



February 10, 2021

The Honorable Chair and Members  
of the Hawai'i Public Utilities Commission  
Kekuanao'a Building, First Floor  
465 South King Street  
Honolulu, Hawai'i 96813

Dear Commissioners:

Subject: Docket No. 2018-0163  
Instituting a Proceeding to Investigate Establishment  
of a Microgrid Services Tariff  
Microgrid Working Group Areas of Disagreements

Pursuant to the Commission Guidance, filed on December 10, 2020, in the subject proceeding,<sup>1</sup> as amended by the Commission letter dated January 22, 2021,<sup>2</sup> the Hawaiian Electric Companies appreciate the opportunity to provide their comments, Attachment 1; associated redlines to the Working Group Microgrid Services Tariff, Attachment A-1;<sup>3</sup> and Working Group Hybrid Microgrid Agreement; Attachment A-2.<sup>4</sup>

Sincerely,

/s/ Kevin M. Katsura

Kevin M. Katsura  
Director  
Regulatory Non-Rate Proceedings

Attachments

c: Service List (via email)

---

<sup>1</sup> Letter dated December 10, 2020 from the State of Hawai'i Public Utilities Commission, Commission Guidance, In re Public Utilities Commission, Docket No. 2018-0163 – Instituting a Proceeding to Investigate Establishment of a Microgrid Services Tariff.

<sup>2</sup> Letter dated January 22, 2021 from the State of Hawai'i Public Utilities Commission, Letter Request to Modify Deadlines, In re Public Utilities Commission, Docket No. 2018-0163 – Instituting a Proceeding to Investigate Establishment of a Microgrid Services Tariff.

<sup>3</sup> Redlines provided in Section D (pg. 6) and Section I (pg. 12).

<sup>4</sup> Redlines provided in Section 2 (pg. 2).

## I. Introduction

The Companies have been actively engaged with the Working Group and individual members. This has included co-chairing with the Consumer Advocate and administratively supporting the Working Group process. The Working Group's Proposed Tariff,<sup>1</sup> submitted on February 1, 2021, meets the intent of Act 200 by enabling the development of Customer Microgrids and Hybrid Microgrids and is substantially acceptable<sup>2</sup> to the Companies.

At the outset, it is important to note that the purpose of Act 200 ("Act") "is to encourage and facilitate the development and use of microgrids through the establishment of a standard microgrid services tariff" to improve resilience and not have customers leave the grid (thereby weakening the overall system and increasing costs for other utility customers). What has been developed by the Working Group meets the purpose of the Act by (1) providing the linkage under existing current tariffs for Customer Microgrids, and (2) enabling the development of Hybrid Microgrids.

Equally important is the fact that microgrids already exist in Hawai'i. For example, there are over 9,000 systems<sup>3</sup> (from residential customers to large commercial customers) approved by the Companies with the equivalent of over approximately 100 megawatts ("MW") with backup generators or energy storage systems. A substantial number of these customers have configured their storage systems to provide microgrid capabilities to power whole home or critical loads during a grid outage. Additionally, of the Companies top 400 largest customers, a substantial portion of them have back-up generation capabilities for grid outages or emergency events.

The Companies have already facilitated the implementation of Customer Microgrids through interconnection of DER under existing tariffs (Tariff Rules 14, 18, 22, 23, 24, 25, 26, and 27). As briefly discussed in the Companies' Opening Brief, filed on February 8, 2019, the Schofield Generating Station Microgrid Project ("SGS Project") is an example of a hybrid microgrid. The SGS Project is a 50 MW power plant that can island and provide power directly to the Army facilities of Schofield Barracks, WAAF, and Field Station Kunia. On Hawai'i Island, the Companies are pursuing a hybrid microgrid project to improve reliability and enhance the resilience for the North Kohala community. In addition, the Companies are already considering the development of microgrids when identifying resilience and other grid needs in the Integrated Grid Planning ("IGP") process as well as the opportunity for microgrids to provide various services to the grid.

---

<sup>1</sup> The Working Group's consensus proposed Microgrid Services Tariff and Hybrid Microgrid Agreement were submitted on February 1, 2021 (collectively "Proposed Tariff"). The Working Group's Proposed Tariff built upon the Companies' Draft Tariff submitted on March 30, 2020 ("Draft Tariff"), Working Group meetings, and the Commission's guidance and redline (provided on December 10, 2020).

<sup>2</sup> The Companies' proposed redlines, attached hereto as Attachments A-1 and A-2, improve upon the Working Group's Proposed Tariff.

<sup>3</sup> See Key Technical Developments to Enable DER Market Growth, Companies Monthly Report for December 2020, pursuant to Order No. 32737 (Dkt. No. 2014-0192).

Accordingly, the Companies view the development of the Proposed Tariff as important to (1) facilitate and clarify that the existing arrangements under the current DER tariff rules 14, 18, 22, 23, 24, 25, 26, and 27 also qualify as Customer Microgrids, and (2) provide a “plug and play” standardized format and Hybrid Microgrid Agreement for Hybrid Microgrids that is straightforward, relatively simple, does not require lengthy negotiation, and can be implemented fairly quickly.

The Companies believe that the Working Group’s Proposed Tariff achieves these goals without further revision.<sup>4</sup> Indeed, the Commission acknowledged in its December 10, 2020 letter that the “Draft Tariff<sup>5</sup> and accompanying documents are very close to completion.” The Proposed Tariff is the first open tariff and pro forma agreement for hybrid microgrids in the United States. This innovative tariff should be implemented as submitted, or as clarified in Attachments A-1 and A-2, in order to obtain the knowledge and experience necessary to determine any further refinements and allow lessons learned to be incorporated prior to scaling or continuing the program.

## **II. Background**

### **A. Brief procedural history**

On July 10, 2018, the Commission opened this docket to investigate establishment of a microgrid services tariff (“MGS Tariff”) for the Hawaiian Electric Companies, pursuant to Act 200.

By Order No. 35884, the Commission set forth various Preliminary Questions, which the Parties addressed (1) at the Technical Conference held on January 9, 2019, and (2) in their Opening and Reply Briefs, filed on February 8, 2019, and March 11, 2019, respectively.

On August 20, 2019, after reviewing the Parties' Opening and Reply Briefs, the Commission issued Order No. 36481, which, among other things, prioritized items for resolution in this Docket and provided a proposed process for this proceeding.

Thereafter, the Working Group was organized and numerous Working Group meetings were held between October 2019 and February 2020.<sup>6</sup>

On February 14, 2020, the Working Group submitted its Working Group Report in accordance with Order 36514, filed on September 12, 2019. This Working Group Report included a draft tariff as well as the key decisions made by the Working Group, including the microgrids considered within the scope of the Microgrid Services Tariff (Customer Microgrids and Hybrid Microgrids), the compensation structure for Hybrid Microgrids, and that the Microgrid Services Tariff should serve as a “portal” tariff.<sup>7</sup>

---

<sup>4</sup> While the Companies support the Working Group’s Proposed Tariff as is, the Companies are proposing additional revisions to improve upon the Proposed Tariff.

<sup>5</sup> In reference to the Companies’ Draft Tariff, filed March 30, 2020.

<sup>6</sup> See Working Group Report at 2-3.

<sup>7</sup> Working Group Report at 6-8.

On March 30, 2020, the Companies filed their Draft Microgrid Services Tariff (“Draft Tariff”), along with the Draft Hybrid Microgrid Operator Disclosure Checklist, Draft Hybrid Microgrid Operator Interconnection Agreement, and Draft Modifications to Rule 24.

On April 27, 2020, the Consumer Advocate, Ulupono, and MRC each submitted comments on the Draft Tariff.

