

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF HAWAII

In the Matter of

PUBLIC UTILITIES COMMISSION

Instituting a Proceeding to
Investigate Establishment of a
Microgrid Services Tariff

DOCKET NO. 2018-0163

COMMENTS

of

MICROGRID RESOURCES COALITION

on

HAWAIIAN ELECTRIC'S TRANSMITTAL OF A DRAFT MICROGRID SERVICES TARIFF

and

CERTIFICATE OF SERVICE

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COMMENTS OF MICROGRID RESOURCES COALITION

TO THE HONORABLE PUBLIC UTILITIES COMMISSION OF THE STATE OF HAWAII:

The Microgrid Resources Coalition (“MRC”) hereby respectfully submits its comments on Hawaiian Electric’s Transmittal of a Draft Microgrid Services Tariff and the materials transmitted therewith submitted to the Public Utilities Commission of the State of Hawaii (the “Commission”) on March 30, 2020 (the entire package of materials is hereafter referred to as the “Company Submittal”, and the draft Microgrid Services Tariff as the “Draft Tariff”). The MRC submits its comments pursuant to the Commission’s Order No. 36514, filed September 16, 2019 (“Order No. 36514” or the “Order”), in this proceeding to investigate establishment of a microgrid services tariff for Hawaiian Electric Company, Inc. (“HECO”), Hawai’i Electric Light Company, Inc. (“HELCO”), and Maui Electric Company, Limited (“MECO”) (collectively, the “Company”) pursuant to Act 200.¹

I. Introduction

¹ House Bill 2110, H.D. 2, S.D. 2, 29th Leg. Reg. Sess. (2018), was signed by the Governor and assigned Act 200 on July 10, 2018 (“Act 200”) and is codified in Haw. Rev. Stat. §269-46.

In Order No. 36514, the Commission directed the Company to work with interested parties to develop a microgrid services tariff responsive to the requirements of Act 200 and to submit a draft tariff. As a reminder, Act 200 defines a microgrid service tariff as follows:

"Microgrid services tariff" means a tariff approved by the public utilities commission that:

- (1) Is designed to provide fair compensation for electricity, electric grid services, and other benefits provided to, or by, the electric utility, the person or entity operating the microgrid, and other ratepayers;
- (2) To the extent possible, standardizes and streamlines the related interconnection processes for microgrid projects. . . .²

The Draft Tariff accomplishes neither. Its only nod to microgrid compensation is to say that microgrids are eligible for the same programs as other resources.³ However, the Company has made scant effort to assure that other programs actually permit participation by microgrids and has given little thought to compensating microgrids for services that they can uniquely provide. Moreover, with respect to interconnection, the Company has not sought to streamline the process but instead seeks to impose additional discriminatory hurdles to microgrid interconnection and operation compared to less resilient distributed energy resource configurations.

The MRC has attached its markup of the Draft Tariff itself as Exhibit A and its markup of proposed new provisions for Rule No. 24 and other Company Rules as Exhibit B. In what follows we provide a background discussion of the purposes of Act 200 and the expected operation of a microgrid. We next discuss our proposed changes to the Draft Tariff and other issues that go beyond simple edits including:

- Integration of microgrids in other programs of the Company;
- Other compensation for microgrids;
- Operational and accounting issues for islanding;
- Interconnection;
- Hybrid Microgrids; and
- Limitation of Company liability.

² Haw. Rev. Stat. 269-46(c).

³ Draft Tariff Section E.1.a.

We follow with a brief discussion of a model in which the Company supports and cooperates with microgrids for the benefit of the wider grid, and conclude with a request that the Commission direct the Company go back to the drawing board on many of the issues that we raise and engage stakeholders in a Commission or third party managed process to ensure discussion of the full range of issues.

