party agrees and irrevocably consents to the exercise of personal jurisdiction 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.
- (c) **Amendment, Modifications, or Waiver.** This Agreement may not be altered or modified by either of the Parties, except by an instrument in writing executed by each of them. None of the provisions of this Agreement shall be considered waived by a Party unless such waiver is given in writing. The failure of a Party to insist in any one or more instances upon strict performance of any of the provisions of this Agreement or to take advantage of any of its rights hereunder shall not be construed as a waiver of any such provisions or the relinquishment of any such rights for the future, but the same shall continue and remain in full force and effect. This Agreement contains the entire agreement and understanding between the Parties, their agents, and employees as to the subject matter of this Agreement. Each Party also represents that in entering into this Agreement, it has not relied on any promise, inducement, representation, warranty, agreement or other statement not set forth in this Agreement.
- (d) **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 hereto any legal or equitable right, remedy or claim under or with respect to this Agreement or any provision hereof. This Agreement and all of its provisions and conditions are for the sole and exclusive benefit of Company, Microgrid Operator and their successors and permitted assigns.
- (e) **Termination of Existing Agreement.** This Agreement shall supersede any existing agreement, if any, under which Microgrid Operator is currently operating the Hybrid Microgrid and any such agreement shall be deemed terminated as of the date this Agreement becomes effective.
- (f) **Notices.** Any notice required under this Agreement shall be in writing and mailed at any United States Post Office with postage prepaid and addressed to the Party, or personally delivered to the Party at the address identified on the last page of the Agreement. Changes in such designation may be made by notice similarly given. Notice sent by mail shall be deemed to have been given on the date of actual delivery or at the expiration of the fifth day after the date of mailing, whichever is earlier.
- (g) **Assignment.** This Agreement may not be assigned by either Party without the prior written consent of the other Party. Such consent shall not be unreasonably withheld. Any consent by Company to an assignment by Microgrid Operator, Company may require the new Microgrid Operator to complete and execute an amended Agreement or new Agreement, as may be applicable, as a condition to such consent. In the event of a collateral assignment by Microgrid Operator for financing, to the extent necessary, Company shall, if requested by Microgrid Operator and if its costs (including reasonable attorneys' fees of outside counsel) in responding to such request are paid by Microgrid Operator, execute such Hawai'i-law-governed documents acceptable to Company in its sole discretion, as may be reasonably requested by a lender in connection with such Hybrid Microgrid financing.

- (h) **Binding Effect.** This Agreement shall be binding upon and inure to the benefit of the Parties hereto and their respective successors, legal representatives, and permitted assigns.
- (i) **Relationship of Parties.** Nothing in this Agreement shall be deemed to constitute any Party hereto as partner, agent or representative of the other Party or to create any fiduciary relationship between the Parties.
- (j) **Limitations.** Nothing in this Agreement shall limit the Company's ability to exercise its rights or expand or diminish its liability with respect to the provision of electrical service pursuant to the Company's tariffs as filed with the Commission, or the Commission's Standards for Electric Utility Service in the State of Hawai'i, which currently are included in the Commission's General Order Number 7, as either may be amended from time to time.
- (k) **Force Majeure.** If a Force Majeure Event prevents a Party from fulfilling any obligations under this Agreement, such Party will promptly notify the other Party in writing, and will keep the other Party informed on a continuing basis of the scope and duration of the Force Majeure Event. The affected Party will specify in reasonable detail the circumstances of the Force Majeure Event, its expected duration, and the steps that the affected Party is taking to mitigate the effects of the event on its performance. The affected Party will be entitled to suspend or modify its performance of obligations under this Agreement, other than the obligation to make payments then due or becoming due under this Agreement, but only to the extent that the effect of the Force Majeure Event cannot be mitigated by the use of reasonable efforts. The affected Party will use reasonable efforts to resume its performance as soon as possible.
- (l) **Non-Warranty.** Neither by inspection, if any, or non-rejection, nor in any other way, does the Company give any warranty, express or implied, as to the adequacy, safety, or other characteristics of any structures, equipment, wires, appliances or devices owned, installed or maintained by the Microgrid Operator or leased by the Microgrid Operator from third parties, including without limitation the Hybrid Microgrid and any structures, equipment, wires, appliances or devices appurtenant thereto.
- (m) **Confidential Information.** Each Party may have a proprietary interest or other need for confidentiality in information that may be furnished to the other during the term of this Agreement. As used herein, "Confidential Information" shall include all non-public information disclosed by either Party ("Disclosing Party") to the other Party ("Receiving Party"), whether disclosed orally or in writing, electronically or by other medium, and whether or not marked or otherwise identified as confidential. Confidential information shall be clearly marked as such on each page or otherwise affirmatively identified. Confidential Information shall not include information if and to the extent the Receiving Party establishes that the information: (i) is part of the public domain through no act or omission of the Receiving Party; or (ii) came into the Receiving Party's lawful possession outside of the performance of this Agreement and through means other than the Disclosing Party.

The Receiving Party agrees that it will exercise at least the same standard of care in protecting the confidentiality of the Disclosing Party's Confidential Information as it does with its own confidential information of a similar nature, but in any event, no less than reasonable care. The Receiving Party will hold in confidence and will not use, reproduce, distribute, transmit or disclose, directly or indirectly, the Disclosing Party's Confidential Information except as permitted herein or as consented to in writing by the Disclosing Party.

The Receiving Party may disclose Confidential Information to its officers, directors, employees, professional advisors and independent contractors with a direct need to know the information for the exercise of rights and/or performance of obligations under this Agreement; provided, however, such persons or entities must be bound by written confidentiality agreements with terms and conditions that are no less restrictive than those contained herein. Confidential Information may also be disclosed by the Receiving Party pursuant to a requirement of a governmental agency, regulatory body or by

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operation of law; provided, however, the Receiving Party shall disclose only that portion of the Confidential Information that it is required to disclose and shall (if permitted) notify the Disclosing Party prior to such disclosure in order to permit the Disclosing Party to lawfully attempt to prevent or restrict such disclosure should it so choose. Finally, Company may disclose Confidential Information, as necessary and appropriate, to the State of Hawai'i Public Utilities Commission and/or State of Hawai'i Consumer Advocate (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 otherwise applicable to the disclosure.

- (n) **Execution of Agreement; Multiple Counterparts.** The Parties agree that this Agreement, including amendments, may be executed and delivered by exchange of electronic signatures, which may be transmitted by facsimile, E-mail, or other acceptable means. A party's electronic signature shall be considered an "original" signature which is binding and effective for all purposes. 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.

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**IN WITNESS WHEREOF**, the Parties hereto have caused two originals of this Agreement to be executed by their duly authorized representatives. This Agreement is effective as of the date first set forth above.

**[MICROGRID OPERATOR]**

By: \_\_\_\_\_  
Signature Date

Name (Print): \_\_\_\_\_

Company Name  
(if applicable): \_\_\_\_\_

Title (if applicable): \_\_\_\_\_

**[HAWAIIAN ELECTRIC COMPANY, INC., MAUI ELECTRIC COMPANY LTD., HAWAII ELECTRIC LIGHT COMPANY, INC.]**

By: \_\_\_\_\_ To be filled out by the Company  
Signature Date

Name (Print): \_\_\_\_\_ To be filled out by the Company

Title: \_\_\_\_\_ To be filled out by the Company

**MAILING ADDRESS [select as appropriate]**

[Hawaiian Electric Company, Inc.  
\_\_\_\_\_  
Division  
P.O. Box 2750  
Honolulu, HI 96840]

[Maui Electric Company, Ltd.  
Attn: \_\_\_\_\_  
P.O. Box 398  
Kahului, HI 96733-6898]

[Hilo:  
HELCO Engineering  
Attn: Hybrid Microgrid Program  
54 Halekauila Street  
Hilo, HI 96720

Kona:  
HELCO Engineering  
Attn: Hybrid Microgrid Program  
74-5519 Kaiwi Street  
Kailua-Kona, HI 96740]

**EXHIBIT A**  
**DESCRIPTION OF HYBRID MICROGRID**

**1. Microgrid Operator Information**

Name (print): \_\_\_\_\_

**Property Address:** \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Meter # (if applicable): \_\_\_\_\_ TMK: \_\_\_\_\_

Phone: \_\_\_\_\_ Cell: \_\_\_\_\_ Email: \_\_\_\_\_

☐ Mailing Address is the same as the Property Address

**Mailing Address:** \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

**Name of Person Authorized to Sign on behalf of Microgrid Operator:**

\_\_\_\_\_

**Hawaii Gross Excise Tax License Number of Microgrid Operator:**

\_\_\_\_\_

**Description of the electrical boundaries of the Hybrid Microgrid:**

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_ (use additional sheet if necessary)

**2. Electrical Contractor**

Electrical Contractor: \_\_\_\_\_ Hawai'i License #: \_\_\_\_\_

Mailing Address: \_\_\_\_\_

City: \_\_\_\_\_ State: \_\_\_\_\_ Zip: \_\_\_\_\_

Phone: \_\_\_\_\_ Cell: \_\_\_\_\_ Email: \_\_\_\_\_

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Supply certification that the generating system will be installed and inspected in compliance with the local Building/Electrical code of the County of: ☐Honolulu ☐Maui ☐Hawai'i

Generating System Building Permit # (to be filled out by the Company upon the Company's approval and execution of Agreement): \_\_\_\_\_ To be filled out by the Company

Interconnection Date (to be filled out by the Company upon the Company's approval and execution of the Agreement): \_\_\_\_\_ To be filled out by the Company

### 3. Insurance

Insurance Carrier: \_\_\_\_\_

### 4. General Hybrid Microgrid Technical Information (Attached)

The attached technical information should clearly describe and illustrate the defined electrical boundaries of the proposed Hybrid Microgrid.

☐ **Microgrid Single Line Diagram**

☐ **Microgrid Three Line Diagram**

☐ **Microgrid Relay List and Trip Scheme (if applicable)**

## 5. Generator Qualifications

Generator Type(s) included in Hybrid Microgrid:

☐ Photovoltaic with DC Inverter      ☐ Non-Photovoltaic DC Generator      ☐ Other: \_\_\_\_\_

What is the Hybrid Microgrid's Maximum Export capability?