On November 30, 2020, the Commission held a technical conference to discuss the Draft Tariff and related documents.

On December 10, 2020, the Commission issued a letter providing guidance and requested that the Parties reconvene the Working Group to revise the Draft Tariff and related documents consistent with the feedback provided in the letter. Acknowledging that the “Draft Tariff and accompanying documents are very close to completion,”<sup>8</sup> the Commission requested that the Parties collaboratively deliver a final Draft Tariff and related documents by January 25, 2021.

The Working Group thereafter met on December 21, 2020, and on January 5, 11, 14, 20, and 21, 2021.

On January 22, 2021, the Commission granted the Parties’ request to modify deadlines, such that the filing on areas of consensus was now due February 1, 2021, the filings on areas of disagreement is due February 10, 2021, and comments to address areas of disagreement is due February 17, 2021.

On February 1, 2021, the Parties submitted the areas of consensus filing and associated revisions to the Draft Tariff and related documents (“Feb. 1, 2021 Working Group Letter”).

## **B. Commission Guidance**

### **1. Order 36481**

On August 20, 2019, the Commission filed Order 36481, (1) Prioritizing Items for Resolution in this Docket and (2) Making Determinations on Issues Raised by the Preliminary Questions in Order No. 35884. In Order 36481, the Commission observed that resiliency is a primary focus of Act 200 and is the initial priority of the microgrid services tariff and the focus of the remainder of this docket:

The initial discussions in this docket have encompassed a broad spectrum of possible attributes and applications for microgrids. To better focus the Commission's and Parties’ near-term efforts on activities that can support the intent of Act 200, the Commission's initial priority in developing the microgrid services tariff is to facilitate applications of microgrids that improve energy resiliency, particularly the islanding of microgrids during emergency events

---

<sup>8</sup> December 10, 2020 Letter at 1.

and grid outages to provide backup power to customers and critical energy uses. As discussed further, the Commission will take broader feedback on potential modifications to existing programs that could improve opportunities for microgrids to provide grid services. **However, given the priorities established by Act 200 and the remaining vulnerabilities of Hawai'i's energy systems to extreme events, the focus for the remainder of this docket is to facilitate the ability of microgrids to island and provide backup power to customers and critical energy uses during contingency events.**<sup>9</sup>

The Commission went on to prioritize items for resolution in this docket as follows:

- Standardized Interconnection language is necessary to facilitate broader adoption of microgrids.
- Revisions to existing programs/ tariffs combined with interconnection process improvements may be more appropriate to support microgrid applications at individual customer sites.
- A Microgrid Services Tariff combined with interconnection improvements can open market development opportunities for multiple customers/users:
  - The proposed initial focus for this tariff is the islanding of a microgrid during emergency conditions and outages to improve resiliency and provide service to customers and subscribers while the utility grid is down.
  - The Commission is open to considering wheeling of power during these conditions to support resilience during outage events.
  - The Parties should consider appropriate compensation for utilization of utility infrastructure during an outage with no grid power source or anticipation of emergency event.
  - The Commission is supportive of reducing or removing regulatory barriers to private investment in microgrids when primary resiliency benefits accrue to microgrid participants, but is not inclined to provide compensation from non-participants if there are limited or no broader benefits to the public and non-participants.

---

<sup>9</sup> Order 35884 at 48 (emphasis added).

- In cases with clear, broad-based public benefits, the Commission may consider compensation through the MGS Tariff for resilience benefit, but the burden is on the Parties to justify this benefit.
- The Commission expects that microgrids developed under the MGS Tariff would be allowed to enroll in existing and future programs to receive compensation for other grid services/value streams.
- The Commission requests recommendations to modify existing programs and introduce new programs in efforts to encourage the development of microgrids that bolster resilience, but expects that any actions on such recommendations would take place in other dockets.<sup>10</sup>

The Commission further requested that the Parties form working groups to address identified issues. These working groups were further defined in Order 36514.

## **2. January 16, 2020 Letter Guidance**

On January 16, 2020, the Commission issued a letter providing guidance to the Working Group in response to Working Group request for guidance on various matters during the January 9, 2020 Commission Status Conference. Specifically, the Commission provided guidance in the areas of (1) compensation while grid connected, (2) third-party retail energy services, (3) renewable energy requirement while grid connected, and (4) additional issues for consideration.

With respect to whether the Microgrid Services Tariff should establish compensation to microgrids while grid connected, the Commission provided guidance that it did not believe it was necessary for the Microgrid Services Tariff to address this issue (with the assumption that the question related to additional grid services provided in the future), and noted that it may be more appropriate to explore the issue in Docket No. 2019-0323, Distributed Energy Resources, and recommended that the Working Group focus on the scope described in Order 36481.<sup>11</sup> The Commission further observed that to the extent the Working Group develops recommendations or revisions or expansion of DER tariffs, such recommendations should be communicated within the appropriate proceedings, as this docket is not intended to be the main venue for such discussions.<sup>12</sup>

Regarding whether the Microgrid Services Tariff should address compensation for retail energy sales (i.e., competitive energy services over the grid) provided by microgrids during normal conditions, the Commission reiterated its intent that the initial phase of this

---

<sup>10</sup> *Id.* at 53-55.

<sup>11</sup> January 16, 2020 Guidance Letter at 1.

<sup>12</sup> *Id.* at 2.

proceeding is to establish a tariff that reduces regulatory barriers that may prevent microgrids from providing energy to consumers during an outage or emergency event.<sup>13</sup>

The Commission also recognized that the Companies' simplified Hybrid Microgrid proposal may result in a more expedited offering, as this proposal does not require retail wheeling, and went on to note that retail wheeling should be addressed at a later time.<sup>14</sup>

Finally, the Commission stated it was supportive of the Working Group addressing complex issues at a later date or in a separate proceeding as determined by the Commission.<sup>15</sup> Such complex issues include, but are not limited to: "(1) 'Mini-grids' and/or Hybrid Microgrids, (2) Point of Common Coupling on the primary distribution system, (3) customer opt-out, (4) retail wheeling coordination, (5) pricing during emergency conditions, and (6) consumer protection issues."<sup>16</sup>

### **3. December 10, 2020 Letter Guidance**

On December 10, 2020, the Commission issued a letter requesting the Parties to reconvene the Working Group to revise the Draft Tariff and Related Documents and provided additional feedback to guide the Working Group's efforts. The Commission acknowledged the Draft Tariff and accompanying documents were very close to completion and provided eleven (11) recommended actions for the Working Group to address. Concurrent with the letter, the Commission provided (via email) the Commission's redlined Word document files ("Commission's Redlines") to assist the Parties in making necessary revisions.

## **III. Discussion**

### **A. The Companies' Guiding Principles**

In their engagement with the Working Group, the Companies have relied upon the four guiding principles from their Opening Brief, dated February 8, 2019: (1) safety, (2) customer benefit and fairness, (3) resiliency and reliability, and (4) consumer protection, to ensure *all* customers benefit from, and are not adversely impacted by, microgrids. For the most part, open items from the latest Working Group revision fall within one or more of these principles and are discussed herein.

**1. Safety.** The first and foremost objective is to create a tariff that maintains safety to the *utility and microgrid customers, the Companies' workers, microgrid operators, and all connected equipment and infrastructure*. The Proposed Tariff and related attachments, as co-developed with the Working Group, achieves this objective. Operation of an electric grid is a complex matter, and Microgrid Operators must abide by the same safety standards as the Companies in delivering quality electric service, protecting electric

---

<sup>13</sup> *Id.* The Commission also noted that if the Working Group is unable to come to a consensus, the Parties should share their individual perspectives on the areas of disagreement. *Id.*

<sup>14</sup> *Id.* at 2-3.

<sup>15</sup> *Id.* at 3-4.