II. Background

A. The Purposes of the Act

In Adopting Act 200 the Legislature articulated several key findings:

- Microgrids can facilitate the achievement of Hawaii's clean energy policies by enabling the integration of higher levels of renewable energy and advanced distributed energy resources.
- Microgrids can also provide valuable services to the public utility electricity grid, including energy storage and demand response, to support load shifting, frequency response, and voltage control, among other ancillary services.
- Microgrids can isolate themselves from the larger electricity grid in a time of emergency. . . . [T]he use of microgrids would build energy resiliency into our communities, thereby increasing public safety and security.
- [W]ithout standard terms regarding interconnection and the value of microgrid services, businesses and residents developing microgrids may choose to leave the utility grid altogether, thereby weakening the overall system and increasing costs for other utility customers.⁴

B. The Operation of Microgrids

⁴ Act 200, §1.

Microgrids, as the statutory definition correctly outlines, encompass both load and generation and also the ability to act as its own micro-control area to balance load and generation through sophisticated controls. In practice, they frequently combine several forms of generation, electrical or thermal storage, and smart internal load management, which allows them both to optimize electric and thermal energy use in normal conditions and to act as an island in emergencies. They are typically designed with generation resources that can meet in the neighborhood of 80 percent of their included load to avoid overbuilding and are able to shed or shift load internally if they need to operate in island mode.

Most microgrids are net importers from the grid. Their included generation, however, keeps such imports modest, and their overall effect can substantially reduce grid peak. They can act as a partner to the grid in this effort even without specific compensation if they face a time-of-use tariff. MRC members who operate microgrids in regions served by Regional Transmission Organizations often purchase imported energy at real-time wholesale prices with a small retail markup.

Given these capabilities, microgrids can indeed accomplish the goals articulated in the legislative findings. They enable integration of renewable energy, as contemplated by the Act, by balancing variable renewable generation with storage and flexible generation so that the burden of balancing variable generating resources does not fall on the Company. Flexibility is provided in part by storage, but longer-term flexibility typically comes from small scale fuel-fired units, using a number of different technologies but frequently including co-generation, that are far cleaner and more efficient to operate than Company central station generation. In addition, while most of these generators currently use fossil fuels, many can move directly to hydrogen or biofuels as they become more economic. By deploying a microgrid that generates 30 to 40 percent of its energy from solid or liquid fuel a customer or community substantially advances the state's clean energy goals and can continue to improve over time.

MRC members currently provide all of the types of services to the grid contemplated by the Act's findings. As discussed further below, however, existing Company programs and tariffs do not yet permit third party provision of these services, or do not permit them in ways that would be accessible to microgrids. Finally, microgrids are the only long-term solution to

customer and community resilience. As the final legislative finding cited above suggests, meeting these goals will depend on the microgrid services tariff.

III. Issues Raised by the Draft Tariff

A. Integration of Microgrid Services in other Programs of the Company

Section B.3. states that “existing tariffs and programs shall generally be applicable” to microgrids, and Section E.1. of the Draft states that “all applicable energy credit rates and compensation under existing applicable programs, Customer tariff(s), and rate schedules will apply to the Microgrid Operator of the Customer Microgrid during Grid-Connected Mode.” However, on their face, most of the relevant programs and tariffs would not apply to microgrids. Many of them only apply to Customer-owned resources, or resources located on a Customer’s premises. The latter would typically apply to most single customer microgrids, but as the discussions in the working group acknowledged, Customer Microgrids may in some circumstances have multiple participants. In those cases, generation may be located on the land of non-Customer participants or even land owned by third-party generators within the microgrid. In addition, while some Company programs acknowledge that generating facilities may be leased as well as owned, most do not. Many renewable energy generators are developed and operated as a service pursuant to power purchase arrangements and are owned by third party tax investors taking advantage of federal tax credits. In the case of governmental and nonprofit participants, these generators cannot even be leased to the beneficiaries under tax law requirements, which limits the role of third-parties in providing development, technical and financial assistance to Customers participating in the Company programs.

