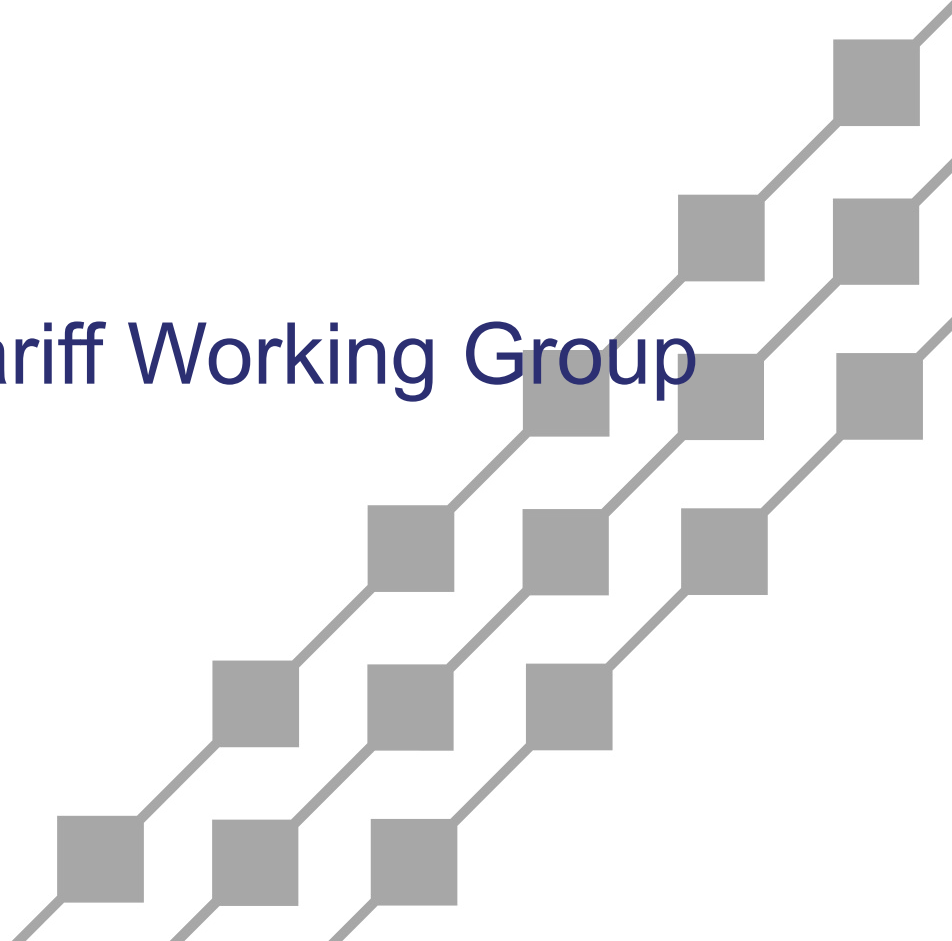




**Hawaiian
Electric**

Microgrid Services Tariff Working Group

January 11, 2021



Agenda

- ◆ Revisit Action Item List
- ◆ Today's Focus
 - Data Set for Feasibility Analysis
 - Hybrid MG Compensation (MRC/Ulupono)
 - Hybrid MGO IA – Clarify phoneline req't and soft-start ramp rate
 - Hybrid MGO IA – Checklist Discussion (CA)
 - DER Tariff Changes
- ◆ Next Steps