Hybrid Microgrid Maximum Export in Grid-Connected Mode: \_\_\_\_\_ kW

Total aggregate rated capacity of the Hybrid Microgrid: Grid-Connected Mode \_\_\_\_\_ kW    Island Mode: \_\_\_\_\_ kW

Total energy capability over a 24-hour period of the Hybrid Microgrid: Island Mode \_\_\_\_\_ kWh

Estimated peak demand of the Hybrid Microgrid: Grid-Connected \_\_\_\_\_ kW    Island Mode \_\_\_\_\_ kW

## 6. Interconnecting Equipment Technical Data

Equipment Information:

Manufacturer: \_\_\_\_\_ Catalog #: \_\_\_\_\_

Type: \_\_\_\_\_ Rated Amps: \_\_\_\_\_ Rated Volts: \_\_\_\_\_

☐ Fused *or* ☐ Non-Fused | ☐ Single Phase *or* ☐ Three Phase | ☐ Uses multiple disconnects

Mounting Location:

## 7. Generator Facility Technical Information for Generating Facilities utilized during Island Mode System Information:

Generator Technology	Manufacturer	Model	Interconnection Application No.	Location (Service Address)	Peak AC Output Rating (kW)
Total Rated Capacity (kW):					



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8. Reserved

☐ Not Applicable

9. Interconnecting Equipment Technical Data

Transformer Data

☐ Not Applicable

*A copy of transformer Nameplate and Manufacturer's Test Report may be substituted*

Transformer Primary (Volts):

Transformer Secondary (Volts):

☐ Delta

☐ Wye

☐ Wye Grounded

☐ Delta

☐ Wye

☐ Wye Grounded

Size: \_\_\_\_\_

KVA Transformer Impedance: \_\_\_\_\_

% on \_\_\_\_\_

KVA

Base Transformer Fuse Data

☐ Not

Applicable

*Attach fuse manufacturer's Minimum Melt & Total Clearing Time-Current Curves*

☐ At Primary Voltage ☐ At Secondary Voltage

Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_ Size: \_\_\_\_\_ Speed: \_\_\_\_\_

Transformer Protection (if not fuse)

☐ Not

Applicable

Please describe: \_\_\_\_\_

Generator Main Circuit Breaker

☐ Not Applicable

*A copy of circuit breaker's Nameplate and Specification Sheet may be substituted*

Manufacturer: \_\_\_\_\_ Type: \_\_\_\_\_

Continuous  
Load Rating

Interrupting  
Rating

Trip  
Speed

(Amps): \_\_\_\_\_

(Amps): \_\_\_\_\_

(Cycles): \_\_\_\_\_

Feeder Circuit Breaker

☐ Not Applicable

*Attach copy of any proposed Time-Overcurrent Coordination Curves*

Manufacturer	Type	Style/Catalog No.	Proposed Setting

Current Transformer Data

☐ Not Applicable

*Attach copy of Manufacturer's Excitation & Ratio Correction Curves*

Manufacturer	Type	Accuracy Class	Proposed Ration
			/5
			/5
			/5
			/5
			/5

10. Feasibility Analysis

Applicant elects to pursue a Feasibility Analysis with the Company pursuant to the Microgrid Services Tariff:

☐ Yes ☐ No

**EXHIBIT B**

**MICROGRID OPERATOR-OWNED GENERATING FACILITY  
AND INTERCONNECTION FACILITIES**

**1. Hybrid Microgrid**

- a. Compliance with laws and standards.
- (i) The Hybrid Microgrid design and drawings shall meet all applicable national, state, and local laws, rules, regulations, orders, construction and safety codes, and shall satisfy the terms of the Interconnection Agreement, the parameters described in Exhibit F (Hybrid Microgrid Operating Parameters), the Microgrid Services Tariff Rule No. XX, and Rule 14H.
  - (ii) This Agreement incorporates by reference the standards and requirements of Company Rule 14H; however, in the event of any conflict between this Agreement and Company Rule 14H, the provisions of this Agreement shall control.
- b. Avoidance of adverse system conditions. The Hybrid Microgrid shall be designed, installed, operated and maintained so as to prevent or protect against adverse conditions on the Company System that can cause electric service degradation, equipment damage, or harm to persons, such as:
- (i) Unintended islanding.
  - (ii) Inadvertent and unwanted re-energization of a Company dead line or bus.
  - (iii) Interconnection while out of synchronization.
  - (iv) Overcurrent.
  - (v) Voltage imbalance.
  - (vi) Ground faults.
  - (vii) Generated alternating current frequency outside of permitted safe limits.
  - (viii) Voltage outside permitted limits.
  - (ix) Poor power factor or reactive power outside permitted limits.
  - (x) Abnormal waveforms.
- c. Specification of protection, synchronizing and control requirements. The Microgrid Operator shall provide the design drawings, operating manuals, manufacturer's brochures/instruction manual and technical specifications, manufacturer's test reports, bill of material, protection and synchronizing relays and settings, and protection, synchronizing, and control schemes for the Hybrid Microgrid to the Company for its review, and the Company shall have the right to specify the protection and synchronizing relays and settings, and protection, synchronizing and control schemes that affect the reliability and safety of operation and power quality of the Company System with which the Hybrid Microgrid is Interconnected.

All protective devices described in the Exhibit B shall be utility-grade protective equipment that meets the requirements defined by: (1) ANSI/IEEE C37.90-1989 IEEE Standards for Relays and Relay Systems Associated with Electric Power Apparatus; (2) IEEE C37.90.1 IEEE Standard Surge Withstand Capability (SWC) Tests for Protective Relays and Relay Systems'; and (3) IEEE C37.90.2 IEEE Trial-Use Standard Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers

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- (i) Protection at Microgrid PCC: Microgrid shall have dedicated protection scheme associated with PCC which, as a minimum, include protection elements such as over/under voltage, over/under frequency, directional overcurrent, and sync-check. The protection schemes shall be associated with a means for automatically disconnecting the Microgrid from the Company System whenever a protective device initiates a trip, or whenever a remote transfer trip signal is received (issued through designated Company protection schemes or other Microgrid control schemes).
- (ii) Means of Disconnection and Isolation at PCC: Microgrid shall be equipped with a means of disconnecting the Microgrid area from the Company System at PCC (i.e., switch, circuit breaker, or recloser) to properly provide a galvanic isolation between the Company grid and the Microgrid prior to entering Island Mode. The PCC means of disconnect shall be able to tolerate two times the nominal voltage at PCC, due to possible 180 degree out of sync operation of the Microgrid and the rest of the Company System.
- (iii) Synchronization at PCC: Microgrid shall have a means of synchronizing at PCC prior to re-connection and restoration from an Island Mode. The criteria outlined in IEEE 1547 for synchronization based on the aggregate size of Generating Facility shall be applied (e.g.:  $\Delta f \leq 0.1$  Hz,  $\Delta V \leq 3\%$ , and  $\Delta$  angle  $\leq 10$  deg, for a Generating Facility size of 1.5 MW to 3 MW).
  - (a) Resynchronization. Under no circumstances shall Microgrid Operator, when separated from the Company System for any reason, reclose into the Company System without first obtaining specific approval to do so from the Company System operator.
- (iv) Protection Schemes: The Microgrid Operator shall provide comprehensive short circuit and protection coordination studies with documentation on protection design of the Microgrid for both Grid-Connected and Island Mode to ensure proper fault detection and clearing scheme. Due to significant change in short circuit level of the Microgrid from one mode to another, advanced and adaptive protection schemes shall be used. The Generating Facilities in the Microgrid and all protection devices associated with the Microgrid shall have the capability of applying multiple setting groups that are pre-defined and automatically selected based on the short circuit levels and protection coordination requirements of each Microgrid mode (e.g. both Grid-Connected and Island Mode).
- (v) Effective Grounding for Island Mode: Microgrid shall have dedicated grounding system independent of the Company System ground (that is typically on the Company grid side) to ensure that all areas within the Microgrid boundary are effectively grounded, when operating in Island Mode. The transformer configurations for the Generating Facility shall be reviewed and proper means of grounding for the Island Mode shall be incorporated.
- (vi) Load following capability and Microgrid stability in Island Mode: Generating Facility within a Microgrid shall be able to quickly respond to changes in loads and regulate the voltage and frequency of the island within  $\pm 10\% \Delta V$ ,  $\pm 0.5$  Hz  $\Delta f$ , and shall maintain a maximum of 3 Hz/second rate of change of frequency (ROCOF) in all situations. The criteria are specified in IEEE 1547-2018. The maximum (worst case) expected step load change to meet these conditions for the Island Mode shall be pre-

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determined and agreed upon between the Company and the Microgrid Operator, as part of the design process. The voltage, frequency, and ROCOF regulation criteria are also required during a load restoration process in a black-start mode, following a break-before-make transition from Grid Connected Mode to an Island Mode, for the agreed level of maximum step load change during restoration. Load sectionalizing schemes shall be applied to restore load in multiple steps if the Microgrid Generating Facility cannot meet the voltage and frequency requirements for picking up the entire load in one shot.

- (vii) Unbalance load condition: The Generating Facilities within a Microgrid shall be able to tolerate up to 30% unbalance load level among three phases in Island Mode. The unbalance condition may cause de-rating of certain Generating Facilities.
- (viii) Under Frequency Load Shedding (UFLS): During Island Mode operation, the Microgrid may include UFLS to support Microgrid stability and frequency restoration if there is a possibility of sudden loss of generation or step load change beyond pre-determined values.
- (ix) Black Start: Microgrid may have provisions for black start to initiate Microgrid in Island Mode from de-energized state by starting available Generating Facilities and picking up the load either in different stages or at once depending on load serving capability of Generating Facilities.
- (x) Microgrid Supervisory Control: A Hybrid Microgrid shall be equipped with a Microgrid supervisory control that meets the requirements of IEEE 2030.7 and IEEE 2030.8 standards for Microgrid controller design and testing. The supervisory controller manages the operation of all controllable resources in the Microgrid, and also coordinate the disconnection and reconnection of the Hybrid Microgrid from/to the Company System. Certain automation schemes associated with Microgrid boundary may also be managed and initiated by a Microgrid controller (e.g. reconfiguration of topology and connect/disconnect loads).

d. Certain Specifications for the Hybrid Microgrid Facility.

- (i) The Hybrid Microgrid shall comply with the following:
  - A. Microgrid Operator shall install a \_\_\_\_ kV disconnect switch and all other items for its switching station (relaying, control power transformers, high voltage circuit breaker). Bus connection shall be made to a manually and automatically (via protective relays) operated high-voltage circuit breaker. The high-voltage circuit breaker shall be fitted with bushing style current transformers for metering and relaying. Downstream of the high-voltage circuit breaker, a structure shall be provided for metering transformers. From the high-voltage circuit breaker, another bus connection shall be made to another pole mounted disconnect switch, with surge protection.
  - B. Microgrid Operator shall provide within the Microgrid Operator Interconnection Facilities a separate, fenced area with separate access for Company. Microgrid Operator shall provide all conduits, structures and accessories necessary for Company to install a metering package if needed. Microgrid Operator shall also provide within such area, space for Company to install its communications,

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SCADA, RTU, and certain relaying if necessary for the Interconnection. Microgrid Operator shall also provide AC and DC source lines as specified later by Company. Microgrid Operator shall provide a telephone line for Company-owned meters. Microgrid Operator shall work with Company to determine an acceptable location and size of the fenced-in area. Microgrid Operator shall provide an acceptable demarcation cabinet on its side of the fence where Microgrid Operator and Company wiring will connect/interface.

- C. Microgrid Operator shall ensure that the Microgrid Operator Interconnection Facilities have a lockable cabinet for switching station relaying equipment. Microgrid Operator shall select and install relaying equipment acceptable to Company. At a minimum the relaying equipment will provide over and under frequency (81) negative phase sequence (46), under voltage (27), over voltage (59), ground over voltage (59G), over current functions (50/51) and other protection elements as required by this Exhibit B. Microgrid Operator shall install protective relays that operate a lockout relay, which in turn will trip the main circuit breaker.
- E. Microgrid Operator's equipment also shall provide at a minimum: [NOTE: **ADDITIONAL ITEMS AND DETAILS MAY BE ADDED PRIOR TO EXECUTION OF AGREEMENT UPON COMPLETION OF TECHNICAL REVIEW.**]
  - (i) Interface with Company's RTU to provide telemetry of electrical quantities as identified by the Company;
  - (ii) Interface with Company's RTU to provide status of devices, as identified by the Company;
  - (iii) Interface with Company's RTU to provide control to incrementally raise and lower the voltage target at the point of regulation operating in automatic voltage regulation control. If Company's RTU is unavailable, due to loss of communication link, RTU failure, or other event resulting in loss of the remote control by Company, provision must be made for Microgrid Operator to be able to institute via local controls, within 30 minutes (or such other period as Company accepts in writing) of the verbal directive by the Company System operator, such change in voltage regulation target as directed by the Company System operator; and
- (ii) Interface with Company's RTU to provide active power control to incrementally limit net real power export from the Hybrid Microgrid and to incrementally remove the limit of the net real power export of the Hybrid Microgrid. The incremental size will be determined as part of the technical review taking into account the size of the Hybrid Microgrid and the dynamic system frequency bias.