To avoid these limitations from preventing microgrid participation, we have made additions to Section B.3. that provide for participation by “all Generating Facilities that are behind the point of common coupling of a Customer Microgrid and under the operating control of the Microgrid Operator.” None of the technical requirements of the programs are modified by this change. We have also suggested in this section that Customer Microgrids be exempt from Rule No. 15. This rule prevents resale of power provided by the Company in addition to land ownership requirements. As contemplated by the working group discussion, except in Island

Mode, the Microgrid Operator will use a mix of internal generation and imported power to supply participants within the microgrid, and the pricing of the aggregate power deliveries to participants will be governed by the contractual relationships among the participants and the Microgrid Operator.

Other Company programs contain restrictions that are more difficult to categorize, and we have not tried to draft specific recommendations. Demand response programs appear to be limited to automatic remote triggering by the Company. Microgrids, however, are typically capable of providing demand response through a range of generating resources, storage, and load reductions. Microgrids are participating in economic and emergency demand response programs on a reduce-when-called basis across the country and would be in a position to provide a better range of response on this basis.

Finally, many Company programs are restricted to renewable generation. As discussed above, microgrids for resilience as well as operating reasons may include some fossil fuel generation, but nevertheless, make an important contribution to state renewable energy goals. The microgrid can be expected to internally exceed state goals by including renewable generation and also by acting as a “shock-absorber” for the grid, helping grid operators to manage unbuffered distributed energy resources. At a time when utility-scale renewable generation in some regions is discussing load banks to shed power, microgrids can offer the ability to rapidly ramp imports both up and down. Moreover, with adequate metering on individual generating resources, it is possible to determine what proportion of generation in a microgrid in any time interval is from renewable resources, and microgrids could be credited accordingly.

B. Other Compensation for Microgrids

Two other areas of possible compensation unique to microgrids should receive meaningful consideration in this proceeding but have not so far. The first is payments for resiliency services, which Section E.3. of the Draft Tariff kicks indefinitely down the road. This was on the agenda more or less from the beginning of the working group, but as we pointed out in our letter to the Commission of February 1, 2020, responding to the filing of the working

group draft (the “Response Letter”), “the Working Group has failed to schedule any meaningful discussion of compensation for microgrids outside of other DER tariffs, whether for resilience or any other purpose.” As the MRC suggested in materials provided to the working group, we believe the Commission should consider making a request for assistance from the Hawaii Emergency Management Agency to work with communities throughout the state to identifying critical facilities for community resilience on a common basis. Microgrids that can sustain these facilities in a long duration emergency should be eligible for financial assistance through public benefit funding.

A second area to consider for compensation is islanding as a service. Islanding is the ultimate demand response, but as we noted in our Response Letter, “islanding is more disruptive and expensive than typical demand response and should require separate treatment” from ordinary demand response. Notwithstanding our Response Letter and subsequent discussions with the working group chairs, the Draft Tariff added a definition of “Emergency Event” that included “a Scheduled Island Mode Operation as a pre-emptive action ahead of impending weather events or natural disasters or in response to other unusual conditions.” This expands the concept of “emergency” beyond the requirements of Rule No. 14H in a way that discriminates against microgrids and requires microgrids to provide free services to the grid. We have replaced this definition with a reference to the provisions of Rule No. 14H Appendix I. We encourage the Company to adopt a tariff that compensates microgrids fairly for islanding services as a type of ancillary service.

Finally, as Act 200 described, microgrids are capable of providing a wide variety of other ancillary services. We encourage the Company and the Commission to expand the range of services that can be provided by customer generation and storage resources.

C. Operational and Accounting Issues for Islanding

In addition to uncompensated services, the Company seeks to impose operational requirements on islanding and returning to parallel operation that are in excess of the requirements already in place under Rule No. 14H Appendix I for self-generators. This too discriminates against microgrids and is contrary to both the spirit and the letter of Act 200. To

the extent that Section H.3. expands on Rule No. 14H we suggest it be deleted. The definitions of “Scheduled Island Mode Operation” and “Unscheduled Island Mode Operation” are probably unnecessary but in any event we have deleted portions that appear to include scheduling and notice requirements separate from the substantive text In Section H, which can speak for itself.