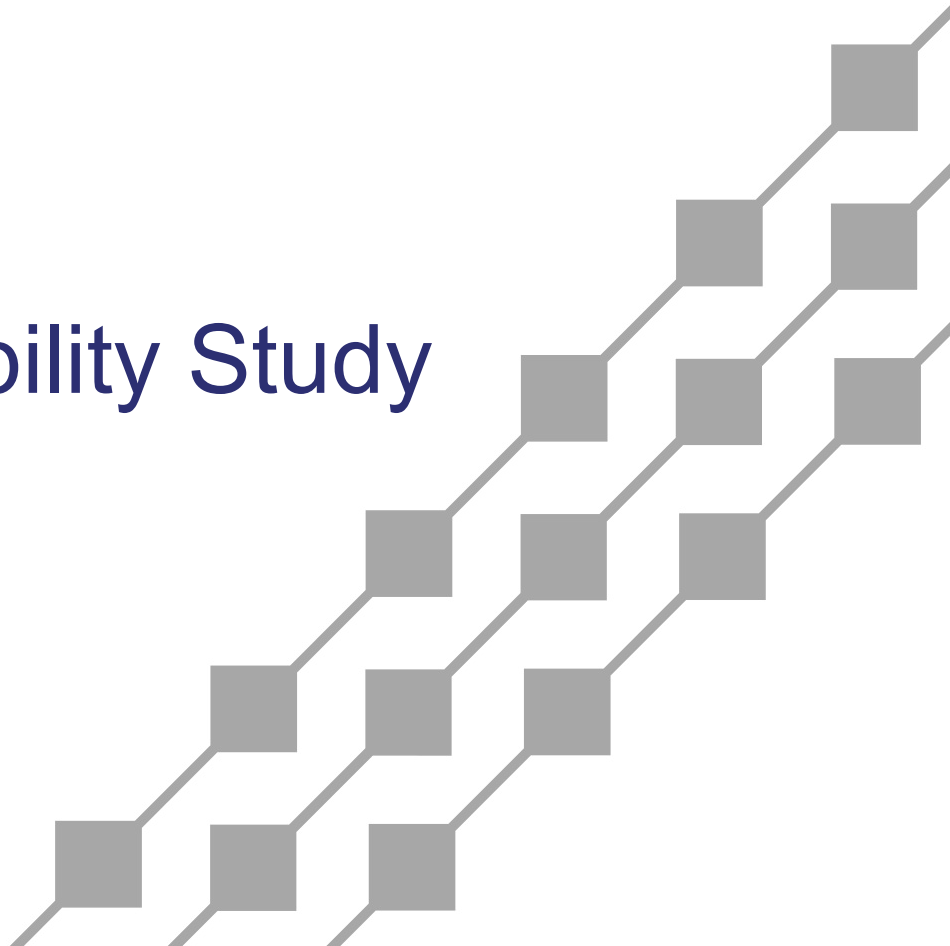
Action Item List

#	Title	Owner	Action	Target	Status
1	Customer MG Interconnection Agreement	n/a	None	n/a	n/a
2	Definition of Customer	ALL	WG Discuss	1/5	Open
3	Applicability of other Tariffs (i.e., Rule 15)	MRC	Present to WG	1/5	Open
4	Indemnification	HECO	Review and propose changes	1/5	Open
5	Data set for feasibility analysis	HECO	Develop list	1/11	
6	Hybrid MG Compensation	MRC/Ulupono	Present to WG and provide redlines for discussion	1/11	
7	Hybrid MG App Interconnection Queue	n/a	None	n/a	n/a
8	Project/Program Caps, Rated Power	HECO	Review and provide redlines	1/18	
9	Anti-Islanding Provisions	HECO	Review and provide redlines	1/5	Closed
10a		ALL	Review MRC Comments – IA Walk-through	1/14	
10b	Hybrid MGO Interconnection Agmt	HECO	Clarify phoneline and soft-start ramp rate	1/11	
10c		CA	Present position regarding checklist	1/11	
11	Draft Mod to Rule 24 and other DER pgms	HECO	Provide draft of all Tariffs w/ revisions	1/11	



**Hawaiian
Electric**

Data Set for Feasibility Study



5) Data set for Feasibility Study

5. Data Set Satisfaction Prior to Conducting the Feasibility Study (Tariff Section D.3.b)

Hawaiian Electric agreed to create a list for this data standard. The Company should create a list of standardized data that will be required of all Applicants of a Hybrid Microgrid who request a feasibility study, incorporate this list in all pertinent documents, and provide all revisions to the Parties for review.

Proposed Action

- Hawaiian Electric to provide for future WG meeting



HECO Proposed Changes to Hybrid MGO IA

- ◆ Hybrid MGO Interconnection Agreement Exhibit A includes information needed to commence with Feasibility Study
- ◆ Supplemented Exhibit A with:
 - Map showing defined electrical boundaries
 - Identification of nearest protective devices on the customer side
 - (if available) the generator's reactive capability curve

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)

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

Protection Devices Not Applicable

<u>Interconnection Location (Service Address)</u>	<u>Nearest Customer Protective Device Type</u>	<u>Manufacturer</u>	<u>Model</u>

Generator Reactive Capability Curve (if available) Not Applicable
Attach copy of Generator Reactive Capability Curve