- e. Maintenance Plan. Microgrid Operator shall maintain Microgrid Operator Interconnection Facilities in accordance with the following maintenance plan:

Distribution line: \_\_\_\_\_



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\_\_\_ kV Facility switching station:  
\_\_\_\_\_

Relay protection equipment: \_\_\_\_\_

Other equipment as identified: \_\_\_\_\_

Microgrid Operator shall furnish to Company a copy of records documenting such maintenance, within thirty (30) calendar days of completion of such maintenance work.

f. Communications and Control Interface.

- (i) The acceptable method(s) of implementing the Hybrid Microgrid's telemetry and control interface ("Communications and Control Interface") requirements will be specified by the Company. The Hybrid Microgrid will require a supervisory control interface to the Company SCADA/EMS system. Company shall review and provide prior written approval of the design for the Communications and Control Interface to ensure compatibility with Company System. If Microgrid Operator materially changes the approved design, such changes will also require Company's review and prior written approval.
  - A. The Microgrid Operator shall provide and maintain in good working order all equipment, necessary to interface the Hybrid Microgrid with the Company System. The Communications and Control Interface shall provide for remote monitoring and control of the real-power output of the Hybrid Microgrid by Company at all times. If the Communications and Control Interface is unavailable, disabled, or otherwise not performing the required capabilities, or if a required protection scheme is unavailable for any reason, including due to loss of communication link or other event resulting in the loss of the remote control by the Company, then the Hybrid Microgrid shall remain in the operating mode present prior to the unavailability of the Communication and Control Interface (i.e., Grid-Connected or Island Mode) until the Communications and Control interface is fully restored, unless Microgrid Operator and Company agree on an alternate means of control. Notwithstanding the foregoing, if Microgrid Operator fails to provide such remote control features (whether temporarily or throughout the term of this Agreement) and fails to remain in its last operating state prior to the unavailability of the Communication and Control Interface, then, notwithstanding any other provision of this Agreement, Company shall have the right to disable the operation of the entire Hybrid Microgrid (and its Generating Facilities) during those periods that such control features are not provided. .
  - B. Microgrid Operator shall not override Company's active power controls without first obtaining specific approval to do so from the Company System operator.
- (ii) The requirements of the Communications and Control Interface may be modified as mutually agreed upon in writing by the Parties.

g. Control System Acceptance Test Procedures.

- (i) Conditions Precedent. The Hybrid Microgrid will be required to complete a Control System Acceptance Test ("CSAT"). The "CSAT" is a test performed on the centralized control system of the Hybrid Microgrid in accordance with the procedures

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set forth in Exhibit E, attached hereto. Each and all of the following conditions precedent must be satisfied prior to the conduct of the CSAT:

- Successful Completion of the acceptance test. The acceptance test is a test conducted by Microgrid Operator and witnessed by Company, within thirty (30) calendar days of completion of all interconnection facilities and in accordance with the criteria and procedures determined by Company and Microgrid Operator as set forth in Schedule II to Exhibit E
  - The Hybrid Microgrid has been successfully energized.
  - All of the Hybrid Microgrid's generators have been fully commissioned.
  - The control system computer has been programmed for normal operations.
  - All equipment that is relied upon for normal operations (including ancillary devices such as capacitors/inductors, energy storage device, statcom, etc.) shall have been commissioned and be operating within normal parameters.
- (ii) Hybrid Microgrid Generators. Unless all of the Hybrid Microgrid's generators are available for the duration of the CSAT, the CSAT will have to be re-run from the beginning unless Microgrid Operator demonstrates to the satisfaction of the Company that the test results attained with less than all of the Hybrid Microgrid's generators are consistent with the results that would have been attained if all of the Hybrid Microgrid's generators had been available for the duration of the test.
- (iii) Procedures. The CSAT will be conducted on business days during normal working hours on a mutually agreed upon schedule. No CSAT will be scheduled during the final 21 calendar days of a calendar year. No later than thirty (30) calendar days prior to conducting the CSAT, Company and Microgrid Operator shall agree on a written protocol setting out the detailed procedure and criteria for passing the CSAT. Schedule III to Exhibit E provides general criteria to be included in the written protocol for the CSAT. Within fifteen (15) business days of completion of the CSAT, Company shall notify Microgrid Operator in writing whether the CSAT(s) has been passed and, if so, the date upon which such CSAT(s) was passed. If any changes have been made to the technical specifications of the Hybrid Microgrid or the design of the Hybrid Microgrid in accordance with this Exhibit B, such changes shall be reflected in an amendment to this Agreement, and the written protocol for the CSAT shall be based on the Hybrid Microgrid as modified. Such amendment shall be executed prior to conducting the CSAT and Company shall have no obligation for any delay in performing the CSAT due to the need to complete and execute such amendment.

## 2. Performance Standards.

- a. Reactive Power Control. Microgrid Operator shall control its reactive power by automatic voltage regulation control. Microgrid Operator shall automatically regulate voltage at a point, the point of regulation, between the Microgrid Operator's generator terminal and the point of interconnection ("POI") to be specified by Company, to within 0.5% of a voltage specified by the Company System operator to the extent allowed by the Hybrid Microgrid reactive power capabilities as defined in this Section 5(b) of this Section. [NOTE: FOR FACILITIES CONNECTED TO THE DISTRIBUTION SYSTEM, THESE REQUIREMENTS MAY BE CHANGED BY COMPANY UPON COMPLETION OF THE TECHNICAL REVIEW.]
- b. Reactive Amount.

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- (i) Microgrid Operator shall install sufficient equipment so that each Generating Facility part of the Hybrid Microgrid will have the ability to deliver or receive, at its terminal, reactive power as illustrated in the **[generator capability]** curve[s] attached to this Agreement by the Microgrid Operator. (Generator Capability Curve(s)). **[NOTE: THE TECHNICAL REVIEW WILL DETERMINE IF ANY ADDITIONAL REACTIVE POWER RESOURCES WILL BE REQUIRED.]**
- (ii) The Hybrid Microgrid shall contain equipment able to continuously and actively control the output of reactive power under automatic voltage regulation control reacting to system or Microgrid voltage fluctuations. The automatic voltage regulation response speed at the point of regulation shall be such that at least 90% of the initial voltage correction needed to reach the voltage control target will be achieved within 1 second following a step change.
- (iii) If the Hybrid Microgrid does not operate in accordance with this Section 2(b), Company may disconnect all or a part of the Hybrid Microgrid from Company System until Microgrid Operator corrects its operation (such as by installing capacitors at Microgrid Operator's expense).

c. Ramp Rates.

The Facility start-up ramp rate shall be \_\_\_\_ MW/min. The Facility shutdown ramp rate shall be \_\_\_\_ MW/min. [Ramp rates will be set equal to (Total Rated Capacity of the Microgrid / 3 MW) x 2 MW/min.]

Ramp rates shall be calculated in accordance with Schedule I attached to Exhibit E.

d. Undervoltage Ride-Through. See Rule 14H

e. Over Voltage Ride-Through. See Rule 14H.

f. Underfrequency ride-through. See Rule 14H.

g. Overfrequency ride-through. See Rule 14H.

h. Voltage Flicker.

Any voltage flicker on the Company System caused by the Hybrid Microgrid shall not exceed the limits stated in IEEE Standard 1453-2015, or latest version "Recommended Practice – Adoption of IEC 61000-4-15:2010, Electromagnetic compatibility (EMC) – Testing and measurement techniques – Flickermeter – Functional and design specifications".

i. Harmonics.

Harmonic distortion at the POI caused by the Facility shall not exceed the limits stated in IEEE Standard 519-2014, or latest version "Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems". Microgrid Operator shall be responsible for the installation of any necessary controls or hardware to limit the voltage and current harmonics generated from the Facility to defined levels.

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j. Frequency Response.

The Hybrid Microgrid shall provide a primary frequency response with a frequency droop characteristic reacting to system frequency fluctuations at the POI in both the overfrequency and underfrequency directions except to the extent such response is not operationally possible because of the level of available solar resource.

- (i) The Hybrid Microgrid frequency response control shall adjust, without intentional delay and without regard to the ramp rate limits in this Section 2(c), the Hybrid Microgrid's net real power export when system frequency is not 60 Hz based on frequency deadband and frequency droop settings specified by the Company.
- (ii) The frequency deadband shall be settable in the range from +/-0.01 Hz to +/-0.10 Hz and the frequency droop shall be settable in the range of 0.1% to 10%.
- (iii) The Hybrid Microgrid frequency response control shall be in continuous operation when the Hybrid Microgrid is exporting energy to the Company unless directed otherwise by the Company.

k. Hybrid Microgrid Protection and Maintenance.

- (i) The Microgrid Operator is solely responsible for securing and providing adequate protection for the Hybrid Microgrid. The Microgrid Operator shall also perform vegetation management and other routine maintenance in accordance with manufacturer recommendations and intervals for purposes of maintaining the Hybrid Microgrid in good working order. Microgrid Operator shall comply with all commercially reasonable requests of Company to update security and/or maintenance if required to prevent security breaches.
- (ii) By the first day of each calendar quarter following the Commercial Operations Date, Microgrid Operator shall provide the Company in writing a projection of maintenance outages for the next calendar quarter. If, during the term of this Agreement, the Hybrid Microgrid or any of the individual components of the Hybrid Microgrid should be damaged or destroyed, or taken out of service for unscheduled maintenance, the Microgrid Operator shall provide the Company as soon as reasonably practicable following or in anticipation of such event, and promptly repair or replace the damaged or destroyed equipment at the Microgrid Operator's sole expense. Microgrid Operation shall complete the necessary repair, replacement or maintenance to Company's reasonable satisfaction, including necessary testing of controls, within ninety (90) calendar days.

l. Information Security Requirements.

- (i) Safety and Security Procedures. The Microgrid Operator shall maintain and enforce safety and security procedures to safeguard: all Company Confidential Information; all generation and telemetry data provided by the Microgrid Operator to the Company; in Microgrid Operator's possession, including Company Confidential Information that Microgrid Operator provides to any contractors, consultants, and other third parties retained by Microgrid Operator to assist Microgrid Operator to perform under this Agreement in the course of Microgrid Operator's performance pursuant to this



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Agreement. Microgrid Operator warrants that it shall (A) NIST industry best practices for physical and systems security measures to prevent destruction, loss, alteration or unauthorized access to, use of, or tampering with, the Hybrid Microgrid, Microgrid Operator software, and Company Confidential Information, including to protect the confidentiality and integrity of any of Company Confidential Information, operation of Company System, and to prevent viruses and similar destructive code from being placed in any software or data provided to Company, on Microgrid Operator's or Company's website, or in Microgrid Operator's or Company's programming; and (B) use NIST industry best practices physical security and precautionary measures to prevent unauthorized access or damage to the Hybrid Microgrid, including to protect the confidentiality and integrity of any of Company's Confidential Information as well as the operation of Company System. Microgrid Operator shall, at a minimum, protect Company's Confidential Information and provide the standard of care required by NIST cybersecurity requirements, and the same measures it uses to protect its own confidential information.