<sup>16</sup> *Id.* at 3.

equipment from damage, and maintaining the reliability and security of the grid.

**2. Customer Benefit and Fairness.** With the state in what may very well be an extended recovery phase from the reeling effects of a global pandemic, emphasis should be placed on the second principle of customer benefit and fairness. Customers should not be unduly burdened by the development of microgrids that do not benefit them and the community as a whole. The current draft of the Proposed Tariff does not impose any incremental cross subsidization between ratepayers for the costs of enabling a Hybrid Microgrid. Hybrid Microgrid Participants are expected to bear the cost of the resilience benefits they receive, much as the Customer Microgrids bear their costs.

**3. Resiliency and Reliability.** The Proposed Tariff addresses the requirements of Act 200 by providing a “plug and play” pathway to develop Hybrid Microgrids for resilience. Customer Microgrids can already be developed under current tariffs and rules.

Nevertheless, the Proposed Tariff provides clarity to the existing tariffs for Customer Microgrids to develop behind-the-meter microgrids that may island for resiliency and during times of the least disturbance to the grid.

The Hybrid Microgrid pathway allows Customers to develop microgrids with a consortium of current Customers, in collaboration with the Companies, to utilize utility infrastructure during Island mode. The Proposed Tariff’s enablement of Hybrid Microgrids in a “plug and play” mode is the first of its kind, with Hawai‘i leading the industry in this regard. The complexity of the Hybrid Microgrids must not be overlooked, and the Working Group’s current Proposed Tariff and Hybrid Microgrid Agreement provide the technical requirements to implement such a system.

In addition to the Customer Microgrid and Hybrid Microgrid, the Proposed Tariff also acknowledges the opportunity for larger scale Hybrid Microgrids through a bi-lateral agreement with the Companies. The Proposed Tariff also does not impede the ability of the Companies to develop microgrids through Company-led efforts (e.g., North Kohala), in partnership with customers (e.g., Schofield Barracks), or through competitive procurements for third-party microgrid services. As such, the Proposed Tariff addresses the intent of Act 200 to facilitate the development of microgrids to address Hawai‘i’s resilience needs.

**4. Consumer Protection.** The Proposed Tariff adopts existing consumer protection found in other tariffs, programs and rules. For Customer Microgrids, existing DER Tariffs were revised and provide a well-established level of consumer protection. Hybrid Microgrids are much more complex than Customer Microgrids, and the proposal is for Microgrid Operators (with varying levels of expertise) to work with the Companies’ customers (with

varying levels of knowledge and resources) to ensure transparency and clear understanding of any Hybrid Microgrid obligations between the Operator and the Participant. The use of a Disclosure checklist enables this transparency and is consistent with the similar disclosure checklist approved and utilized in the Companies' CBRE Tariff.

**B. The Proposed Tariff and The Companies' Proposed Redlines Substantially Meet the Intent of Act 200 and Commission Guidance**

The Proposed Tariff developed by the Working Group, and for which areas of consensus were reached, substantially meets the intent of Act 200 and is consistent with Commission guidance. Additionally, the Companies offer redline modifications that are not necessarily areas of disagreement but offered as modest improvements to the Proposed Tariff. Consistent with Act 200, the Proposed Tariff is focused on enhancing grid resilience against disruptions caused by extreme weather events or other disasters to assure public safety and security through the use of microgrids. The Proposed Tariff and additional redlines offered by the Companies attend to the Commission's priorities by:

- Removing barriers for microgrid enablement. Customer Microgrids are already permitted under existing interconnection tariffs and agreements. No additional barriers are introduced under the Proposed Tariff. In short, no additional review of a DER system that is intended to operate as a customer microgrid has been proposed in the Proposed Tariff than what is already required under Rule No. 14, Paragraph H. To that end, the Working Group has proposed revisions to existing programs/tariffs to support microgrid applications at individual customer sites.
  - As a separate matter, the Companies have taken significant steps to streamline the interconnection process for DER systems as part of Docket No. 2019-0323. For example, introducing a quick connect pre-approval program as well as other improvements in response to the COVID-19 pandemic.<sup>17</sup>
- Allowing microgrids developed under the Proposed Tariff to enroll in existing and future programs to receive compensation for other grid services/value streams as defined by the specific DER Tariffs. The Proposed Tariff does not impede on any existing provisions of any existing DER tariff that may allow compensation of grid services.
- Setting forth a standardized agreement for the operations of Hybrid Microgrids that would allow for "plug and play" interconnection for standard, simple, hybrid microgrids under 3 MW in size. For example, the generating facility components of Hybrid Microgrids incur no more review than what is already required under Rule 14H. The Hybrid Microgrid interconnection process and agreement is primarily focused on operations and orchestration of the Hybrid Microgrid DER assets.
- Proposing standardized interconnection language and technical requirements for microgrids by defining performance requirements and definitions of a scheduled and unscheduled island mode operation. One key aspect of the technical

---

<sup>17</sup> See, Hawaiian Electric's Status Update Filing filed in Docket No. 2019-0323 on December 4, 2020.

requirement requires no export or import of power (i.e., 0 kW) across the point of common coupling of the microgrid to ensure the net impact to the rest of the grid and customers is minimized.

- Limiting or eliminating any compensation to microgrid beneficiaries from non-participants while still supporting private investment of microgrids by providing compensation for Hybrid Microgrid owner/operator generation for energy supplied during island mode emergency events that may not otherwise qualify for compensation under existing DER programs.
- Providing for a check-in point to improve the Proposed Tariff through a program (tariff) cap. This is a mechanism that has served customers well in other programs, such as the interim DER tariffs, CBRE program, etc., and allows lessons learned to be incorporated prior to scaling or continuing the program.

### **C. Open Items / The Companies' Redlines**

While the Companies would be agreeable to moving forward with the Proposed Tariff and related documents in the form submitted on February 1, 2021, and believe no further action is necessary to implement the Proposed Tariff, in this Section, the Companies discuss (1) proposed changes the Companies believe would be beneficial to the program, (2) sections highlighted by the Working Group for additional clarification or discussion, and (3) potential proposals by other Parties. To facilitate this discussion, for the Commission's convenience, redline documents highlighting proposed changes or discussion points against the Proposed Tariff have been attached as Attachments A-1 (Tariff) and A-2 (Hybrid Microgrid Agreement).

#### **1. Microgrid Services Tariff Open Items**

##### **a. Sec. B.4:<sup>18</sup> Availability (Working Group Open Item #1.a<sup>19</sup>)**

A subject of discussion within the Working Group was the applicability of existing tariffs to the Microgrid Tariff in connection with Sections B.3 and B.4. While the Working Group has agreed to the Proposed Tariff language in sections B.3. and B.4.a., a Working Group member requested adding language to Section B.4. (as a proposed Section B.4.b. that would only be applicable to Customer Microgrids) that was not included in the Proposed Tariff. This additional language appeared to have the potential impact of creating exceptions to existing DER Tariffs in order to ensure that this Working Group member's envisioned Customer Microgrids qualify for existing DER Tariffs. Section 4 of the Proposed Tariff is therefore highlighted to indicate that a Working Group member may propose additional language (as a proposed Section B.4.b.) in its February 10, 2021 filing.

However, the DER Tariffs and their eligibility requirements were created with a broad stakeholder group, in alignment with Hawai'i Revised Statute §269-101, and were carefully constructed to ensure balance between various interest groups. Therefore, the proposed language would effectively create eligibility for Customer Microgrids to be compensated

---

<sup>18</sup> Refers to the section of the Microgrid Services Tariff.