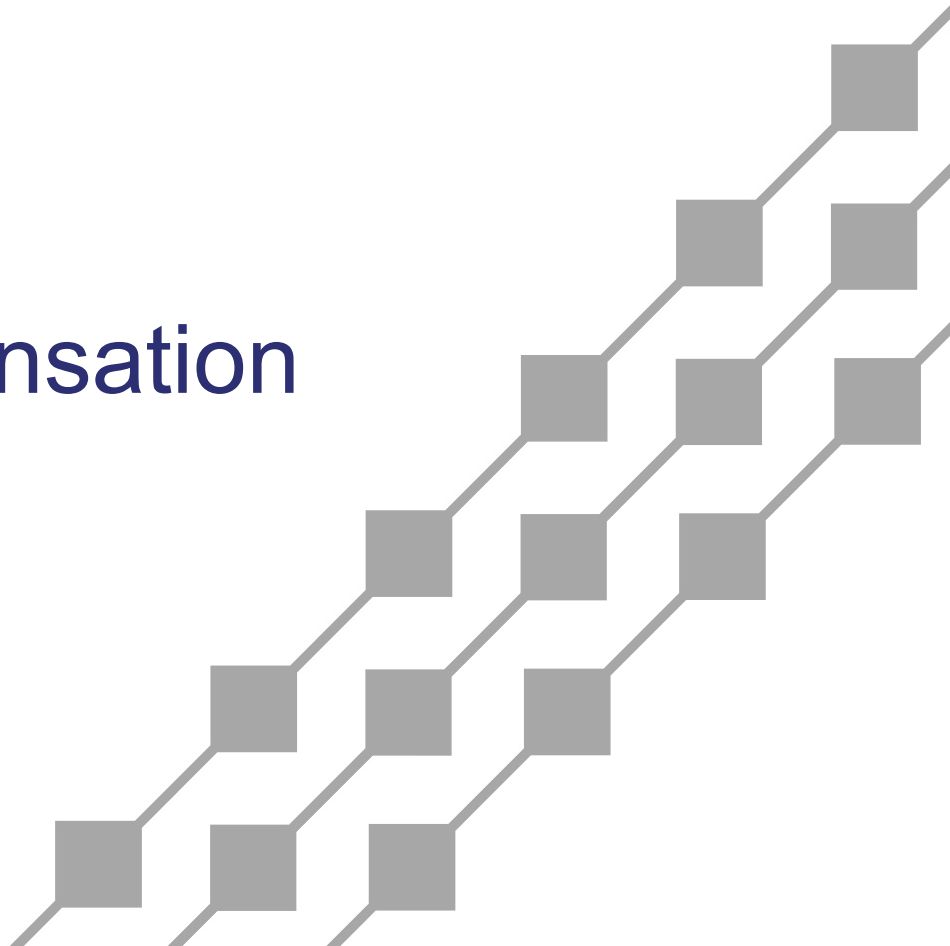




**Hawaiian
Electric**

Hybrid MG Compensation

MRC & Ulupono



6) Hybrid Microgrid Compensation

6. Hybrid Microgrid Compensation (Tariff Section E.2)

Hawaiian Electric's consultant acknowledged that leasing has not been discussed significantly in this proceeding and remains a very complicated topic in other jurisdictions. MRC asserted that leasing could be a way to allow Hybrid Microgrids to operate as if they were Customer Microgrids and commented that there will be very few providers that would pursue a Hybrid Microgrid project under the singular arrangement considered in the Draft Tariff. The Parties should discuss the possibility of including language in the Draft Tariff that allows for a leasing arrangement between the Microgrid Operator and the Company for Hybrid Microgrids.

Proposed Action

- MRC and/or Ulupono to present to WG and provide redlines for discussion



Three Hybrid Microgrid Models

- Draft Tariff Model
- Community Solar Model
- Customer Microgrid Model
- In each model Participant billing is the same in both grid connected and islanded mode

Draft Tariff Model

- Participants are customers of the company
- Microgrid Operator operates all controllable generation within the microgrid, sells all power output to Company in accordance with a power purchase agreement
- Company bills Participants for their entire usage at regular rates

“Community Solar Model”

- Participants are Customers of the Company
- Microgrid Operator operates all included generation for the Benefit of the Participants
- Microgrid Operator allocates deliveries of power (net of exports) and calculates charges for power to Participants per the Microgrid Operator’s contract with participants
- Company bills the allocated amount of power at the Microgrid operator’s price to participants, and bills at regular rates for any remaining usage

“Customer Microgrid Model”