- (ii) Exception to Certain NIST Requirements. Company, at its sole and absolute discretion, may waive the requirements concerning NIST industry best practices as set forth in subsection (i)(A) and (B) above provided that Microgrid Operator implements alternate measures that Company deems acceptable and not inconsistent with Company's standards with respect to (A) physical and systems security measures to prevent destruction, loss, alteration or unauthorized access to, use of, or tampering with, the Hybrid Microgrid, software and Company's Confidential Information, including to protect the confidentiality and integrity of any of Company's Confidential Information, operation of Company System, and to prevent viruses and similar destructive code from being placed in any software provided to Company, on Microgrid Operator's or Company's website, or in Microgrid Operator's or Company's programming; and (B) physical security and precautionary measures to prevent unauthorized access or damage to the Hybrid Microgrid, including to protect the confidentiality and integrity of any of Company's Confidential Information as well as the operation of Company System.
- (iii) Security Breach. In the event that Microgrid Operator discovers or is notified of a Security Breach, Microgrid Operator shall immediately (i) notify Company of such Security Breach, whether or not such breach has compromised any of Company Confidential information, (ii) investigate and remediate the effects of the Security Breach, (iii) cooperate with Company with respect to any such Security Breach and provide necessary information on the Security Breach as requested by Company; and (iv) comply with all applicable privacy and data protection laws, including any notification obligations. Any remediation of any Security Breach will be at Microgrid Operator's sole expense.

m. Microgrid Operator Interconnection Facilities.

- (i) The Microgrid Operator shall furnish, install, operate and maintain Microgrid Operator Interconnection Facilities. Such facilities shall be accessible at all times to authorized Company personnel.
- (ii) The Microgrid Operator shall comply with the Company's Interconnection Standards.
- (iii) Single-line diagram of the Hybrid Microgrid; relay list, trip scheme and settings of the Hybrid Microgrid; Hybrid Microgrid equipment list; and three-line diagram, which

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identify the circuit breakers, relays, switches, synchronizing equipment, monitoring equipment, and control and protective devices and schemes, shall, after having obtained prior written consent from the Company, be attached to Exhibit A and made a part hereof at the time the Agreement is signed. The single-line diagram shall include pertinent information regarding operation, protection, synchronizing, control, monitoring, and alarm requirements. The single-line diagram and three-line diagram shall expressly identify the POI of the Hybrid Microgrid to the Company System. The relay list, trip scheme and settings shall include all protection, synchronizing and auxiliary relays that are required to operate the Hybrid Microgrid in a safe and reliable manner. The three-line diagram shall show potential transformer and current transformer ratios, and details of the Hybrid Microgrid's configuration, including relays, meters, and test switches.

- (iv) Microgrid Operator shall provide final as-built drawings of the Microgrid Operator Interconnection Facilities within thirty (30) calendar days of the successful completion of the initial verification test. Within thirty (30) calendar days of Company's receipt of the proposed as-built drawings, Company shall provide Microgrid Operator with either (A) its comments on the proposed as-built drawings or (B) notice of acceptance of the proposed as-built drawings as final as-built drawings. If Company provides comments on the proposed as-built drawings, Microgrid Operator shall incorporate such comments into a final set of as-built drawings and provide such final as-built drawings to Company within twenty (20) calendar days of Microgrid Operator's receipt of Company's comments.
- n. Approval of Design Drawings. The single-line diagram, relay list, trip scheme and settings of the Hybrid Microgrid, and three-line diagram shall be approved by a Professional Electrical Engineer registered in the State of Hawaii prior to being submitted to the Company. Such approval shall be indicated by the engineer's professional seal on all drawings and documents.
- o. [Reserved]
- p. Schedule. The Company and the Microgrid Operator have agreed upon on a schedule for the progression of the Hybrid Microgrid's construction (e.g., construction start date, Commercial Operations Date, etc.) and each Party has a copy of such schedule and agrees to use commercially reasonable efforts to adhere to such schedule.

### 3. Verification Testing.

- a. Upon initial Grid-Connected operation of the Hybrid Microgrid, or any time either (i) interface hardware or software is changed, or (ii) the Company observes that the Microgrid Operator is not in compliance with the operational and performance requirements specified in the Company's Rule 14H and/or this Agreement, a verification test shall be performed. Such verification test shall include testing of the telemetry and control interface which allows the Company to remotely measure, monitor, evaluate and verify technical compliance, Hybrid Microgrid performance, and power quality and, if necessary, control the Hybrid Microgrid. A licensed professional engineer or otherwise qualified individual shall perform verification testing in accordance with the manufacturer's published test procedure. Qualified individuals include professional engineers, factory trained and certified technicians, and licensed electricians with experience in testing protective equipment. The Company reserves the right to witness verification testing or require written certification that the testing was performed.
- b. Verification testing shall also be performed every four years. The Company reserves the right to perform, at its expense, additional verification testing. All verification tests prescribed by the manufacturer shall be performed. If wires must be removed to perform certain tests, each wire

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and each terminal shall be clearly and permanently marked. The Microgrid Operator shall maintain verification test reports for inspection by the Company.

- c. Any Hybrid Microgrid that depends upon a battery to operate any breakers, switches, or any other equipment critical to the operation of the Microgrid shall be checked once per month for proper voltage. Once every four (4) years the battery shall either be replaced or have a discharge test performed. The Microgrid Operator shall maintain a log of these operations for inspection by the Company.
- d. Tests and battery replacements as specified in this Section 3 shall be at the Microgrid Operator's expense.
- e. Hybrid Microgrids shall also be subject to an acceptance test and a control system acceptance test prior to initial Grid-Connected Mode operation. The procedures for such tests will be provided to Microgrid Operator by the Company prior to executing this Agreement.

**4. Inspection of the Hybrid Microgrid.**

- a. The Company may, in its discretion and upon reasonable notice not to be less than 24 hours (unless otherwise agreed to by the Company and the Microgrid Operator), observe the construction of the Hybrid Microgrid (including but not limited to relay settings and trip schemes), Generating Facilities within the Hybrid Microgrid and any related equipment to be installed therein.
- b. A Hybrid Microgrid Smaller than 1 MW: Within fourteen calendar days after receiving a written request from the Microgrid Operator to begin operating as a Hybrid Microgrid, the Company may inspect the Hybrid Microgrid (including but not limited to relay settings and trip schemes) and observe the performance of the verification testing. The Company may accept or reject the request to operate as a Hybrid Microgrid based upon the inspection or verification test results.
- c. A Hybrid Microgrid 1MW or Larger: The Company and Microgrid Operator will work together to schedule the acceptance test and control system acceptance test. The Microgrid Operator shall provide notice forty-five (45) calendar days in advance of its readiness to begin the acceptance test. The Company may accept or reject the request to begin producing electric energy based upon the results of the acceptance test and control system acceptance test.
- d. With regards to facilities smaller than 1 MW only, if the Company does not perform an inspection of the Hybrid Microgrid (including but not limited to relay settings and trip schemes) and observe the performance of verification testing within the fourteen-day period, the Microgrid Operator may begin to produce energy after certifying to the Company that the Hybrid Microgrid has been tested in accordance with the verification testing requirements and has successfully completed such tests. After receiving the certification, the Company may conduct an inspection of the Hybrid Microgrid (including but not limited to relay settings and trip schemes) and make reasonable inquiries of the Microgrid Operator, but only for purposes of determining whether the verification tests were properly performed. The Microgrid Operator shall not be required to perform the verification tests a second time, unless irregularities appear in the verification test report or there are other objective indications that the tests were not properly performed in the first instance.
- e. The Company may, in its discretion and upon reasonable notice not to be less than 24 hours (unless an apparent safety or emergency situation exists which requires immediate inspection to resolve a known or suspected problem), inspect the Hybrid Microgrid (including but not

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limited to relay settings and trip schemes) and its operations (including but not limited to the operation of control, synchronizing, and protection schemes) after the Hybrid Microgrid commences operations.

**5. Operating Records and Procedures.**

- a. The Company may require periodic reviews of the maintenance records, and available operating procedures and policies of the Hybrid Microgrid. Microgrid Operator shall maintain adequate records of all maintenance services, any upgrade or changes applied to the Microgrid Facility throughout the operation for Company audit and to demonstrate compliance of all equipment covered by the scope of codes and standards.
- b. Logs shall be kept by the Microgrid Operator for information on unit availability including reasons for planned and forced outages; circuit breaker trip operations, relay operations, including target initiation and other unusual events. The Company shall have the right to review these logs, especially in analyzing system disturbance, in Grid-Connected and/or Island-Mode. Microgrid Operator shall maintain such records for a period of not less than six (6) years.

**6. Changes to the Hybrid Microgrid, Operating Records, and Operating Procedures.**

- a. The Microgrid Operator agrees that no material changes or additions to the Hybrid Microgrid as reflected in the single-line diagram, relay list, trip scheme, setting, and controller settings of the Hybrid Microgrid, Hybrid Microgrid equipment list, and three-line diagram shall be made without having obtained prior written consent from the Company, which consent shall not be unreasonably withheld.
- b. As a result of the observations and inspections of the Hybrid Microgrid (including but not limited to relay list, trip scheme and settings) and the performance of the verification tests, if any changes in or additions to the Hybrid Microgrid, operating records, and operating procedures and policies are required by the Company, the Company shall specify such changes or additions to the Microgrid Operator in writing, and the Microgrid Operator shall, as soon as practicable, but in no event later than thirty (30) calendar days after receipt of such changes or additions, respond in writing, either noting agreement and action to be taken or reasons for disagreement. If the Microgrid Operator disagrees with the Company, it shall note alternatives it will take to accomplish the same intent, or provide the Company with a reasonable explanation as to why no action is required by good engineering practice.

**7. Hybrid Microgrid Equipment List.**

The Hybrid Microgrid shall include the following equipment:

[Note: Specific items to be attached as necessary. The Hybrid Microgrid equipment list, together with the single-line diagram, relay list and trip scheme, and three-line diagram, should be attached to this Exhibit B.]

- 8. All Requirements, Standards and Covenants are Material.** All of the performance standards, interconnection requirements, testing standards and other covenants of this Exhibit B are material to the safe and efficient operation of the Hybrid Microgrid. Any failure by Microgrid Operator to comply with such requirements, standards and/or covenants shall be deemed a material breach of this Agreement if, after written notice of such failure is provided by Company, Microgrid Operator is unable to remedy or cure such failure to the reasonable satisfaction of Company within ninety (90) days of such notification.



**EXHIBIT C**  
**COMPANY INTERCONNECTION FACILITIES**

(To be filled out by Company)

**1. Description of Company Interconnection Facilities**

The Company will purchase (at Microgrid Operator's sole cost and expense), construct, own, operate and maintain the interconnection facilities required to Interconnect the Company System with the Hybrid Microgrid at \_\_\_\_\_ volts, up to the Point of Common Coupling, and those interconnection facilities required to establish the boundary of Hybrid Microgrid.

The description of the Company Interconnection Facilities, for which the Microgrid Operator agrees to pay, in advance, include:

[Need to specify the interconnection facilities. If no interconnection facilities, state "None".]