<sup>19</sup> "Working Group Open Item" refers to the Open Item listed in the Feb. 1, 2021 Working Group Letter.

under DER programs for which they may not have otherwise qualified. Such purported changes to the application of DER Tariffs are more appropriately addressed and resolved in the DER docket, as recognized by Commission guidance in Order 36481 and its January 16, 2020 letter.

As noted above, there are no barriers for customers interconnecting DER under current DER Tariffs to qualify as customer microgrids, and with the Proposed Tariff and proposed revision to other DER Tariffs, the Companies make it abundantly clear that Customer Microgrids are welcomed on the Companies' grids. The Companies have long supported customers who choose to enhance the resilience of their electric service through the interconnection over 9,000 systems of different rate classes and DER types that have the capability to power loads during times of grid outages.

**Recommendation:** The existing Section B.4., as set forth in the Proposed Tariff, is acceptable and the Companies do not recommend any modifications.

**b. Sec. C.1 & C.2: Responsibilities Among the Parties  
(Working Group Open Item #1.b)**

Sections C.1. and C.2. of the Proposed Tariff were highlighted to reflect that a Working Group member may propose additional language to these provisions.

**Recommendation:** The existing Sections C.1. and C.2., as set forth in the Proposed Tariff, are acceptable and the Companies do not recommend any modifications.

**c. Sec. D.2: Interconnection (Working Group Open Item #1.c)**

The Commission's Redlines removed this section prompting discussion within the Working Group. The Companies explained a project size limit was appropriate for standardized Hybrid Microgrid Agreements due to the typical size of distribution feeders, to which the Working Group agreed. The Working Group thus agreed to the language in Section D.2. of the Proposed Tariff.

Section D.2. of the Proposed Tariff was also highlighted in order to reflect that the Companies would be submitting proposed revisions to the agreed upon language. The Companies' proposed redlines, reflected in Attachment A-1, hereto, reflect discussions in the Working Group regarding the microgrid project size limits, as well as taking into consideration the Commission's Guidance, Action Item 8 regarding eligibility for Moloka'i and Lāna'i. The Company proposes to change "Total Rated Capacity" to "Total Peak Demand", consistent with Working Group Proposed Appendix II, Hybrid Microgrid Agreement. Using O'ahu as an example, this change allows for the development of Hybrid Microgrids with aggregate generating resources greater than 3 MW to be built provided that the Total Peak Demand within the microgrid boundary cannot exceed 3 MW. In other words, it expands the types of Hybrid Microgrids that can be developed. The project limits for Moloka'i and Lāna'i are consistent with limits used in the Phase 1 CBRE Tariff.

**Recommendation:** The Companies recommend the inclusion of the provided redlines reflected in Attachment A-1, Section D.2.

**d. Sec. E: Billing and Compensation (Working Group Open Item #1.d)**

Section E, as set forth in the Proposed Tariff is acceptable to the Working Group as is, but was highlighted to reflect that a Working Group member may propose additional language. The Companies believe that this section does not require further revision in order to implement the Proposed Tariff.

Of note, Hawai‘i offers under its existing tariffs and programs, more distributed resource compensation opportunities than any other state in the United States to support microgrid development. The proposed Hybrid Microgrid compensation structure was co-developed within the Working Group process between October 3, 2019 and February 14, 2020 and received Commission guidance to proceed as proposed.<sup>20</sup> The Hybrid Microgrid compensation structure is one that respects the current DER tariff rules and rates, which customers used successfully to adopt solar and storage, and has led to the highest percentage adoption in the United States. The DER tariffs, in turn, have and continue to undergo thoughtful discussion in the DER docket with a larger set of Hawai‘i stakeholders than is present in the Working Group, which only includes MRC, Ulupono Initiative, and the Consumer Advocate.

Indeed, the Commission previously noted in this docket that it may be more appropriate to explore the grid connected compensation issue in Docket No. 2019-0323, Distributed Energy Resources, and recommended that the Working Group focus on the scope described in Order 36481, discussed above.<sup>21</sup> The Commission further observed that recommendations for revisions or expansion of DER tariffs should be communicated within the appropriate docket, as the present proceeding is not intended to be the main venue for such discussions.<sup>22</sup>

**Recommendation:** The Companies recommend that the Commission accept Section E as set forth in the Proposed Tariff.

**e. Section E.5 (Standby Service)**

The Commission’s Redlines removed section E.5 regarding Customer Microgrids being subject to Schedule SS (Standby Service). The Companies support the inclusion of section E.5 as provided in the Working Group Proposed Tariff submittal. The intent of Act 200 was to enable microgrids for resilience, and not to encourage businesses and residents to “leave the utility grid altogether, thereby weakening the overall system and increasing costs for other utility customers.”

---

<sup>20</sup>See January 16, 2020 Guidance Letter at 2-3 (the Commission recognizes the Companies’ simplified hybrid microgrid proposal may result in a more expedited offering, as their proposal does not require retail wheeling; as a general matter, the Commission believes retail wheeling will likely require additional discussion after the filing deadline and as such, this issue should be addressed at a later time).

<sup>21</sup> January 16, 2020 Guidance Letter at 1.

<sup>22</sup> *Id.* at 2.

The Proposed Tariff essentially clarifies the ability for Customer Microgrids to Island at the Microgrid Operator's discretion, leaving the potential for the grid to be used as a backup source to the microgrid, which effectively increases costs to non-participating customers because the Companies would need to plan to serve microgrid customer loads any time the microgrid does not have sufficient resources to serve its own customer's load, while at the same time, the microgrid customer avoids the cost of those services when the microgrid is actively supplying power to its load.

**Recommendation:** The Companies recommend keeping Section E.5 without modifications.

**f. Section I.2 (Program Cap) – Also in Appendix II**

The Commission's Redlines removed parts of section I.2 regarding the Hybrid Microgrid Application Program capacity for each island. The Companies support the inclusion of this capacity limit in order to ensure a checkpoint is in place to allow for improvements or adjustments in the tariff should there be a significant uptake in the program. The Companies have also provided redlines to the Proposed Tariff, attached as Attachment A-1, to clarify that the program capacity is based on the Total Peak Demand of Hybrid Microgrid applications, and includes limits for Moloka'i and Lāna'i in accordance with proposed changes to Section D.2, which should be amendable to the Parties.

**Recommendation:** The Companies recommend the inclusion of the provided redlines in Tariff, Section I.2, as reflected in Attachment A-1.

**2. Appendix II Hybrid Microgrid Agreement Open Items**

**a. Section 1: Notice and Disclaimer Regarding Future Rate and Tariff Modifications (Working Group Open Item #2.a<sup>23</sup>)**

Section 1 has been highlighted to reflect that a Working Group member may propose revisions to this section. However, the Companies have extensively used proven and reliable, Commission-approved language where applicable in the Proposed Tariff and Hybrid Microgrid Agreement. Hybrid Microgrid Agreement Section 1 "Notice and Disclaimer Regarding Future Rate and Tariff Modifications," contains standard language used in the Companies' interconnection agreements and should remain consistent.<sup>24</sup> The Companies will address any specific additions by the other Parties in the Companies' responsive filing on February 17, 2021.

---

<sup>23</sup> "Working Group Open Item" refers to the Section in the Hybrid Microgrid Agreement under consideration.

<sup>24</sup> See, for example, Rule No. 22, Appendix I, Rule No. 23, Appendix I, and Rule No. 26, Appendix III, among others.

**Recommendation:** Section 1 is acceptable to the Companies as currently written in the Working Group’s Proposed Hybrid Microgrid Agreement<sup>25</sup> submittal, and no additional modifications are recommended.

**b. Section 2: Term and Termination (Working Group Open Item #2.b)**

The length of term has been highlighted in Section 2 of the Proposed Hybrid Microgrid Agreement to reflect non-consensus among the Parties. The Companies have provided redlines to the Proposed Hybrid Microgrid Agreement, attached hereto as Attachment A-2, adopting the Commission’s proposed 10-year term.