- Microgrid Operator has a joint operating agreement with the Company for use of wires behind the PCC
- It imports and exports power at the PCC as a Customer
- Participants are not Customers
- Microgrid Operator bills Participants in accordance with their contract, passing through the cost of imported power
- Company could act as meter reader and billing agent in accordance with the joint operating agreement

MRC/Ulupono Proposed Changes

E. BILLING AND COMPENSATION

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

- c. For a Hybrid Microgrid in which Microgrid Participants are also Customers, Customers within such a Hybrid Microgrid shall be billed monthly by the Company for (i) the portion of the energy supplied to the Customer by the Company, in accordance with Rule No. 8, the applicable rate schedule, and Company's rules filed with the Commission, and (ii) the portion of the energy supplied to the Customer by the Microgrid Operator, in accordance with the agreement executed by the Microgrid Operator and the Microgrid Participant. The Company thereafter pays the Microgrid Operator for the portion of the energy supplied by the Microgrid Operator at the rate charged by the Microgrid Operator to the Customers.
- d. For a Hybrid Microgrid in which the Microgrid Participants are not Customers, Microgrid Participants shall be billed monthly by the Microgrid Operator for (i) the portion of the energy supplied to the Microgrid Operator by the Company, in accordance with Rule 8, the applicable rate schedule, and Company's rules filed with the Commission, and (ii) the portion of the energy supplied to the Microgrid Participants from any Microgrid Generating Facility operated by the Microgrid Operator, in accordance with the agreement executed by the Microgrid Operator and the Microgrid Participant. The Microgrid Operator and the Company may enter into an agreement whereby the Company will perform the meter reading and billing as a service to the Microgrid Operator.

- c. For a Hybrid Microgrid in which Microgrid Participants are also Customers, Customers within such a Hybrid Microgrid shall be billed monthly by the Company for (i) the portion of the energy supplied to the Customer by the Company, in accordance with Rule No. 8, the applicable rate schedule, and Company's rules filed with the Commission, and (ii) the portion of the energy supplied to the Customer by the Microgrid Operator, in accordance with the agreement executed by the Microgrid Operator and the Microgrid Participant. The Company thereafter pays the Microgrid Operator for the portion of the energy supplied by the Microgrid Operator at the rate charged by the Microgrid Operator to the Customers.
- d. For a Hybrid Microgrid in which the Microgrid Participants are not Customers, Microgrid Participants shall be billed monthly by the Microgrid Operator for (i) the portion of the energy supplied to the Microgrid Operator by the Company, in accordance with Rule 8, the applicable rate schedule, and Company's rules filed with the Commission, and (ii) the portion of the energy supplied to the Microgrid Participants from any Microgrid Generating Facility operated by the Microgrid Operator, in accordance with the agreement executed by the Microgrid Operator and the Microgrid Participant. The Microgrid Operator and the Company may enter into an agreement whereby the Company will perform the meter reading and billing as a service to the Microgrid Operator.