**2. Microgrid Operator Payment to Company for Company Interconnection Facilities. Review of Hybrid Microgrid, and Review of Verification Testing**

The Microgrid Operator shall pay to the Company Total Estimated Interconnection Cost. The following summarizes the Total Estimated Interconnection Cost:

Description	Estimated Cost (\$) [If no cost, state "None".]
<b>Total Estimated Interconnection Cost (\$):</b>	

The Total Estimated Interconnection Cost, which, except as otherwise provided herein, is non-refundable, shall be paid by the Microgrid Operator fourteen (14) calendar days after receipt of an invoice from the Company, which shall be provided not less than thirty (30) calendar days prior to start of procurement of the Company Interconnection Facilities.

Within thirty (30) calendar days of receipt of an invoice, which shall be provided within fourteen (14) calendar days of the final accounting, which shall take place within sixty (60) calendar days of completion of construction of the Company Interconnection Facilities, the Microgrid Operator shall remit to the Company the difference between the Total Estimated Interconnection Cost paid to date and the Total Actual Interconnection Cost. If in fact the Total Actual Interconnection Cost is less than the payments received by the Company as the Total Estimated Interconnection Cost, the Company shall repay the difference to the Microgrid Operator within thirty (30) calendar days of the final accounting.

If the Interconnection Agreement is terminated prior to the Microgrid Operator's payment for the Total Actual Interconnection Cost (or the portion of this cost which has been incurred) or prior to the Company's repayment of the over collected amount of the Total Estimated Interconnection Cost (or the portion of this cost which has been paid), such payments shall be made by the Microgrid Operator or Company, as appropriate. If payment is due to the Company, the Microgrid Operator shall pay within thirty (30) calendar days of receipt of an invoice, which shall be provided within fourteen (14) calendar days of the final accounting, which shall take place within sixty (60) calendar days of the date the

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Agreement is terminated. If payment is due to the Microgrid Operator, the Company shall pay within thirty (30) calendar days of the final accounting.

All Company Interconnection Facilities shall be the property of the Company.

**3. Operation, Maintenance and Testing Costs**

The Company will bill the Microgrid Operator monthly and the Microgrid Operator will, within 30 calendar days after the billing date, reimburse the Company for any costs incurred in operating, maintaining, repairing/replacing or testing the Company Interconnection Facilities. The Company's costs will be determined on the basis of outside service costs, direct labor costs, material costs, transportation costs, applicable overheads at time incurred and applicable taxes. Applicable overheads will include such costs as vacation, payroll taxes, non-productive wages, supervision, tools expense, employee benefits, engineering administration, corporate administration, and materials handling. Applicable taxes will include the Public Service Company Tax, and Public Utility Fee.

**EXHIBIT D**

**FORM OF LETTER OF CREDIT**

**[Bank Letterhead]**

**[Date]**

**Beneficiary: [Hawaiian Electric Company, HELCO or MECO, as appropriate]  
[Address]**

**[Bank's Name]  
[Bank's Address]**

**Re: [Irrevocable Standby Letter of Credit Number]**

Ladies and Gentlemen:

We hereby establish, in your favor, our irrevocable standby Letter of Credit Number \_\_\_\_\_ (this "Letter of Credit") for the account of **[Applicant's Name]** and **[Applicant's Address]** in the initial amount of \$\_\_\_\_\_ **[dollar value]** and authorize you, Hawaiian Electric Company **[HELCO or MECO, as appropriate]** ("Beneficiary"), to draw at sight on **[Bank's Name]**.

Subject to the terms and conditions hereof, this Letter of Credit secures **[Project Entity Name]**'s certain obligations to Beneficiary under the Hybrid Microgrid Interconnection Agreement dated as of \_\_\_\_\_ between **[Project Entity Name]** and Beneficiary.

This Letter of Credit is issued with respect to the following obligations:\_\_\_\_\_.

This Letter of Credit may be drawn upon under the terms and conditions set forth herein.

Partial draws of this Letter of Credit are permitted. This Letter of Credit is not transferable. Drafts on us at sight shall be accompanied by a Beneficiary's signed statement signed by a representative of Beneficiary substantially as follows:

The undersigned hereby certifies that (i) I am duly authorized to execute this document on behalf of Hawaiian Electric Company **[HELCO or MECO, as appropriate]**, and [(ii) the amount of the draft accompanying this certification is due and owing to Hawaiian Electric Company **[or HELCO or MECO, as appropriate]** under the terms of the Interconnection Agreement dated as of \_\_\_\_\_, between \_\_\_\_\_, and Hawaiian Electric Company **[or HELCO or MECO, as appropriate]**] [(ii) the amount of the draft accompanying this certification is due and owing to Hawaiian Electric Company **[or HELCO or MECO, as appropriate]** under the terms of the Interconnection Agreement, [(ii) the Letter of Credit will expire in less than thirty (30) calendar days, it has not been replaced or extended and collateral is still required under Section \_\_\_\_\_ of the Interconnection Agreement\*].

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\* For draw relating to lapse of Letter of Credit while credit support is still required pursuant to the Power Purchase Agreement.

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Such drafts must bear the clause "Drawn under [Bank's Name and Letter of Credit Number \_\_\_\_\_ and date of Letter of Credit.]"

All demands for payment shall be made by presentation of originals or copies of documents, or by facsimile transmission of documents to [Bank Fax Number] or other such number as specified from time to time by the bank. If presentation is made by facsimile transmission, you may contact us at [Bank Phone Number] to confirm our receipt of the transmission. Your failure to seek such a telephone confirmation does not affect our obligation to honor such a presentation. If presented by facsimile, original documents are not required.

This letter of credit shall expire one year from the date hereof. Notwithstanding the foregoing, however, this letter of credit shall be automatically extended (without amendment of any other term and without the need for any action on the part of the undersigned or Beneficiary) for one year from the initial expiration date and each future expiration date unless we notify you in writing at least thirty (30) calendar days prior to any such expiration date that this letter of credit will not be so extended. Any such notice shall be delivered by registered or certified mail, or by FedEx, both to [revise for HELCO or MECO, as appropriate]:

Director, CER Programs  
Hawaiian Electric Company, Inc.  
220 South King Street, 12<sup>th</sup> Floor  
Honolulu, Hawai'i 96813

and to

SVP & Chief Financial Officer  
Hawaiian Electric Company, Inc.  
1001 Bishop Street, 25<sup>th</sup> Floor  
Honolulu, Hawai'i 96813

We hereby agree with drawers that drafts and documents as specified above will be duly honored upon presentation to [Bank's Name] and [Bank's Address] if presented on or before the then-current expiration date hereof.

Payment of any amount under this Letter of Credit by [Bank] shall be made as the Beneficiary shall instruct on the next Business Day after the date the [Bank] receives all documentation required hereunder, in immediately available funds on such date. As used in this Letter of Credit, the term "Business Day" shall mean any day other than a Saturday or Sunday or any other day on which banks in the State of Hawai'i are authorized or required by law to be closed.

Unless otherwise expressly stated herein, this irrevocable standby letter of credit is issued subject to the rules of the International Standby Practices, International Chamber of Commerce publication no. 590 ("ISP98").

[Bank's Name]:

By: \_\_\_\_\_  
[Authorized Signature]

Sheet No. 49.3-AJ  
Effective July 11, 2018

**EXHIBIT E**

**METHODS AND FORMULAS FOR MEASURING PERFORMANCE STANDARDS,  
ACCEPTANCE TEST GENERAL CRITERIA,  
CONTROL SYSTEM ACCEPTANCE TEST CRITERIA**

**[SCHEDULE I WILL BE REVISED TO REFLECT  
THE RESULTS OF TECHNICAL REVIEW]**

**SCHEDULE I TO EXHIBIT E  
METHODS AND FORMULAS FOR MEASURING PERFORMANCE STANDARDS**

1. Performance Standards as defined below shall be used, in part, to govern actions by Company to limit the actual power output of the Hybrid Microgrid or its Generating Facilities for purposes of maintaining power quality on Company System. Specific standards are defined for:
  - Ramp Rate (RR)
2. Formulas for measuring the performance standards are presented below, and assume that the power fluctuations will be monitored on the Company's SCADA and EMS systems. These formulas are based on the periodicity at which analog data is retrieved from the RTU. This periodicity is called the "scan rate". Company presently uses a two-second analog scan rate. The formulas below are based on the two-second scans. The two-second scan rate, characteristics of transducers and RTU reporting, and SCADA method of calculation, were considered and included in the proposed values for the performance standards.

**3. Ramp Rate Calculation:**

$$RR = MW_s - MW_{s-30}$$

Where:

$RR$  = Ramp Rate, may be calculated once every scan

$MW_{s-30}$  = The instantaneous MW analog value 30 scans (60 seconds) prior the present scan

$MW_s$  = The instantaneous MW analog value for the present scan



SCHEDULE II  
ACCEPTANCE TEST GENERAL CRITERIA

**[SCHEDULE II WILL NEED TO BE MODIFIED  
BASED ON THE TYPE AND DESIGN OF THE FACILITY]**

Upon final completion of Company review of the Hybrid Microgrid's drawings, final test criteria and procedures shall be agreed upon by Company and Microgrid Operator no later than thirty (30) calendar days prior to conducting the acceptance test in accordance with the Agreement. The acceptance test may include the following:

1. Interconnection:

- (a) Based on manufacturer's specification, test the local operation of the Hybrid Microgrid's [REDACTED] kV breakers, which connect the Hybrid Microgrid to the Company System – must open and close locally using the local controls. Test and ensure that the status shown on the energy management system (EMS) is the same as the actual physical status in the field.
- (b) Remotely test the operation of the Hybrid Microgrid's [REDACTED] kV breakers which connect the Hybrid Microgrid to the Company System – must open and close remotely from Company's EMS. Test and ensure that the status shown on the EMS is the same as the actual physical status in the field.
- (c) Relay test engineers to connect equipment and simulate certain inputs to test and ensure that the protection schemes such as any under/over frequency and under/over voltage protection or the direct transfer trip operate as designed. (For example, a fault condition may be simulated to confirm that the breaker opens to sufficiently clear the fault. Additional scenarios may be tested and would be outlined in the final test criteria and procedures.) Microgrid Operator to also test the synchronizing mechanisms to which the Hybrid Microgrid would be synchronizing and closing into the Company System to ensure correct operation. Other relaying also to be tested as specified in the protection review of the IRS and on the single line diagram for the Hybrid Microgrid.
- (d) All [REDACTED] kV breaker disconnects and other high voltage switches will be inspected to ensure they are properly aligned and operated manually or automatically (if designed).
- (e) Switching station inspections – The switching station may be inspected to test and ensure that the equipment that Microgrid Operator has installed is installed and operating correctly based upon agreed-to design. Wiring may be field verified on a sample basis against the wiring diagrams to ensure that the installed equipment is wired properly. The grounding mat at the switching station may be tested to make sure there is adequate grounding of equipment.
- (f) Communication testing – communication system testing to occur to ensure correct operation. Detailed scope of testing will be agreed by Company and Microgrid Operator to reflect installed systems and communication paths to tie the Hybrid Microgrid to the Company's communications system.