**Recommendation:** The Companies recommend the adoption of the redlines reflected in Section 2 of Attachment A-2.

**c. Section 13.b.i: Indemnification (Working Group Open Item #2.c)**

Section 13.b.i. is highlighted in the Proposed Hybrid Microgrid Agreement to reflect that a Working Group member may propose additional language to this provision.

**Recommendation:** Section 13.b.i is acceptable to the Companies as currently written in the Working Group’s Proposed Hybrid Microgrid Agreement submittal, and no modifications are recommended.

**d. Section 22.c Microgrid Services Tariff (Working Group Open Item #2.d)**

Section 22.c. is highlighted in the Proposed Hybrid Microgrid Agreement to reflect that a Working Group member may propose revisions or comments to this provision. The Proposed Hybrid Microgrid Agreement includes a modest \$5/kW recurring annual fee intended to cover costs for the Company to administer the Hybrid Microgrid program, which may include the processing of Hybrid Microgrid applications, resources to work with Microgrid Operators to appropriately design the Hybrid Microgrid boundaries and operations, and to cover recurring costs needed to assure safety and reliability of the system each time a microgrid transition is initiated. For instance, the Companies may need to perform switching operations to allow for the Hybrid Microgrid to transition to island mode, or to enforce performance requirements of the Hybrid Microgrid Agreement. The fees are consistent with the Commission’s guidance to minimize costs attributable to Microgrid Operators and Participants from being funded by non-participants.

**Recommendation:** Section 22.c is acceptable to the Companies as currently written in the Working Group’s Proposed Hybrid Microgrid Agreement submittal, and no additional modifications are recommended.

---

<sup>25</sup> “Proposed Hybrid Microgrid Agreement” refers to the consensus Hybrid Microgrid Agreement submitted to the Commission on February 1, 2021.

**e. Section 22.f: Microgrid Services Tariff (Working Group Open Item #2.d)**

Section 22.f. is highlighted to reflect non-consensus to this provision by the Working Group. The Companies agree with the use of a Disclosure Checklist, and look forward to reviewing the Consumer Advocate's revision. The current form of the Disclosure Checklist is similar in requirements to the disclosure checklist in the Companies' CBRE Tariff. CBRE projects, by comparison, are arguably less complex arrangements than those within a Hybrid Microgrid. There is no need to remove or require major structural changes to the Disclosure Checklist.

**Recommendation:** The Companies recommend the inclusion of a Disclosure Checklist and note that the Consumer Advocate will be submitting a revision for the Parties' review.

**f. Exhibit B, Sec. 2.1.iii: Information Security Requirements – Security Breach (Working Group Open Item #2.e)**

One section that was not directly addressed in the Working Group is Appendix II, Sec. 2.1.iii (Information Security Requirements – Security Breach),<sup>26</sup> which contained Commission-suggested edits to include a reciprocal provision for a security breach to the Companies' information Systems that was not included in the Proposed Hybrid Microgrid Agreement. Section 2.1.iii of the Proposed Hybrid Microgrid Agreement was therefore highlighted to reflect that the Companies respectfully decline to include the suggested edits, as the existing Microgrid Agreement is consistent with previously approved Interconnection Agreements (i.e., RDG PPA, CBRE Interconnection Agreement, etc.) that do not have such a reciprocal provision. The Companies also note that Customer information is already protected by the Companies' Privacy Policy. There are other potential issues with the suggested edits – for example, the Companies note that "Security Breach" as defined in the Proposed Hybrid Microgrid Agreement contemplates a breach of the Hybrid Microgrid or of Microgrid Operator's systems and not of the Companies' systems.

**Recommendation:** Exhibit B, Section 2.1.iii as reflected in the Proposed Hybrid Microgrid Agreement is acceptable to the Companies, and no additional modifications are recommended.

**g. Exhibit C, Sec. 2: Microgrid Operator Payment for Company Interconnection Facilities (Working Group Open Item #2.f)**

Another section not directly addressed in the Working Group was Appendix II, Exhibit C, Section 2. which was the subject of Commission comments inquiring whether certain provisions should be extended from 14 calendar days to 30 days. The Companies maintain the requirement for developers to pay invoices in a timely manner, which in this case is 14 calendar days after the developer/operator receives the invoice. This 14 calendar day requirement is present in all Interconnection Agreements, and an exception for a Hybrid

---

<sup>26</sup> Working Group Letter dated Feb. 1, 2021, Open Item #2.e.

Microgrid applicant is not warranted. This Section was therefore highlighted to reflect that the Companies respectfully decline to change the existing 14 calendar day requirement.

**Recommendation:** Exhibit C, Section 2 as reflected in the Proposed Hybrid Microgrid Agreement is acceptable to the Companies, and no additional modifications are recommended.

#### IV. Conclusion

The intent of Act 200 was “*to encourage and facilitate the development and use of microgrids*” that can “*build energy resiliency into our communities, thereby increasing public safety and security.*” The Working Group’s Proposed Tariff, as well as the version reflected in the redlines attached as Attachments A-1 and A-2, meets the spirit and intent of Act 200, while balancing the needs of multiple stakeholder perspectives.

The Proposed Tariff and revisions to existing DER Tariffs provide clarity in the eligibility for existing tariffs, programs and procurements, and pathways for interconnection. The Proposed Tariff and Appendices provide an industry leading framework with thoughtful requirements that enable complex and flexible Hybrid Microgrid arrangements to be “plug and play.”

This is the only widely applicable customer and Hybrid Microgrid tariff and pro forma Hybrid Microgrid Agreement published in the United States. In the spirit of Act 200, the pursuit of perfection and narrow interests should not impede customers’ opportunity to benefit under the Proposed Tariff and related documents. Microgrid development should be allowed to commence under the Proposed Tariff and related documents, or as clarified in Attachments A-1 and A-2, to obtain the knowledge and experience necessary to determine any further refinements and allow lessons learned to be incorporated prior to scaling or continuing the program.

SHEET NO. XX  
Effective XX

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.

HAWAIIAN ELECTRIC COMPANY, INC.

Transmittal No. \_\_\_ Dated \_\_\_\_\_.

SHEET NO. XX  
Effective XX

- i. "Customer Microgrid" is a Microgrid that uses non-utility infrastructure on the customer side of the Point of Common Coupling<sup>1</sup> (PCC), 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 emergency conditions and pre-emergency conditions as specified in footnotes 5 and 7 in Rule No. 14H Appendix I.
- n. "Generating Facility" means Customer or utility-owned electrical power generation or electric power generation that is included in a microgrid and is under the operating control of the Microgrid Operator and 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 to the Point of Common Coupling.
- p. "Hybrid Microgrid" is a Microgrid that uses utility and non-utility infrastructure on the Microgrid's side of the PCC, including distribution lines, Generating Facilities, and related equipment, to meet its interconnected loads.
- q. "Hybrid Microgrid Agreement" means the Hybrid Microgrid Agreement attached hereto as, Appendix II.
- r. "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.
- s. "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.

---

<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.

HAWAIIAN ELECTRIC COMPANY, INC.

SHEET NO. XX  
Effective XX

- 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 the PCC, and the Microgrid is generating or producing energy to provide electric service within the Microgrid under the operational coordination of the Microgrid Operator. Hybrid Microgrids may enter Island Mode only under (1) Emergency Events, or (2) as otherwise permitted or directed by the Company.
- 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, and that: (1) is subject to this Microgrid Services Tariff; and (2) generates or produces energy.
- w. "Microgrid Participant" means a 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 planned, scheduled and coordinated in advance between the Microgrid Operator and the Company, as more particularly described in Section H, below.