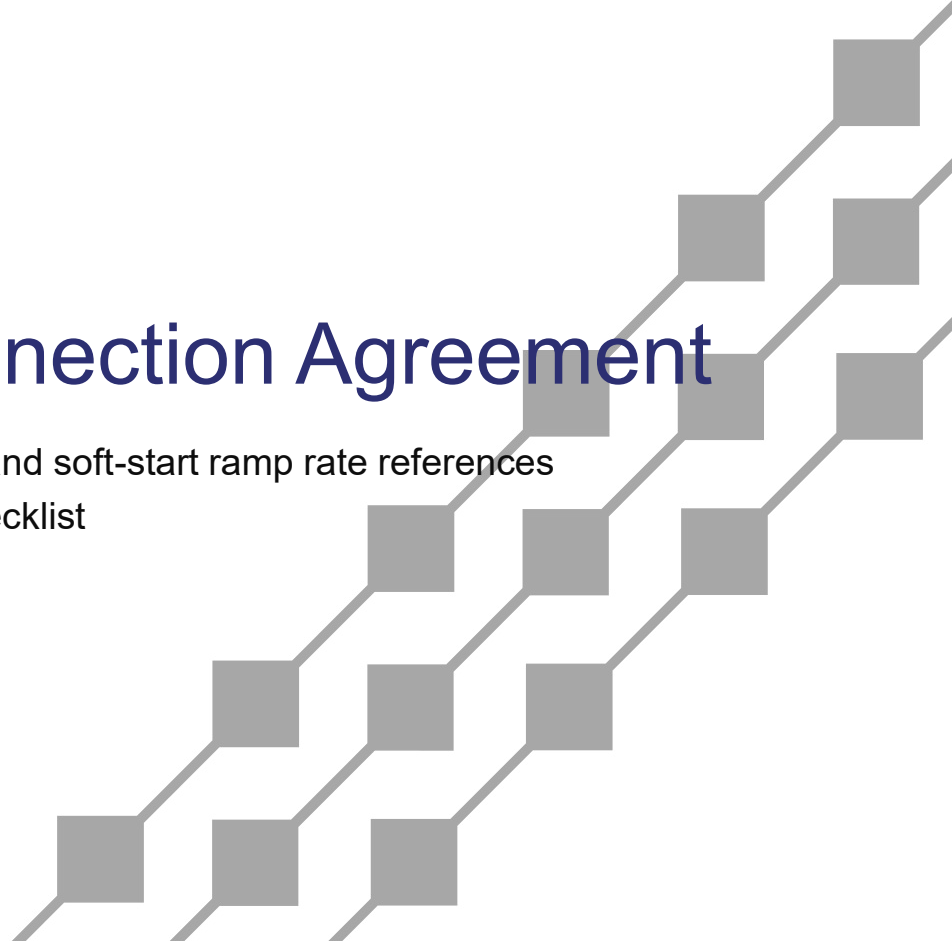


**Hawaiian
Electric**

Hybrid MGO Interconnection Agreement

Action Item 10B: Clarify phoneline requirement and soft-start ramp rate references

Action Item 10C: Present position regarding checklist



10) Hybrid MG Operator Interconnection Agreement

10. Draft Hybrid Microgrid Operator Interconnection Agreement

The Parties are requested to engage in further dialogue on and revise the Draft Hybrid Microgrid Operator Interconnection Agreement to reflect discussion at the Technical Conference. For instance, at the Technical Conference, the Company clarified that a phonenumber requirement may not be necessary for Company-owned meters (as specified in Section 1.d.i.B of Exhibit B), as advanced meters could provide the necessary functionalities. In addition, the Company should replace or revise any references to a Soft-Start Ramp Rate (as seen in Section H.3.a.i of the Draft Tariff) to ensure consistency in definitions of ramp rate throughout the Draft Tariff and accompanying documents.

With respect to the Draft Hybrid Microgrid Operator Disclosure Checklist referenced in the Draft Hybrid Microgrid Operator Interconnection Agreement, the Commission has proposed removal of the checklist. At the Technical Conference, the Consumer Advocate emphasized the importance of protecting customers. The Parties should discuss the Consumer Advocate's concerns and work to identify ways to further streamline the Draft Hybrid Microgrid Operator Disclosure Checklist.

The Commission emphasizes the importance of Parties working collaboratively to revise and further streamline the Draft Hybrid Microgrid Operator Interconnection Agreement as this draft does not appear to adequately meet the intent of Act 200.

Proposed Action

- Parties to present, and either provide redlines to the Hybrid Microgrid Operator Interconnection Agreement or an alternate proposal for discussion. Other ideas to resolve within stated deadline?
- Hawaiian Electric will clarify phonenumber requirement and soft-start ramp rate references.
- Consumer Advocate to present their position regarding the Disclosure Checklist. Parties to provide alternative proposals to resolve concerns.



HECO Proposal to address 10B: Phonenumber Requirement

Phonenumber Requirement (Exhibit B, Sec. 1.d.i.B.)

- Remove requirement (shown in red)

<p>B. Microgrid Operator shall provide within the Microgrid Operator Interconnection Facilities a separate, fenced area with separate access for Company. Microgrid Operator shall provide all conduits, structures and accessories necessary for Company to install a metering package if needed. Microgrid Operator shall also provide within such area, space for Company to install its communications,</p>	
<p>SCADA, RTU, and certain relaying if necessary for the Interconnection. Microgrid Operator shall also provide AC and DC source lines as specified later by Company. Microgrid Operator shall provide a telephone line for Company-owned meters. Microgrid Operator shall work with Company to determine an acceptable location and size of the fenced-in area. Microgrid Operator shall provide an acceptable demarcation cabinet on its side of the fence where Microgrid Operator and Company wiring will connect/interface.</p>	<p>4 Author For Hawaiian Electric: would a separate telephone line be necessary if the Company installed an advanced meter?</p>



HECO Proposal to address 10B: Soft-Start Ramp Rate

Ramp Rate Clarification

- Commission question in Exhibit E
 - Soft Start RR pertains to how a facility returns to service after being offline
- Revised Exhibit B, Sec. 2.c. Performance Standards (in red) to be consistent with current PPAs and Interconnection Agreements

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

Author
Is this intended to be the same requirement as the soft start ramp rate in Rule 14H? Can this requirement be clarified and standardized?

c. Ramp Rates.