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- (g) Various contingency scenarios to be tested to ensure adequate operation, including testing contingencies such as loss of communications, and fault simulations to ensure that the Hybrid Microgrid's    kV breakers open as they are designed to open. (Back up relay testing)
- 2. Witness Hybrid Microgrid protection scheme testing in Grid-Connected and Island Mode:
  - (a) Company may have a representative on-site when Microgrid Operator performs any testing dealing with Microgrid Operator's protection schemes such as any under/over voltage or under/over frequency protection schemes to ensure they meet the performance requirements of this Agreement and the IRS.
- 3. Telephone Communication in Grid-Connected and Island Mode:
  - (a) Test to confirm Company has a direct line to the Hybrid Microgrid control room at all times and that it is programmed correctly.
  - (b) Test to confirm that the Microgrid Operators can sufficiently reach Company System operator.
- 4. Witness Hybrid Microgrid operation in Grid-Connected and Island Mode:
  - (a) Company may have a representative on-site when Microgrid Operator performs any testing dealing with Microgrid Operator's operation in Grid-Connected and Island-Mode to ensure the performance requirements of this Agreement and the IRS are met.
  - (b) Witness performance testing of Hybrid-Microgrid in Island Mode to ensure all Participants within the Hybrid Microgrid receive the same quality of power as from the Company.
- 5. Witness Hybrid Microgrid Transitional Sequences:
  - (a) Company may have a representative on-site when Microgrid Operator performs transition to Island-Mode to according to the predefined approach (seamless or break-before-make) to ensure the Hybrid-Microgrid successfully transitions to Island Mode.
  - (b) Witness resynchronization of the Hybrid-Microgrid to the main grid and return to Grid-Connected Mode as designed, while maintaining appropriate power quality requirements.

If agreed in writing, some requirements, may be postponed to the CSAT.



SCHEDULE III  
CONTROL SYSTEM ACCEPTANCE TEST CRITERIA

**[SCHEDULE III WILL BE REVISED TO REFLECT  
THE RESULTS OF TECHNICAL REVIEW]**

Final test criteria and procedures shall be agreed upon by Company and Microgrid Operator no later than thirty (30) calendar days prior to conducting the CSAT in accordance with good engineering and operating practices and with the terms of this Agreement. The RTU/EMS points list is necessary for the effective operation of the Company System and will be tested during the Control System acceptance test.

The CSAT is comprised of two parts, a set of onsite (at Hybrid Microgrid) specific tests and a monitoring performance test. These tests may include the following:

On-site Tests in Grid-Connected and Island Mode as applicable:

1. Telemetry and control test to verify the status and analog telemetry, and if the remote controls between the Company and the Hybrid Microgrid are working properly end-to-end.
2. Disconnect and Island Mode test to verify if the Hybrid Microgrid's controls and the Communications and Control Interface with the Company are working properly. The Test is generally conducted by the Microgrid Operator and witnessed by the Company.
3. Control test for voltage regulation to verify the Hybrid Microgrid can properly perform automatic voltage regulation as defined in this Agreement. Test is generally conducted by making small adjustments of the voltage setpoint and verifying by observation that the Hybrid Microgrid regulates the voltage at the point of regulation to the setpoint by delivering/receiving reactive power to/from the Company System to maintain the applicable setpoint according to the reactive power control and the reactive amount requirements of Section 2 of Exhibit B to the Interconnection Agreement.
4. Frequency regulation control test to verify the Hybrid Microgrid provides a frequency droop response as defined in this Agreement. Test is generally conducted by making adjustments of the frequency reference setting and verifying by observation that the Hybrid Microgrid responds per droop and deadband settings.
5. Loss-of-communication Test to verify the Hybrid Microgrid will properly ramp down or ramp up such that the power export or import, respectively, across the PCC to the Company is zero kW (+/-1% of the Total Rated Capacity) at the ramp rate defined in accordance with Exhibit B. Monitoring Test:
  - a) The monitoring test requires the Hybrid Microgrid to operate as it would in normal operations in Grid-Connected and Island Mode.
  - b) To ensure useful and valid test data is collected, the monitoring test shall end when one of the following criteria is met:
    - A. The Hybrid Microgrid continuously operate in Island Mode, for at least [ ] hours in any continuous 24-hour CSAT period.
  - c) At the end of the test, an evaluation period is selected based on the criteria that triggered the end of the test.

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Transmittal Letter dated XX

- d) The performance of the Hybrid Microgrid during the period of a successfully completed monitoring test is evaluated to verify the performance meets the requirements of this Agreement, as specified in Exhibit B. The Hybrid Microgrid is considered to have complied with a requirement if the Hybrid Microgrid was compliant with the requirement at least 99.0% of the time during the evaluation period and the Hybrid Microgrid does not grossly violate the requirement when the Hybrid Microgrid was in violation. The Parties understand and agree that these compliance conditions are limited only to determining whether the Hybrid Microgrid successfully completes the CSAT monitoring test and are not for use in determining compliance during Commercial Operations, shall not be considered a waiver of any of the performance standards of Microgrid Operator, all of which are hereby reserved, and shall not alleviate Microgrid Operator from any of its obligations under the Agreement.

**EXHIBIT F****HYBRID MICROGRID OPERATING PARAMETERS**

**[EXHIBIT F MAY BE REVISED TO REFLECT  
THE RESULTS OF TECHNICAL REVIEW AND/OR  
FINAL INTERCONNECTION REQUIREMENTS STUDY]**

- 1. INITIAL HYBRID MICROGRID OPERATING PARAMETERS** The following Hybrid Microgrid operating parameters, including disconnection/reconnection from/to the Company System, testing of Hybrid Microgrid and/or Generating Facilities, and repairs, are initial baseline requirements and may be expanded, amended, and/or modified following technical review and/or the completion of the final Interconnection Requirements Study for the Hybrid Microgrid.
- 2. HYBRID MICROGRID DISCONNECTION/RECONNECTION FROM/TO COMPANY SYSTEM**
  - a. Disconnection of the Hybrid Microgrid from Company System:
    - i. Scheduled Island Mode. A Scheduled Island Mode Operation can be initiated through a manual action by the Microgrid Operator or the Company or other operating dispatch means (e.g., energy management system) that trigger the transition from operating in Grid-Connected Mode to (i.e., in parallel and synchronized with the Company System) to operating in Island Mode.
      1. Scheduled Island Mode Operation is normally initiated to test Island Mode Operation, or as a pre-emptive action ahead of impending weather events or Emergency Events.
      2. At the request of the Microgrid Operator, the Microgrid Operator shall coordinate with the Company to facilitate switching activities. Company has final approval to do so.
      3. At the request of the Company, the Company to provide 30-day notice for planned outages.
    - ii. Unscheduled Island Mode. Unscheduled Island Mode Operation is initiated autonomously in response to abnormal conditions present on the Company System. An automatic action will trigger the Microgrid to transition from Grid-Connected Mode to Island Mode.
      1. The Hybrid Microgrid may disconnect from the Company System and transition from Grid-Connected Mode to Island Mode as measured at the PCC, (1) under any of the Trip or Cease to Energize conditions as required by Exhibit B (i.e., as described in the Ride-Through requirements) or (2) where anti-islanding conditions are present where the Hybrid Microgrid or its Generating Facilities are required to Cease to Energize and Trip within two seconds where an island may be detected on the Company System. In either of these cases, the Hybrid Microgrid may transition to Island Mode provided that the Microgrid does not energize any part of the Company System that is outside the defined electrical boundaries of the Microgrid.
      2. Emergency repairs by Company that require Island Mode of Microgrid.
    - iii. Transition from Grid-Connected Mode to Island Mode. If the Microgrid transitions from Grid-Connected Mode to Island Mode while the Company System is operating within the Continuous Operating region defined in the Ride-Through requirements described in Exhibit B, the act of transitioning shall not cause step or ramp changes in the voltage measured at the PCC exceeding 5% of nominal and exceeding 5% per second averaged over a period of one second. This Frequency Ride-Through requirement (regardless of whether the Company System has a disturbance) also ensures that the act of transitioning does not cause a

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frequency disturbance on the Company System. These limits also apply to frequent switching of capacitors, frequent tripping or misoperation of the Hybrid Microgrid and its Generating Facilities, or frequent energization of transformers.

1. During a Scheduled Island Mode event, the Microgrid additionally, shall ramp down or ramp up such that the power export or import, respectively, across the PCC to the Company is zero kW (+/-1% of the Total Rated Capacity) at the ramp rate defined in accordance with Exhibit B.
- iv. Company shall be allowed to trip the Hybrid Microgrid and/or its Generating Facilities at any time.
- v. Company shall be granted methods of blocking control of isolating device(s) at PCC for preventing un-expected Microgrid re-connection.
- b. Re-connection of a Hybrid Microgrid to Company System:
  - i. Decision to re-connect subsequent to a Scheduled Island Mode:
    1. Microgrid Operator shall obtain permission from the Company for re-connecting to the Company System and coordinate the process of synchronization and re-connection.
  - ii. Decision to re-connect subsequent to an Unscheduled/ Emergency Island Mode
    1. Microgrid Operator shall confirm the Company System is at stable operating conditions by measuring and qualifying the voltages and power frequency of the system at PCC for a period of 5 minutes (re-connect delay), consistent with the Return to Service requirements pursuant to Rule 14H, prior to informing and coordinating with the Company for initiating the re-connection process. The re-connect delay shall be adjustable in the range of 30 seconds to 60 minutes.
  - iii. Method of synchronization and re-connect:
    1. The designated switch at PCC (means of Microgrid isolation) shall be equipped with a sync-check relay
    2. Microgrid Operator has to determine the operating (real time) voltage, frequency, and phase angle of the voltage waveform on the Company side of the PCC and drive the Microgrid Generating Facilities to match those values as close as technically possible to achieve synchronization criteria (based on voltage difference, frequency difference, and phase angle difference) prescribed in the Interconnection Agreement. The Microgrid Operator may choose to set the frequency slightly lower than the Company power frequency (e.g. 0.1 Hz lower) to ensure a point of intersection between the instantaneous values of voltage waveforms on each side of the PCC can be achieved.
    3. Following synchronization methods can be utilized:
      - a. Active synchronization – In this method Microgrid voltage and frequency are controlled and maintained to tightly align with the Company System voltage and frequency (based on Synchronization criteria in the Interconnection Agreement) and then switch at PCC is closed.
      - b. Passive synchronization – In this method, no measure is taken to closely align the voltage and frequency at both sides of PCC. This method solely relies on creating an intersection point where all conditions are met and use of a sync-check relay at PCC to verify condition and close the PCC switch. The closing time of the PCC switch shall be less than 8 cycles to avoid out-of sync closing once a close command is issued by the sync-check relay.
      - c. Open Transition — this method is not preferred, since it exposes Participant to additional momentary outage, but it may be considered if there is agreement among Participants and the Microgrid Operator. The

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method involves de-energizing all Generating Facilities in the Hybrid Microgrid, prior to closing the PCC switch. Once the Microgrid is re-connected and Participants are restored, the Generating Facility can then be restarted as directed by the Company.

iv. Post re-connection:

1. The Microgrid re-connection shall not create voltage change at PCC more than 3% in any condition.
- c. The Company may disable or disconnect the Hybrid Microgrid for failure to comply with the parameters stated in this Exhibit F (Hybrid Microgrid Operating Parameters) pursuant to Section 11, Continuity of Service and Section 12, Personnel and System Safety of this Interconnection Agreement.