In general, throughout the working group process the Company has sought to limit the ability of microgrids to operate in Island Mode. Practically, such limitations are unnecessary because microgrid incentives will limit island operation – Island Mode can be expensive and will likely require internal load shedding. Microgrid operators are unlikely to island without good cause. No other customer guarantees to make a continuous demand for power (though their eligibility for a rate class may be affected), and microgrids should be no different. Microgrids in the many other jurisdictions where MRC members operate are generally able to island and resume parallel operation with little or no notice or consultation with grid operators - islanding is typically not the focus of direct regulations. Because of the sophisticated controls required to island at all, microgrids generally pose less risk to grid operations than other customer generation, and this proceeding should focus on achieving the major benefits of dynamic microgrid services, not minor risks.

Island Mode raises accounting as well as operational issues. The Company has sought in Section B.6. to exclude Customer Microgrid island mode operation from its Renewable Portfolio Standards. The MRC has no objection to this but believes that operation in Island Mode should potentially be excluded from other tariff calculations. We have suggested additional language in Section E.4. to exclude island mode operation of Customer Microgrids from the calculation of standby charges. There may be other such issues that we have not identified as yet.

D. Interconnection

Act 200 calls for a microgrid services tariff that “(t)o the extent possible, standardizes and streamlines the related interconnection processes for microgrid projects.”⁵ The Draft Tariff makes no attempt to do either. Section D.1.a. simply states: “Customer Microgrids are subject to

⁵ Haw. Rev. Stat. §269-46(c).

the applicable program or Rule, for which they seek Interconnection,” without any guidance as to what may be applicable. We believe, for the most part that will mean Rule No. 14H Appendix I and may involve Rule No. 18 for microgrids eligible for net metering. As the Company adds additional services it purchases for the grid (such as frequency regulation) there may be specific communications equipment and protocols that may be required. Rule No. 14H Appendix III provides for expedited review for certain self-supply systems and NEM+ systems and a simplified process for certain other systems.

In the absence of a special exception, the various step timelines in Appendix III for Company action on a typical application aggregate longer than seven months and do not account for time to the applicant to respond or delays if an application is deemed incomplete. In all the process can easily exceed one year. The tariff should provide shorter, more certain outcomes, and the Company should have incentives to achieve that result. The Commission is separately pursuing incentive ratemaking in Docket 2018-0088. The Commission may wish to consider a benchmark in the nature of “90 x 120,” (i.e. 90 percent of interconnection applications completed in 120 days) and provide incentive payments for meeting the benchmark and possible penalties for falling short of a minimum standard. In any event, we strongly suggest that the Commission require the Company to review Appendix III with a view to articulating a streamlined interconnection process for most microgrids as Act 200 requires.

E. Hybrid Microgrids

The Draft Tariff treats Hybrid Microgrids at great length. The MRC has provided limited comments on these provisions because we believe they are largely unworkable. In the Draft Tariff, the model of a hybrid microgrid requires (i) every customer to be a Customer of the Company, (ii) the excess over self-supply from every Customer generator to be sold to the Company, and (iii) all power for all Customers to be purchased from the Company, including in Island Mode. The only stated role of the Microgrid Operator is to operate the microgrid in Island Mode. As a practical matter, the only way for this to function at all is if the Microgrid Operator acts as an aggregator for all the included generation so that it has the regular ability to be in operational control of the included generation.

The larger problem, however, is that there is very little incentive for anyone to attempt to undertake development and operation of this version of a hybrid microgrid. The operator, even serving as an aggregator, would have very limited ability to produce any economic benefit for the Customers. The development, equipment and operating costs of the Microgrid Operator would have to be paid by the Customers solely with a view to resilience. To top it off, the Company has proposed a disclosure regime that rivals the complexity and exceeds the delivery requirements of the federal securities laws. It requires the Customer to separately acknowledge delivery or explanation of over 50 items.