HAWAIIAN ELECTRIC COMPANY, INC.

Transmittal No. \_\_\_\_ Dated \_\_\_\_\_.

SHEET NO. XX  
Effective XX

- 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 Hybrid Microgrid Agreement.
- ff. "Unscheduled Island Mode Operation" means a Microgrid operating in Island Mode that is not planned, scheduled, or coordinated in advance 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 that do not Interconnect to the Company System are not eligible for this Tariff.
3. For Hybrid Microgrids, existing tariffs and programs shall also be applicable.
4. For Customer Microgrids, existing tariffs and programs shall also be applicable.
  - a. A Microgrid Operator of a Customer Microgrid may allocate costs without markup for electric service received from the Company to other persons within the electrical boundaries of the microgrid who have contracted to receive regular service from the microgrid.
5. 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.
6. Microgrids shall, at minimum, meet the requirements of all applicable Hawaii laws and regulations governing generating resources.

HAWAIIAN ELECTRIC COMPANY, INC.

Transmittal No. \_\_\_ Dated \_\_\_\_\_.

SHEET NO. XX  
Effective XX

7. 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 Hybrid Microgrid Agreement, the operation or maintenance of the Hybrid Microgrid during Island Mode, and/or Company's actions taken in accordance with the Hybrid Microgrid Agreement, except to the extent that such damages, losses, claims, or actions were
3. Limitation of Liability - Customer Microgrids. The Company shall not be responsible for for any damages, losses, claims and/or actions arising out of or related to the Customer Microgrid, except to the extent such damages, losses, claims, and/or actions are directly caused by the negligence or willfull misconduct of Company; provided that the Company is not excused for failure to perform in accordance with its contracts, tariffs or applicable law.
4. Limitation of Liability - Hybrid Microgrids. The Company shall not be responsible for any damages, losses, claims and/or actions 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, except to the extent such damages, losses, claims, and/or actions are directly caused by the negligence or willful misconduct of Company; provided that the Company is not excused for failure to perform in accordance with its contracts, tariffs or applicable law.

D. INTERCONNECTION

1. Each Microgrid shall be designed to Interconnect and operate in Grid-Connected Mode and in Island Mode with the Company System without adversely affecting the operations of the connected electric grid and without presenting safety hazards to the Company's or other Customers' personnel, and in the case of a Hybrid Microgrid without adversely affecting the operations of its Microgrid Participants. 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),

HAWAIIAN ELECTRIC COMPANY, INC.

Transmittal No. \_\_\_\_ Dated \_\_\_\_.

SHEET NO. XX  
Effective XX

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 Hybrid Microgrid 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.
- b. Hybrid Microgrids will require a Hybrid Microgrid 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.
  - i. 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 Peak Demand for Hybrid Microgrids utilizing the Hybrid Microgrid Agreement included in Appendix II~~The Total Rated Capacity of the Hybrid Microgrid~~ cannot exceed 3 MW (AC) on Oahu, 1 MW (AC) on Maui Island, 0.5 MW on Moloka'i, 0.5 MW on Lana'i, or 1 MW (AC) on Hawaii Island. A Microgrid with ~~Generating Facilities with a Total Rated Capacity~~Peak Demand greater than the specified limits are not eligible under this tariff<sup>2</sup>.

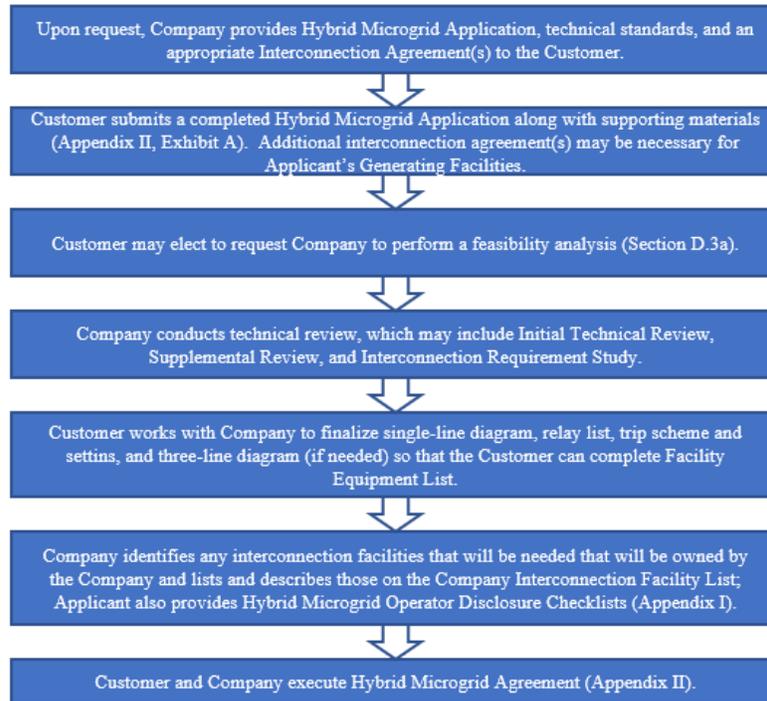
3. Hybrid Microgrid Interconnection Process

<sup>2</sup> Hybrid Microgrids with a Total Peak Demand greater than the specified limits may be proposed to the Utility for Public Utilities Commission approval. Generating resources and development of such projects may require Power Purchase Agreements.

HAWAIIAN ELECTRIC COMPANY, INC.

Transmittal No. \_\_\_\_ Dated \_\_\_\_\_.

SHEET NO. XX  
Effective XX



- 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 Hybrid 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, to the Company's satisfaction (see Hybrid Microgrid Agreement Exhibit A), 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.

HAWAIIAN ELECTRIC COMPANY, INC.

Transmittal No. \_\_\_ Dated \_\_\_\_\_.

SHEET NO. XX  
Effective XX

- 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 Hybrid 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 the Hybrid Microgrid 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 a Hybrid Microgrid 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 that the Hybrid 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 Hybrid 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 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 Hybrid Microgrid Agreement for Hybrid Microgrids or Customer Interconnection Agreement for Customer Microgrids.

#### E. BILLING AND COMPENSATION

- 1. Customer Microgrids.
  - a. Subject to the provisions of Section B.4., all applicable energy credit rates and compensation under existing applicable programs, Customer tariff(s), and rate schedules will apply to the Customer of the Customer Microgrid during Grid-Connected Mode. The Microgrid Operator may be a Customer.
- 2. Compensation for Hybrid Microgrid Operator and Microgrid Participants.
  - a. For a Hybrid Microgrid Operator and all 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 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 for energy supplied during Island Mode only.

HAWAIIAN ELECTRIC COMPANY, INC.

Transmittal No. \_\_\_\_ Dated \_\_\_\_.

SHEET NO. XX  
Effective XX

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. Alternative Hybrid Microgrids. The developer of a proposed Hybrid Microgrid may make a proposal for Microgrids not covered by this Tariff to the Company, which would, if acceptable to the Company, be incorporated in a separate agreement with the Company that is subject to Commission approval.
4. Resilience. Compensation for resilience grid services may be compensable under an appropriate resiliency tariff, rate, or rider.
5. 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 a Microgrid 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 Microgrid Participants. The Microgrid Operator will submit completed Disclosure Checklists from all Microgrid Participants as part of the Hybrid Microgrid Application process.

G. The Disclosure Checklist is supplemental to and does not replace the disclosure and consumer protection requirements required of any other tariff or program.  
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. A Hybrid Microgrid Application may be submitted beginning on the effective date of this Tariff. A Hybrid Microgrid Application 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 interconnection queue purposes. If more than one Applicant is seeking to establish the same 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 a Hybrid Microgrid Agreement with the Company for the duration of the approved Hybrid Microgrid. The Hybrid Microgrid Agreement, and its Exhibits, shall include information to govern the expected performance and

HAWAIIAN ELECTRIC COMPANY, INC.