### 3. TESTING OF HYBRID MICROGRID AND GENERATING FACILITIES AND REPAIRS

- a. Initial Testing for Hybrid Microgrid operation. Initial testing for the Hybrid Microgrid shall be conducted in accordance with the CSAT procedures outlined in the Hybrid Microgrid Interconnection Agreement
- b. Periodic Hybrid Microgrid testing.
  - i. Test and verify means of real-time communications (Company SCADA grade or better) between Company dispatch center and the Microgrid Operator (or controller).
  - ii. Test and verify that Microgrid Operator can report Microgrid state of operation, available energy capacity, and power quality values (pre-defined) measured at PCC and at each Generating Facility POI in real time to the Company dispatch center.
  - iii. Test and Verify that Microgrid can reduce the power flow at PCC (both active and reactive power) close to zero and maintain a state of zero-power flow at PCC for a pre-defined zero-flow duration (e.g. 5 minutes - adjustable duration between 30 seconds to 60 minutes).
  - iv. Test and Verify that connection and disconnection of Generating Facilities within a Microgrid does not cause a voltage change more than 3% at PCC per IEEE 1547-2018 for medium voltage synchronization.
  - v. Test and Verify that Hybrid Microgrid can be remotely disconnected from Company System.
  - vi. Test and Verify that Microgrid Generating Facility can perform black start without the need for "house power" being supplied from the Company System, when in Island Mode.
  - vii. Test and Verify that Microgrid Generating Facility can pick up all Participants loads, either in one step or in multiple steps, using load sectionalizing and restoration schemes – under both cold load or hot load pickup.
  - viii. Test and Verify that Microgrid Generating Facility can respond to load step change of certain size (pre-determined) while maintaining voltage and frequency within prescribed ranges, described in the Interconnection Agreement.
  - ix. Test and Verify that Hybrid microgrid can synchronize and reconnect Microgrid area with Company System at PCC, based on given criteria in Interconnection Agreement.
- c. Testing for Generation Facilities
  - i. Acceptance testing – each Generating Facility shall meet the Company's acceptance test in the Company's Interconnection Agreement
  - ii. Acceptance testing as part of the Microgrid
  - iii. Periodic Generating Facility testing
- d. Protection System Verifications
  - i. The Microgrid Operator shall provide evidence of having the capability to detect external faults (i.e. faults outside of the Microgrid electrical boundary) and isolate the Microgrid from Company System within a pre-defined duration.
  - ii. The Microgrid Operator shall provide evidence of having the capability to detect and clear internal faults (within the Microgrid boundary) in both Grid-Connected Mode and Island Mode.

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- iii. Microgrid Operator shall provide provisions for implementing a protection scheme which is adjusted automatically to adapt to the change in short circuit levels as the Microgrid transitions between Grid-Connected Mode and Island Mode.
- iv. Microgrid Operator shall provide that the Microgrid Facility maintains protection coordination with Company distribution system during Grid-Connected Mode.
- v. Microgrid Operator shall verify and provide “As-Left” Protection settings for all associated protection schemes of Generating Facilities, either parts of the external protection devices or residing in the inverter-based resources – upon request by Company.
- vi. Microgrid operator shall maintain protection and metering accuracy and state of health as described in the Interconnection Agreement.
- e. Control and Communications System Verification
  - i. Microgrid Operator shall be responsible for establishing and maintaining communications in accordance with Company standard protocols to the Company control platform.
  - ii. Microgrid Operator shall have provisions for prioritizing Company dispatch control over Microgrid control so that the Company operator is able to override Microgrid controls in case of an emergency or event.
  - iii. Microgrid Operator shall have the capability to connect/disconnect the Generating Facility upon Company request during Grid-Connected Mode.

#### 4. NOTICE OF HYBRID MICROGRID OPERATION OR TESTING

- a. A minimum of \_\_\_\_ calendar days prior written notice is required to conduct testing of the Hybrid Microgrid.
- b. A minimum of \_\_\_\_ calendar days prior written notice is required to conduct a Scheduled Island Mode operation initiated by the Microgrid Operator.
- c. Microgrid Operator shall provide such notice to:  
via email:  
[Company Representative]  
[Position/Title]  
\_\_\_\_@hawaiianelectric.com

or letter correspondence at:  
Hawaiian Electric

\_\_\_\_\_

Attn: \_\_\_\_\_

- d. On the mutually-agreed-upon testing date, prior to commencing testing, Microgrid Operator shall contact Hawaiian Electric’s System Operation Control Center (“SOCC”) as \_\_\_\_\_ to confirm both systems are ready for testing to begin. Additional sequential requirements:
  - i. [NOTE: SPECIFIC SWITCHING OPERATIONS TO BE FILLED IN BASED UPON THE INTERCONNECTION REQUIREMENTS STUDY]

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**EXHIBIT G**  
**DEFINITIONS FOR HYBRID MICROGRID INTERCONNECTION**  
**AGREEMENT**

Unless otherwise defined in this Agreement, capitalized terms in this Microgrid Services Tariff - Hybrid Microgrid Interconnection Agreement (3 MW or less), including all Exhibits, shall be defined as follows, which definitions shall be consistent with defined terms in the Microgrid Services Tariff, to the extent repeated in this Exhibit G (subject to references to sections or provisions in this Agreement which may be added for clarifying purposes only). Any terms not otherwise defined in this Exhibit G or in the Agreement shall have the same meaning ascribed to them in the Microgrid Services Tariff. In the event of any conflict between the definitions in this Agreement, Exhibit G, and the Microgrid Services Tariff, this Agreement and Exhibit G shall control.

1. "Agreement" or "Interconnection Agreement" means this Microgrid Services Tariff - Hybrid Microgrid Interconnection Agreement (3 MW or less), including all Exhibits and Schedules attached hereto.
2. "Applicant" means the Microgrid Operator applying under the Microgrid Services Tariff.
3. "Application" or "Hybrid Microgrid Application" means the form by which the Applicant provides a description of the planned Hybrid Microgrid and applies to the Company to be a Microgrid Operator.
4. "Bill Credits" means the dollar amount credited by the Company to each Participant on the Participant's retail electric service bill, which represents the payment from Participant's participation in other distributed generation serving the premises of the Participant and other customer energy programs, if applicable.
5. "Commercial Operations Date" shall be the first day of the calendar month following the date on which all of the following conditions have been satisfied with respect to the Hybrid Microgrid: (a) Microgrid Operator has completed construction of the facilities necessary to operate the Hybrid Microgrid in accordance with the requirements of this Agreement; (b) all Company testing of the Hybrid Microgrid has been completed and passed by the Company; (c) all Generating Facilities within the Hybrid Microgrid have an interconnection agreement with the Company, (d) originally executed Disclosure Checklists have been provided to the Company from all Customers within the Hybrid Microgrid, and (e) the Microgrid Operator provides Company with written notice that (i) the all Customers within the Hybrid Microgrid have signed the Disclosure Checklist and entered into an agreement to participate with the Microgrid Operator and (ii) Microgrid Operator is ready to declare the Hybrid Microgrid in commercial operation.
6. "Commission" means the Public Utilities Commission of the State of Hawai'i.
7. "Company" means [Hawaiian Electric Company, Inc., Maui Electric Company, Ltd., Hawaii Electric Light Company, Inc.].
8. "Company Confidential Information" means all data provided by Company to Microgrid Operator pursuant to this Agreement or in any way connected with the Microgrid Services Program and the administration of the Microgrid Services Program including but not limited to Participant names, Participant account numbers and information on such accounts, Participant addresses, Participant rate schedules and Participant's participation in other distributed generation serving the premises of the Participant and any related Bill Credits and all information regarding Company's Customers, Customer lists, any of the data and testing results produced under this Agreement and any information identified by Company as confidential.

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9. "Company Interconnection Facilities" are those to Interconnection facilities furnished, installed, operated and maintained by the Company on the Company's side of the PCC as required for Grid-Connected Mode and any Interconnection facilities needed to establish the electrical boundary of the Hybrid Microgrid and as more fully described in Exhibit C (Company-Owned Interconnection Facilities) attached hereto and made a part hereof.
10. "Company System" means all electrical wires, equipment and other facilities owned or provided by the Company, through which the Company provides electrical service to its Customers.
11. "Customer" or "Customers" used herein is as defined in Company Rule No. 1.
12. "Customer Interconnection Agreement" means the applicable interconnection agreement for a non-utility Generating Facility.
13. "Disclosure Checklist" means the Microgrid Operator Disclosure Checklist attached as Appendix I to the Microgrid Services Tariff.
14. "Distribution Level" is defined as Interconnection to electrical wires, equipment, and other facilities at the distribution voltage levels (such as 25kV (Oahu only), 12kV, or 4kV) owned or provided by the Company, through which the Company provides electrical service to its Customers.
15. "Emergency Events" means, as determined by Company in its reasonable discretion, a condition or situation requiring prompt action by Company (a) to maintain the reliable operation of the Company System; (b) to prevent or limit the loss of load or generation; (c) to maintain public safety or the safety of Company's personnel; or (d) to protect Company, Customer, or third-party property; or as a Scheduled Island Mode Operation as a pre-emptive action ahead of impending weather events or natural disasters or in response to other unusual conditions.
16. "Escrow Agent" is a reputable escrow agent acceptable to the Company.
17. "Force Majeure Event" means any event: (a) that is beyond the reasonable control of the affected Party; and (b) that the affected Party is unable to prevent or provide against by exercising reasonable diligence, including the following events or circumstances, but only to the extent they satisfy the preceding requirements: acts of war, public disorder, insurrection or rebellion; floods, hurricanes, earthquakes, lightning, storms, and other natural calamities; explosions or fires; strikes, work stoppages, or labor disputes; embargoes; and sabotage.
18. "Generating Facility" means Customer or Company-owned electrical power generation that is Interconnected to the Company System.
19. "Grid-Connected Mode" means a mode of operation when the Microgrid is Interconnected to and operating in parallel with the Company System, is not operating in Island Mode, and the Company maintains operational coordination of the delivery of electric service.
20. "House Power" includes the electricity needed to assist in the Hybrid Microgrid Facility's system operation, performance monitoring, generation, and associated communications (including energy directly required for the local control and safe operation of the Hybrid Microgrid Facility) and also includes other electricity used by the Hybrid Microgrid, such as for perimeter lighting or any other structures or facilities at the Hybrid Microgrid Facility.



21. "Hybrid Microgrid" is a Microgrid that uses utility and non-utility infrastructure beyond the PCC, including distribution lines, Generating Facilities and related equipment, to meet its interconnected loads as more particularly described and identified in Exhibit A to this Agreement.
22. "Hybrid Microgrid Facility" means the facilities and equipment needed to create and operate a Hybrid Microgrid, including the generation, breakers, protective and associated equipment, improvements, and other tangible assets, contract rights, easements, rights of way, surface use agreements and other interests or rights in real estate reasonably necessary for the construction, operation, and maintenance of the Hybrid Microgrid subject to the Microgrid Services Tariff.
23. "IEEE" means Institute of Electrical and Electronics Engineers.
24. "Interconnect" or "Interconnected" or "Interconnection" means the physical connection(s) between the Company System and the Microgrid at a designated PCC.
25. "Interconnection Requirements Study" or "IRS" means pursuant to Rule 14H, Appendix III, Section 4, a study to establish the requirements for interconnection with the Company System.
26. "Island Mode" means a mode of operation when a Microgrid that normally operates in Grid-Connected Mode is disconnected from the Company System at PCC, and the Microgrid is generating or producing energy to provide electric service within the Microgrid under the operational coordination of the Microgrid Operator.
27. "Land Rights" means all easements, rights of way, licenses, leases, surface use agreements and other interests or rights in real estate.
28. "L/C Proceeds" is the amount of proceeds drawn on the letter of credit by the Company in the event the letter of credit is not renewed or extended at least thirty (30) calendar days prior to its expiration or earlier termination.
29. "Microgrid," means a group of interconnected loads and distributed energy resources within clearly defined electrical boundaries that acts as a single self-governing controllable entity with respect to the utility's electrical grid and is connected to a public utility's electrical grid at the PCC to operate in Grid-Connected Mode and can disconnect from the utility's electrical grid to operate in Island Mode only during Emergency Events, and that: (1) is subject to the Microgrid Services Tariff; and (2) generates or produces energy.
30. "Microgrid Participant" or "Participant" means the Customer that has executed the appropriate documents with the Microgrid Operator to participate in the Hybrid Microgrid in which the Customer is located.
31. "Microgrid Operator" is as defined in the beginning of the Agreement.
32. "Microgrid Operator Agents" means the Microgrid Operator's contractors, vendors, subcontractors, installers, suppliers and/or agents.
33. "Microgrid Operator Interconnection Facilities" are those Interconnection facilities (such as circuit breakers, relays, switches, synchronizing equipment, monitoring equipment, and control and protective devices and schemes) furnished, installed, operated and maintained by the Microgrid Operator on the Microgrid Operator's side (in other words the Hybrid Microgrid's side) of the PCC as required for Grid-Connected Mode which are designated by or acceptable to the Company as suitable for the Grid-Connected operation of the Hybrid Microgrid with the Company System as more fully described in in Exhibit B (Microgrid Operator-Owned Hybrid Microgrid and Interconnection Facilities) attached hereto and made a part hereof.