In material that the MRC provided to the working group, we provided a typology of possible hybrid microgrids. In the simplest of these, the Company would lease to a Microgrid Operator a portion of its system to be included in a hybrid microgrid, which would otherwise operate in most respects like a Customer Microgrid. Without discussion with the working group, the Company asked the Commission for guidance on proposals that included “retail wheeling,” and was advised not to pursue them. While a lease of wires is a much simpler proposition than wheeling of power over the general grid (there is no need for elaborate cost allocation as all costs would be paid by the microgrid), we had no further discussion of other models. We are not aware of what was or wasn’t explained to the Commission or the reasoning behind its guidance, but we are familiar with hybrid microgrids that have been built elsewhere and believe there are better ways.

Finally, the Company has included in the Company Submission over 100 pages of supporting material directed at hybrid microgrids, none of which was discussed with the working group even in concept. The MRC has not attempted to provide detailed comments on this material other than as noted above with respect to the disclosure requirements. In our limited review we point out that Section 2 provides that the Interconnection Agreement for a Hybrid Microgrid terminates 5 years after the commercial operation date and Section 2. (c) permits the Company to terminate if “there is a material change in an applicable statute, rule or tariff and Company reasonably concludes that the Microgrid Services Program cannot be continued”. Each provision would make this agreement unfinanceable. No investor would engage in a project of this magnitude if its entire return was limited to five years and especially if the Company can pull out the rug earlier by changing its tariff.

F. Limitation of Company Liability

Section C. of the Draft Tariff provides a limitation of liability for the Company. We have added language to ensure that the Company is not excused from liability for violation of its obligations under contracts, tariffs or law.

IV. The Grid of the Future

The MRC believes that the most important role for the Company is preparing its grid to take advantage of the benefits that the legislature expects from microgrids. The grid is made more reliable when it is served by smaller, more diverse resources that reduce the size and impacts of contingencies. The grid is made more resilient when individual microgrids can serve their local communities in emergencies, and when the grid itself is capable of being reconfigured, perhaps in larger islands, to take advantage of resilient local resources. If, as Act 200 envisions, the grid of Hawaii's future includes many privately-operated distributed energy resources including many microgrids, then the Company must have the technical capacity to "conduct the distributed energy resource concert" to realize their benefits. It is the Company's job, as it proclaims in the preamble to the Draft Tariff, to "encourage and facilitate the development and use of new microgrids throughout Hawai'i."

V. Conclusion

The MRC is disappointed with the Company's response to the working group's efforts, both the process and the product. As is clear from the redline versions included in the Company submission, what has been filed with the Commission bears only a passing resemblance to even the diluted draft produced by the working group. While we would not object to the tariff as we have modified it, the MRC strongly suggests that the Commission send the Company back to the drawing board, and that it consider reconvening the working group with a Commission or third-party moderator who would ensure a complete agenda and an open discussion.

Respectfully submitted on April 27, 2020.

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CERTIFICATE OF SERVICE

I hereby certify that I have on this date served copies of the foregoing document upon the following parties by the method of service noted below:

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C. Baird Brown

C. Baird Brown

Counsel to the Microgrid Resources Coalition

Exhibit A

Microgrid Resources Coalition Comments

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. [and includes the Microgrid Operator of a Customer Microgrid.](#)
- h. "Customer Interconnection Agreement" means the applicable interconnection agreement for a non-utility Generating Facility.

- i. "Customer Microgrid" is a Microgrid that uses non-utility infrastructure beyond the Point of Common Coupling¹, 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. 14 H 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 that, in either case, 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 beyond the PCC, including distribution lines, Generating Facilities, and related equipment, to meet its interconnected loads.
- q. "Hybrid Microgrid Facility" means the facilities and equipment needed to create and operate a Hybrid Microgrid, including the generation, breakers, protective and associated equipment, improvements, and other tangible assets, contract rights, easements, rights of way, surface use agreements and other interests or rights in real estate reasonably necessary for the construction, operation, and maintenance of the Hybrid Microgrid subject to this Tariff.
- r. "Interconnect" or "Interconnected" or "Interconnection" means the physical connection(s) between the utility electric grid (i.e., the Company System) and the Microgrid at a designated PCC.