Transmittal No. \_\_\_\_ Dated \_\_\_\_\_.

SHEET NO. XX  
Effective XX

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 a Customer Microgrid or a 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 Microgrid Operator shall notify the Company in advance, when possible, of a Scheduled Island Mode Operation. Scheduled Island Mode Operation is permitted provided the power export or import, across the PCC to the Company is zero kW (+/-1% of the Total Rated Capacity).

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 or within the microgrid.

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<sup>3</sup> conditions are present and 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 4A-5 (Frequency Ride-Through for Molokai and Lanai), the act of

---

<sup>3</sup>Per Section 8.1 of IEEE 1547-2018, "For an unintentional island in which the DER energizes a portion of the Area EPS through the PCC, the DER shall detect the island, cease to energize the Area EPS, and trip within 2 s[econds] of the formation of an island."

HAWAIIAN ELECTRIC COMPANY, INC.

SHEET NO. XX  
Effective XX

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 mis-operation of any distributed 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 Total Rated Capacity 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 Hybrid Microgrid 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 Hybrid Microgrid Agreement will be permitted under specific circumstances with the Company's prior approval. The Hybrid Microgrid 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 Hybrid 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;

HAWAIIAN ELECTRIC COMPANY, INC.

SHEET NO. XX  
Effective XX

- 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~~ Peak Demand 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; 0.5 MW on Moloka'i; 0.5 MW on Lana'i is reached, whichever comes first, or as required by Commission Order.
- 3. The Company shall provide an annual report to the Commission after the effective date of this Tariff, and every three years thereafter, or as directed by the Commission, of the Total Rated Capacity, by island.

HAWAIIAN ELECTRIC COMPANY, INC.

Transmittal No. \_\_\_\_ Dated \_\_\_\_\_.

**APPENDIX II****MICROGRID SERVICES TARIFF – HYBRID MICROGRID 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, , in Island Mode disconnected from the Company’s System in accordance with Tariff Rule No. XXX and/or this Agreement;

**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 Peak Demand within the boundaries of 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.**

2. **Term and Termination.** The Term of this Agreement shall commence on the Effective Date and shall end ~~five (5)~~ **ten (10)** years after the Commercial Operations Date, unless extended upon agreement by the Parties. 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) If, the Company, 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 Company, unless a different timeframe is specified in such notice; provided, however, that if it is objectively impossible to cure such breach or default within said thirty (30) Day period, then, for so long as the Company is making a good faith effort to cure such breach or default, then the Company may have such additional time as agreed to by the Parties, not to exceed 90 days, to cure such breach or default.
  - (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) 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;
    - (iii) 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 longer timeframe is specified in such notice; provided, however, that if it is objectively impossible to cure such breach or default within said thirty (30) Day period, then, for so long as the Microgrid Operator is making a good faith effort to cure such breach or default, then the Microgrid Operator may have such additional time as agreed to by the Parties, not to exceed 90 days, to cure such breach or default.
  - (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) 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.

- (e) In the event there is a material change in the applicable statute, rule, or tariff, that materially adversely affects a Party, at the request of the adversely affected Party, the Parties will enter into negotiations with the goal of reaching an agreement to continue operations of the Microgrid. Should an agreement not be reached, each Party can petition the Public Utilities Commission to issue a decision on the dispute. If the Public Utilities Commission issues a decision that is not mutually agreeable to the Parties, then such Party can terminate this Agreement effective 30 calendar days after written notice to the other Party of such termination. Notwithstanding the foregoing, neither Party is obligated to perform any obligation under this Agreement if such obligation violates such applicable statute, rule, or tariff.
- (f) In the event of a material breach or default by the Microgrid Operator for which the Company sends a written notice pursuant to this Section 2, Company shall also send a copy of the notice as soon as practicable to any financing party for the Hybrid Microgrid facility whose contact information has been provided to the Company. Any such financing party shall have the right to cure the alleged breach within the cure period provided in Section 2 and Company agrees to accept any such cure as if made by the Microgrid Operator. The Company shall be under no obligation to provide any such financing party with any confidential information. With respect to the Microgrid Operator, the Company shall be under no obligation to provide any such financing party with any information it may have which is confidential to the Microgrid Operator unless the Microgrid Operator has provided written consent to the Company permitting the release to the financing party of such confidential information.

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 not unreasonably withhold, including providing Hybrid Microgrid Operator with options to satisfy the Company's concerns, to the extent such options exist .
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 in a manner in violation of Rule XXX or 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, provided that the costs associated with such post interconnection installations or modifications shall be paid by the utility or through other mechanisms approved by the Commission, except where the Company determines that such installations or modifications are necessary to remedy a safety or reliability issue caused by the Microgrid Operator or the Hybrid Microgrid.
- (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) Total Rated Capacity. The Hybrid Microgrid shall not have Generating Facilities with an aggregate nameplate capacity in excess of \_\_MW.
  - (3) The Microgrid Operator agrees to test the Hybrid Microgrid, to maintain operating records, and to follow good engineering and operating procedures, and include those operating procedures specified by the Company to protect the Company System from damages resulting from the operation of the Hybrid Microgrid, such as 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.

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.

(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, should the Interconnection Agreement be extended, 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 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 (1) disable the operation of the Hybrid Microgrid, or (2) require the Microgrid Operator to enter into 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 obligations for providing electric service under applicable Tariffs and Rules; 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.

---

<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.

- (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 in accordance with this Agreement, provided that 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. Notwithstanding any other provision of this Agreement to the contrary, at any time, the Company determines, in its sole discretion, that the Hybrid Microgrid may endanger the public, Company's personnel, and/or that the continued operation of the Hybrid Microgrid may endanger any person or property, the Company System or integrity thereof, or have an adverse effect on the safety, power quality, and/or electric service of Customers, the Company shall have the right to (a) disable Hybrid Microgrid operation remotely or otherwise, (b) disconnect the Hybrid Microgrid from the Company System, and/or (c) shutdown/de-energize the Generating Facilities part of the Hybrid Microgrid. The Hybrid Microgrid shall remain disabled, disconnected, and/or de-energized as the case may be until such time as the Company is satisfied that the conditions referred to above have 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.** 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 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, except to the extent of damages directly caused by the negligence or willful misconduct of Company; provided that the Company is not excused for failure to perform in accordance with its contracts, tariffs or applicable law.
- (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.

- (iii) The Company shall not be responsible for any claims and/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, except to the extent such claims and/or damages are directly caused by the negligence or willful misconduct of Company; provided that the Company is not excused for failure to perform in accordance with its contracts, tariffs or applicable law.
- (i) Each Party's liability to the other Party for failure to perform its obligations under this Agreement shall be limited to the amount of direct damage actually incurred. In no event shall either Party be liable to the other Party for any punitive, incidental, indirect, special, or consequential damages of any kind whatsoever, including for loss of business opportunity or profits, regardless of whether such damages were foreseen.

(b) Indemnification.

(i) Microgrid Operator shall at all times indemnify, defend and hold harmless Company from any and all damages, losses, claims and/or 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 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, and/or actions were directly caused by the negligence or willful misconduct of Company.

(ii) Company shall at all times indemnify, defend and hold harmless Microgrid Operator from any and all damages, losses, claims and/or 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 Company's performance of its obligations under this Agreement, except to the extent that such damages, losses, claims, and/or actions were directly caused by the negligence or willful misconduct of Microgrid Operator and/or Participant.