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- 34. "Microgrid Services Program" is as defined in the WHEREAS clauses in beginning of the Agreement.
- 35. "Microgrid Services Tariff" is as defined in the WHEREAS clauses in beginning of the Agreement.
- 36. "Network System" An electrical system in which two or more utility feeder sources are electrically tied together on the primary or secondary voltage level to form one power source for one or more Customers and is designed to provide higher reliability for Customers connected to it.
- 37. "NEC" means National Electric Code.
- 38. "NIST" means the National Institute of Standards and Technology.
- 39. "Participant Agreement" means the contract between the Microgrid Operator and the Participant.
- 40. "Point of Interconnection" or "POI" is the point at which the Company and the Customer interface, including the Generating Facility, occurs.
- 41. "Point of Common Coupling" or "PCC" is shown on the single-line diagram and three-line diagram (provided by the Microgrid Operator and reviewed by the Company) which are attached to Exhibit B (Microgrid Operator-Owned Hybrid Microgrid and Interconnection Facilities).
- 42. "RTU" means remote terminal unit.
- 43. "Security" means that irrevocable standby letter of credit with no documentation requirement (i) in an amount not less than twenty-five percent (25%) of the total estimated costs for the Company Interconnection Facilities; (ii) substantially in the form attached to this Agreement as Exhibit D (Form of Letter of Credit) from a bank or other financial institution located in the United States with a credit rating of "A-" or better, and (iii) such letter of credit shall remain in effect through the earlier of forty-five (45) calendar days after the Commercial Operations Date, or seventy-five (75) calendar days after the termination of this Agreement and true-up of any costs owed to Company.
- 44. "Security Breach" means a breach and/or unauthorized access, potential breach and/or unauthorized access, or other security incident at the Hybrid Microgrid or of Microgrid Operator's systems.
- 45. "Supervisory Control" or "SCADA" means remote monitoring and/or control of a Generating Facility's power output and interrupting device status by means of a communication channel that is acceptable to the Company.
- 46. "Scheduled Island Mode Operation" means a Hybrid Microgrid operating in Island Mode that is scheduled and coordinated between the Microgrid Operator and the Company, as more particularly described in Section H of the Microgrid Services Tariff and Exhibit F to the Interconnection Agreement.
- 47. "Total Actual Interconnection Cost" is (i) the total costs of the Company Interconnection Facilities, and (ii) the total engineering costs associated with a) developing the Company Interconnection Facilities and b) reviewing and specifying those portions of the Hybrid Microgrid which allow Interconnected operations as such are described in Exhibit A, and (iii) reviewing the verification testing.
- 48. "Total Estimated Interconnection Cost" is a cost paid by the Microgrid Operator to the Company and consists of (i) the estimated cost of the Company Interconnection Facilities, (ii) the estimated engineering costs associated with a) developing the Company Interconnection Facilities and b) reviewing and

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Order No XX,

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specifying those portions of the Hybrid Microgrid which allow Interconnected operation, and iii) witnessing and reviewing the verification testing, which shall include testing of the telemetry and control interface which allows the Company to remotely measure, monitor, evaluate and verify technical compliance, Hybrid Microgrid performance, and power quality and, if necessary, control of the Hybrid Microgrid.

49. "Total Rated Capacity" means the aggregate total of all Generating Facilities that intend to supply power to the Hybrid Microgrid during Island Mode as defined in Section 7 of Exhibit A to this Interconnection Agreement.
50. "Unscheduled Island Mode Operation" means a Hybrid Microgrid operating in Island Mode that is not scheduled or coordinated between the Microgrid Operator and the Company in response to an unplanned event on the Company System, as more particularly described in Section H of the Microgrid Services Tariff and Exhibit F to this Interconnection Agreement.

**Proposed Edits to Rule 24 and other DER Tariffs**

F. MICROGRIDS

1. Capitalized terms used in this section are as defined in Rule No. XX, Microgrid Services Tariff.
2. During Grid-Connected Mode, the Microgrid will be operated in parallel with the Company's System.
3. A Customer may operate their Generating Facility as a Customer Microgrid and be a Participant in a Hybrid Microgrid.
4. A Customer who intends to operate their Generating Facility as a Microgrid, or as a Participant in a Hybrid Microgrid, shall notify the Company in their application through the Customer Interconnection Tool.
5. A Customer who operates their Generating Facility as a Microgrid after obtaining interconnection approval from the Company shall update their application through the Customer Interconnection Tool. Such notification and revision shall satisfy the Customer's notice requirements set forth in Tariff Rule 3B (Change in Customer's Equipment Or Operations).
6. Customer Microgrid and Hybrid Microgrid Participants shall comply with the requirements of Rule No. XX, Microgrid Services Tariff, including Section II, Microgrid Operation.

**Redlined Modifications between the Working Group's Draft Revisions to Rule 24 (2/14/20)  
and the Company's Proposed Draft Revisions to Rule 24 (3/30/20)**

F. CUSTOMER MICROGRIDS [Other DER tariffs to be modified similarly]

1. Capitalized terms used in this section are as defined in Rule No. XX, Microgrid Services Tariff, and Rule No. 14, Appendix I.
2. During Grid-Connected Mode, the Microgrid will be operated in parallel with the Company's transmission and distribution facilitiesSystem.

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3. A Customer may operate their Generating Facility that intends to operate as a Customer Microgrid shall indicate such operation in Section X of the Interconnection Agreement and comply with Rule 14, Paragraph H, Section 4, Operating Requirements forbe a Participant in a Hybrid Microgrid Operation. [drafting note: modify Interconnection Agreement].
4. During the transition from Grid-Connected Mode to Island Mode, the Microgrid shall not at any time energize the Company's transmission or distribution system for a duration of more than 100 milliseconds.
4. If a MicrogridA Customer who intends to operate in parallel withtheir Generating Facility as a Microgrid, or as a Participant in a Hybrid Microgrid, shall notify the Company for more than 100 milliseconds, thein their application through the Customer Interconnection Tool.
5. A Customer who operates their Generating Facility as a Microgrid Operator must indicate such operation in Section X of the Interconnection Agreement. [drafting note: modify Interconnection Agreement]after obtainng interconnection approval from the Company shall update their application through the Customer Interconnection Tool. Such notifcation and revision shall satisfy the Customer's notice requirements set forth in Tariff Rule 3B (Change in Customer's Equipment Or Operations)
6. Upon Technical Review of the Interconnection Agreement, the Company may require an Operating Agreement between the Microgrid Operator and the Company to facilitate the operation of the Microgrid in parallel with the Company's system for a duration exceeding 100 miliseconds.
6. The Operating Agreement is intended to enable the Microgrid to operate as a Customer Microgrid during electrical power disturbances and to reconnect to the Company system when normal operating conditions are restored. The scope of



the Operating Agreement is intended to establish mandatory operating procedures in connection with the operation of the Customer Microgrid to ensure it does not adversely affect the safety and reliability of, or otherwise interfere with, the Company's operations. Customer Microgrid and Hybrid Microgrid Participants shall comply with the requirements of Rule No.XX, Microgrid Services Tariff, including Section H, Microgrid Operation.

Proposed Rules and Sections Being Modified (see Attachment 5 for language)

A	B	C	D	E	F
1 Rule	Title	Island	Sheet	New Section	Comment
2 14	Service Connections and Facilities on Customer's Premises	Oahu	34A-4	H.5	
3 18	Net Energy Metering	Oahu	38F	F	
4 22	Customer Self-Supply	Oahu	43A	E	
5 23	Customer Grid Supply	Oahu	45B	E	
6 24	Customer Grid Supply Plus	Oahu	47H	F	Current Section F (Application Charge) to be changed to Section G
7 25	Smart Export Program	Oahu	48E	E	Current Section E (Application Charge) to be changed to Section F
					Current Section H (CBRE Program Facility Subscriber Organization Agreements) to be changed to Section I
8 26	Community-Based Renewable Energy Program	Oahu	49P	H	Current Section I (Allowed CBRE Facility Development Timeframe) to be changed to Section J
					Current Section E (Non-Applicability of NEM Rules and Statute) to be changed to Section F
9 27	Net Energy Metering Plus	Oahu	49.15-E	E	Current Section F (Application Charge) to be changed to Section G
10					
11 14	Service Connections and Facilities on Customer's Premises	Maui, Molokai, Lanai	36A-4	H.5	
12 18	Net Energy Metering	Maui, Molokai, Lanai	40F	F	
13 22	Customer Self-Supply	Maui, Molokai, Lanai	45A	E	
14 23	Customer Grid Supply	Maui, Molokai, Lanai	47B	E	
15 24	Customer Grid Supply Plus	Maui, Molokai, Lanai	49.1-I	F	Current Section F (Application Charge) to be changed to Section G
16 25	Smart Export Program	Maui, Molokai, Lanai	49.3-F	E	Current Section E (Application Charge) to be changed to Section F
					Current Section H (CBRE Program Facility Subscriber Organization Agreements) to be changed to Section I
17 26	Community-Based Renewable Energy Program	Maui, Molokai, Lanai	49.5-P	H	Current Section I (Allowed CBRE Facility Development Timeframe) to be changed to Section J
					Current Section E (Non-Applicability of NEM Rules and Statute) to be changed to Section F
18 27	Net Energy Metering Plus	Maui, Molokai, Lanai	49.15-E	E	Current Section F (Application Charge) to be changed to Section G
19					
20 14	Service Connections and Facilities on Customer's Premises	Hawaii Island	38A-5	H.5	
21 18	Net Energy Metering	Hawaii Island	42F	F	
22 22	Customer Self-Supply	Hawaii Island	47A	E	
23 23	Customer Grid Supply	Hawaii Island	49B	E	
24 24	Customer Grid Supply Plus	Hawaii Island	49.1-I	F	Current Section F (Application Charge) to be changed to Section G
25 25	Smart Export Program	Hawaii Island	49.3-F	E	Current Section E (Application Charge) to be changed to Section F
					Current Section H (CBRE Program Facility Subscriber Organization Agreements) to be changed to Section I
26 26	Community-Based Renewable Energy Program	Hawaii Island	49.5-Q	H	Current Section I (Allowed CBRE Facility Development Timeframe) to be changed to Section J
					Current Section E (Non-Applicability of NEM Rules and Statute) to be changed to Section F
27 27	Net Energy Metering Plus	Hawaii Island	49.15-E	E	Current Section F (Application Charge) to be changed to Section G

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