Deleted: , as determined by Company in its reasonable discretion, a condition or situation requiring prompt action by Company (a) to maintain the reliable operation of the Company System; (b) to prevent or limit the loss of load or generation; (c) to maintain public safety or the safety of Company's personnel; or (d) to protect Company, Customer, or third-party property; or as a Scheduled Island Mode Operation as a pre-emptive action ahead of impending weather events or natural disasters or in response to other unusual conditions

Commented [BB1]: It is not clear what the intention of this new clause is. It would be more accurate to say that the Company acts as the balancing authority for the load and generation included in the Microgrid.

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

- s. "Interconnection Agreement" means the Hybrid Microgrid Interconnection Agreement attached hereto as, Appendix II.
- t. "Interconnection Requirements Study" or "IRS" means pursuant to Rule 14H, Appendix III, Section 4, a study to establish the requirements for Interconnection with the Company System.
- u. "Island Mode" means a mode of operation when a Microgrid that normally operates in Grid-Connected Mode is disconnected from the Company System at 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.
- v. "Microgrid," means a group of interconnected loads and distributed energy resources within clearly defined electrical boundaries that acts as a single self-governing controllable entity with respect to the utility's electrical grid and is connected to a public utility's electrical grid at the PCC to operate in Grid-Connected Mode and can disconnect from the utility's electrical grid to operate in Island Mode only during Emergency Events, and that: (1) is subject to this Microgrid Services Tariff; and (2) generates or produces energy.
- w. "Microgrid Participant" or "Participant" means 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 in advance.
- ee. "Total Rated Capacity" means the aggregate total of all Generating Facilities that intend to supply power to the Hybrid Microgrid during Island Mode as defined in Section 7 of Exhibit A to the Interconnection Agreement.

Commented [BB2]: This phrase is more accurate here than in the definition of Grid Connected Mode, but you also could say that the Microgrid Operator acts as the balancing authority.

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Commented [BB3]: This term was suggested in the Working group to describe a participant in a Customer Microgrid, who may not be a Customer of the Company. All participants in a Hybrid Microgrid as defined in the Draft Tariff must be Customers of the Company, so it is less needed there.

Deleted: is scheduled and coordinated..

Deleted: between the Microgrid Operator and the Company,

Deleted: as more particularly described in Section H, below.

ff. "Unscheduled Island Mode Operation" means a Microgrid operating in Island Mode that is not planned in advance but results in response to an unplanned event on the Company System or within the Microgrid.

Deleted: scheduled

Deleted: or coordinated between the Microgrid Operator and the Company i

Deleted: , 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 so that they are capable of operating in Grid-Connected Mode are not eligible for this Tariff.

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3. For Customer Microgrids and Hybrid Microgrids, existing tariffs and programs shall generally be applicable. However, a Customer Microgrid shall not be subject to Rule 15. In addition, any Company Rule which requires that Generating Facilities be owned by a Customer or located on Customer premises to be eligible shall be deemed to include all Generating Facilities that are behind the Point of Common Coupling of a Customer Microgrid and under the operating control of the Microgrid Operator.

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4. A Microgrid Operator or Microgrid Participant with existing or future agreements to provide grid services to the Company are obligated to meet such requirements (e.g., availability, capacity, etc.) when such services are called. Participation in a Microgrid service whereby the operation of that Microgrid precludes the Customer (whether a Microgrid Operator or Microgrid Participant) from delivering services (e.g., because the Microgrid is in Island Mode) in accordance with said grid services contract or tariff shall not absolve a Microgrid Operator or Microgrid Participant from such contractual or tariff obligations and inability to deliver services.