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.4, 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) 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, 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 FIVE MILLION DOLLARS (\$5,000,000) for any occurrence. The limit may be satisfied through the use of umbrella or excess liability insurance sufficient to meet these requirements.

- (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 30 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, including service address. Such data shall include additions, deletions or changes to the listing of Participants in the Hybrid Microgrid.
- (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. The Parties shall attempt to resolve any dispute arising out of this Agreement, however defined, in accordance with the Dispute Resolution provision in Section 25 (n). All legal proceedings 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 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) **Dispute Resolution.** Each Party agrees to attempt to resolve all disputes arising hereunder promptly, equitably and in a good faith manner.
- (i) Any dispute regarding the application of Tariffs or Rules may be submitted to the Commission to be resolved. If a Party disagrees with the Commission decision, then appeals may be taken in the manner and in the time provided by the Hawaii Revised Statutes and the Rules of Practice and Procedure before the Public Utilities Commission.
  - (ii) If any dispute other than in Sec. 25(n)(i) arises between the Parties which cannot be resolved by the Parties within thirty (30) Days after written notice of the dispute to the other Party, then the dispute may, upon the agreement of the Parties, first be submitted to confidential mediation in Honolulu, Hawai'i pursuant to the administration by, and in accordance with the Mediation Rules, Procedures and Protocols of, Dispute Prevention & Resolution, Inc. (or its successor) or, in their absence, the American Arbitration Association ("DPR") then in effect. If the Parties agree to submit the dispute to confidential mediation, the Parties shall each pay 50% of the cost of the mediation (i.e., the fees and expenses charged by the mediator and DPR) and shall otherwise each bear their own mediation costs and attorneys' fees. If the Parties do not submit the dispute(s) to mediation, or if they do submit the dispute(s) to mediation but settlement of the dispute(s) is not reached within 60 Days after commencement of the mediation, then either Party may initiate legal proceedings in a court of competent jurisdiction in the State of Hawai'i.
- (o) **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.

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., HAWAI'I ELECTRIC LIGHT COMPANY, INC.]**

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

**Electrical Contractor Information**

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

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

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

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

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)**
- Map Showing Defined Electrical Boundaries**

5. Generator Qualifications

Generator Type(s) included in Hybrid Microgrid:

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

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):					

8. Reserved

Not Applicable

**9. Interconnecting Equipment Technical Data**  Not Applicable

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 (Amps):	Interrupting Rating (Amps):	Trip Speed (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

Protection Devices  Not Applicable

Interconnection Location (Service Address)	Nearest Customer Protective Device Type	Manufacturer	Model

Generator Reactive Capability Curve (if available)

Not Applicable

*Attach copy of Generator Reactive Capability Curve*

---

10. Feasibility Analysis

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

Yes  No

**EXHIBIT B****HYBRID MICROGRID INTERCONNECTION FACILITIES**

Microgrid Operator agrees to furnish, install, operate, and maintain the Facility in accordance with the provisions of this Agreement, including, without limitation, the operating procedures and performance standards described in this Exhibit B (Hybrid Microgrid Interconnection Facilities). After the Commercial Operations Date, Microgrid Operation agrees that no changes or additions to the Hybrid Microgrid shall be made without prior written approval by Company and amendment to the Agreement unless such changes or additions to the Hybrid Microgrid could not reasonably be expected to have a material effect on the assumptions used in performing the Interconnection Requirements Study.

**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 portions of the Hybrid Microgrid supplied and installed by the Microgrid Operator shall be designed, installed, and maintained and operated in conjunction with the portions provide by the Company 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

- (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 1547-2018 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 and above).
  - (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 designed to quickly respond to changes in loads and regulate the voltage and frequency of the island within +/- 10%  $\Delta V$ , +/- 0.5 Hz  $\Delta f$ , and to 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-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. If applicable, 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, 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 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: \_\_\_\_\_

\_\_\_ 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 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.

- (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.

Microgrid Operator shall ensure that the ramp rate of the aggregate of the Hybrid Microgrid is less than the following limits for all conditions including start up, normal operations, curtailing and uncurtailing, Microgrid Operator adjusting the Hybrid Microgrid's net real power export, changes in the solar resource, and shut down for the following periods as calculated in accordance with Schedule I to this Exhibit E.

- Maximum Ramp Rate Upward of [ ] MW/minute for all periods. [TO BE DETERMINED FOLLOWING Technical Review.]

Maximum Ramp Rate Downward of [ ] MW/minute for all periods other than periods for which such maximum is not operationally possible because of rapid loss of solar resource. [Ramp rates will be set equal to (Total Rated Capacity of the Microgrid / 3 MW) x 2 MW/min.]

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.

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.

1. 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 Agreement. Microgrid Operator warrants that it shall (A) follow 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 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. If Interconnection Agreement is extended, verification testing shall also be performed every five 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 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. Upon extension of the Interconnection Agreement, the the battery shall either be replaced or have a discharge test performed every five years. 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 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

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\*].

---

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

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]**

**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 \_\_\_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 \_\_\_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 \_\_\_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.

HAWAIIAN ELECTRIC COMPANY, INC.

- (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.

HAWAIIAN ELECTRIC COMPANY, INC.

- 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

HAWAIIAN ELECTRIC COMPANY, INC.

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. The Company shall detail the process for re-connecting and synchronization, including the conditions under which the Microgrid Operator can re-connect to the Company System. [Details of the process to be worked out between the Company and Microgrid Operator]
  - 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

HAWAIIAN ELECTRIC COMPANY, INC.

there is agreement among Participants and the Microgrid Operator. The 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.
- 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]**

HAWAIIAN ELECTRIC COMPANY, INC.

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

Unless otherwise defined in this Agreement, capitalized terms in this Microgrid Services Tariff - Hybrid Microgrid 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.

HAWAIIAN ELECTRIC COMPANY, INC.

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 emergency conditions and pre-emergency conditions as specified in footnotes 5 and 7 in Rule No. 14H Appendix I.
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, lighting, 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. Hybrid Microgrids may enter Island Mode only under (1) Emergency Events, or (2) as otherwise permitted or directed by the Company.
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.
34. “Microgrid Services Program” is as defined in the WHEREAS clauses in beginning of the Agreement.

HAWAIIAN ELECTRIC COMPANY, INC.

Order No XX,  
Transmittal Letter dated XX

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 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

HAWAIIAN ELECTRIC COMPANY, INC.

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. “Total Peak Demand” means the peak demand (MW) in the previous 12-months as measured by the Company, or as estimated by the Company where actual measurements are not available.
51. “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.

## Service List

DEAN NISHINA (Dean.K.Nishina@dcca.hawaii.gov)  
Executive Director  
Division of Consumer Advocacy  
Dept. of Commerce & Consumer Affairs  
P.O. Box 541  
Honolulu, HI 96809

CHRIS DEBONE (chris@hawaiienergyconnection.com)  
President  
Distributed Energy Resources Council  
99-1350 Koaha Place  
Aiea, HI 96701

WILLIAM J. ROLSTON (willenergyisland@gmail.com)  
Director – Energy Island  
73-4101 Lapaau Place  
Kailua Kona, HI 96740-8424

CHRISTOPHER B. BERENDT (christopher.berendt@faegredrinker.com)  
Co-Counsel  
Drinker Biddle & Reath LLP  
1500 K Street, N.W.  
Washington, DC 20005-1209

Counsel for the Microgrid Resources Coalition

GERALD A. SUMIDA (gsumida@carlsmith.com)  
ARISMA A. MULLER (amuller@carlsmith.com)  
Carlsmith Ball LLP  
ASB Tower, Suite 2100  
1001 Bishop Street  
Honolulu, HI 96813

Attorneys for Ulupono Initiative