5. Microgrids shall, at minimum, meet the requirements of all Hawaii Laws and Regulations governing generating resources.

6. Microgrids operating in Island Mode shall not be included in the calculation of the Company's Renewable Portfolio Standards.

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C. RESPONSIBILITIES AMONG THE PARTIES

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

3. Limitation of Liability - Customer Microgrids. The Company shall not be responsible for claims and/or damages arising out of or related to the Customer Microgrid, except to the extent 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.

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

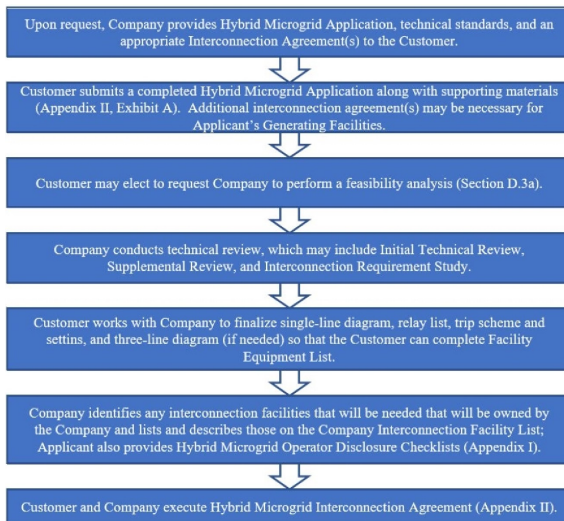
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D. INTERCONNECTION

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

- a. Customer Microgrids are subject to the applicable program or Rule, for which it is seeking Interconnection.

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



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

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- b. If the Applicant chooses to undertake a feasibility analysis, the Applicant shall agree to pay the cost estimate for the feasibility analysis provided by the Company. The Company shall make best efforts to complete the feasibility analysis within one hundred twenty (120) calendar days of the Company's receipt of all of the following: (a) the Applicant's written agreement to move forward with the feasibility analysis; (b) a complete set of data, to the Company's satisfaction, needed to conduct the feasibility analysis; and (c) payment of the feasibility analysis cost.
- c. The completion of the feasibility analysis may include the Company's proposal to the Applicant of the following: (a) Interconnection requirements and a non-binding, good faith estimate of the Company's portion of the costs to perform the Interconnection requirements; (b) protection and synchronizing relays and settings, protection, synchronizing and control schemes; and/or (c) any other equipment requirements necessary to enable the Hybrid Microgrid.
- d. The feasibility analysis is intended to inform the Applicant regarding potential Interconnection facilities and costs required to Interconnect the Hybrid Microgrid prior to development of the Microgrid. The feasibility analysis may be used to inform the scope of the Interconnection Requirements Study should one be required pursuant to Rule 14H, Appendix III.
- e. Additional Interconnection facilities required to enable Microgrids shall be borne by the Applicant.
- f. Subsequent to the submittal of a Hybrid Microgrid Application and the feasibility analysis, if applicable, and prior to the execution of an Interconnection Agreement, the Applicant may revise the Hybrid Microgrid. Following a complete Hybrid Microgrid Application submittal, the interconnection process as described in Rule 14H will be followed.

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- 4. The proposed PCC between a Hybrid Microgrid and the Company System shall be reviewed to ensure the Microgrid boundary is properly defined and can be isolated from the rest of the Company System for the purpose of Island Mode operation. The Company System within a Microgrid boundary shall also be examined to ensure adequate thermal rating is available.
- 5. Under no circumstances shall a Customer or Microgrid Operator Interconnect and/or operate a Hybrid Microgrid or Customer Microgrid with the Company's System without prior written approval by the Company in the form of a fully executed Interconnection Agreement for Hybrid Microgrids or Customer Interconnection Agreement for Customer Microgrids.

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E. BILLING AND COMPENSATION

- 1. Compensation for Customer Microgrids.
 - a. For a Customer Microgrid, the Microgrid Operator is a Company Customer, participants receiving power within the microgrid need not be Company Customers, and all applicable energy credit rates and compensation under existing applicable programs, Customer tariff(s), and rate schedules will apply to the Microgrid Operator of the Customer Microgrid during Grid-Connected Mode.
- 2. Compensation for Hybrid Microgrid Operator and Participants.

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

3. Compensation for resilience grid services may be compensable under an appropriate resiliency tariff, rate, or rider.
4. Customer Microgrids shall be subject to Schedule SS (Standby Service), as modified from time to time except as generation within the Customer Microgrid may be excluded by the terms of Schedule SS. For purposes of the exception set forth in Section F.2.(c) of Schedule SS all of the resources in a Microgrid, other than resources exempt under Section F.2.(a) and (b) of Schedule SS, will be treated as a single controllable resource. Periods of operation in Island Mode shall not be included in calculating applicable Standby Charges for Customer Microgrids.

Commented [BB4]: Act 200 permits the Commission to consider this in this docket.

F. HYBRID MICROGRID PARTICIPANTS

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

Commented [BB5]: This Checklist and the related process is unduly burdensome and unnecessary.

Commented [BB6]: Act 200 requires the tariff to streamline and reduce barriers. Not impose new ones.

G. HYBRID MICROGRID APPLICATION

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

serve as the date of the Applicant's Hybrid Microgrid Application for queue purposes, in the event more than one Applicant is seeking to establish the same or partially overlapping microgrid boundaries. Microgrid boundaries will be established on a first come first served basis.

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

H. MICROGRID OPERATION

1. Capitalized terms used in this section are as defined in this Rule No. XX, Microgrid Services Tariff, and Rule 14H. In the event of any conflict between capitalized terms used in this section and Rule 14H, defined terms in this Rule shall control.
2. The Company may disconnect the Customer Microgrid or Hybrid Microgrid in the same manner as defined for a Generating Facility in Rule 14H Appendix I, Section 4.a and 4.b.

3. Customer Microgrid Operation: A Customer Microgrid may intentionally enter into and out of Island Mode on a scheduled or unscheduled basis. A Scheduled Island Mode Operation can be initiated through (1) a manual action by the Microgrid Operator of a Customer Microgrid or (2) by other operating dispatch means (e.g., energy management system).

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

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

Commented [BB7]: To the extent that Section H.3. imposes requirements that are more onerous than Rule 14 H it violates both the letter and the spirit of Act 200.

Commented [BB8]: It is not clear what this means or why it is needed. Two paragraphs below, Unscheduled outages are "via autonomous action by the Customer". That should be sufficient here. The Company cannot initiate island mode except by directing the Microgrid Operator in an Emergency or otherwise in accordance with Rule 14 H or through a tariff that compensates the microgrid for a service.

Deleted: The Company may notify the Microgrid Operator that advance notice of Scheduled Island Mode Operation with the Company System may be required in order to assure that a smooth transition is executed and coordinated.

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Commented [BB10]: It is not clear what this means.

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

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Commented [BB11]: There may well be more than one.

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

Commented [BB12]: What is the rated power of a microgrid with two or more generating resources and/or storage?

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

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

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

5. Hybrid Microgrid Monitoring and Reporting: Each 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;

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

- 6. Remote control: The Microgrid Operator shall provide a means of remote control for PCC of the Hybrid Microgrid.
- 7. Adjustable settings: Generating Facilities within a Hybrid Microgrid shall have the ability to adjust protection settings to implement various setting groups for different modes of operation of the Generating Facility and the Hybrid Microgrid.

I. HYBRID MICROGRID CAPACITY ALLOCATION

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

Exhibit B

Microgrid Resources Coalition Comments

Proposed Edits to Rule 24 and other DER Tariffs

F. **MICROGRIDS**

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

Commented [BB1]: This set of provisions works only if the recommended changes in the Microgrid Tariff are adopted.

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