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

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



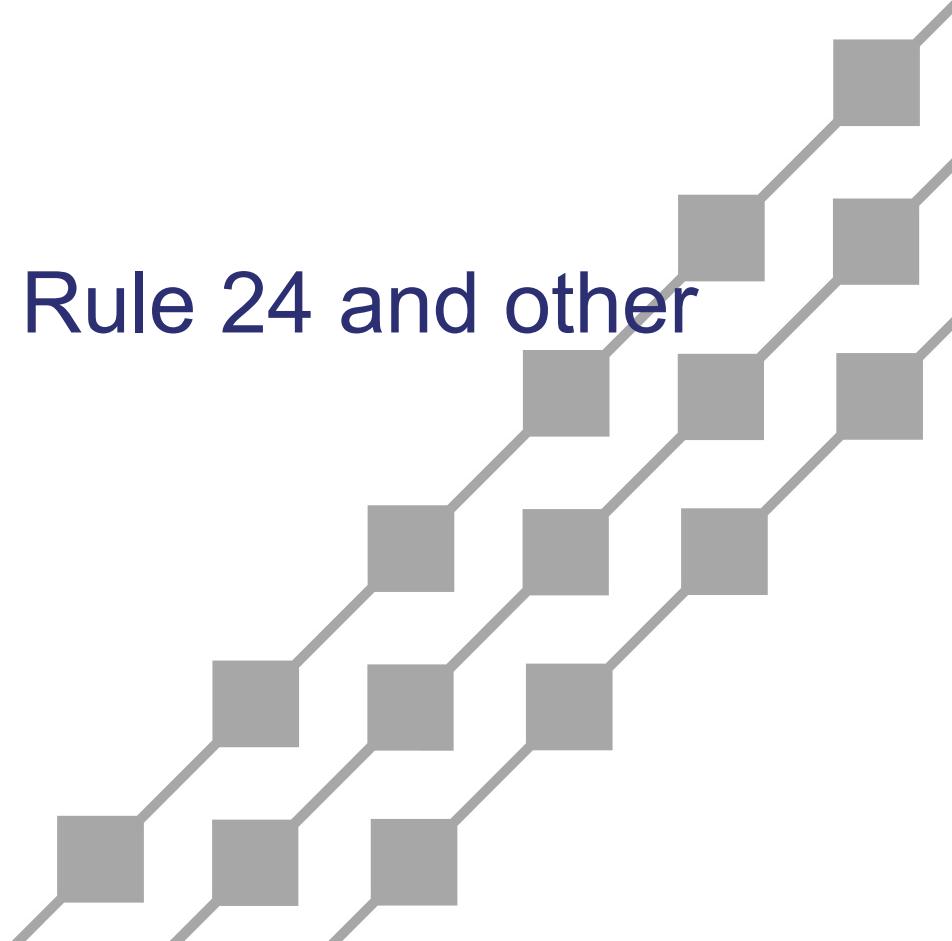
10C: Disclosure Checklist Discussion





**Hawaiian
Electric**

Draft Modifications to Rule 24 and other DER Programs



11) Draft Modifications to Rule 24 and other DER Programs

11. **Draft Modifications to Rule 24 and Other DER Programs for Customer and Hybrid Microgrids**

At the Technical Conference, the Company reaffirmed its intent to include the Draft Modifications to Rule 24 in all other applicable DER programs. The Company should identify all such other applicable DER programs (“Other Rules”) which are expected to contain redlined language. Further, if there are any additional modifications that need to be made to Rule 24 and the Other Rules (whether broadly applicable or applicable to only a subset of the Rules), the Commission directs the Parties to provide such additional modifications for both Customer and Hybrid Microgrids for review. The Commission requests that the Parties provide redlined versions of the DER tariffs for the Commission’s review incorporating the modifications, along with any necessary justifications or comments.

Proposed Action

- Hawaiian Electric will review Commission’s redlines, and add them to each existing DER Tariff for WG review.



11) Draft Modifications to Rule 24 and other DER Programs

- WG to confirm no changes
- HECO ok with Commission's edits
 - Red: HECO Draft
 - Dark Red: Commission's edits
- Next step to copy/paste to various Tariffs

F. MICROGRIDS

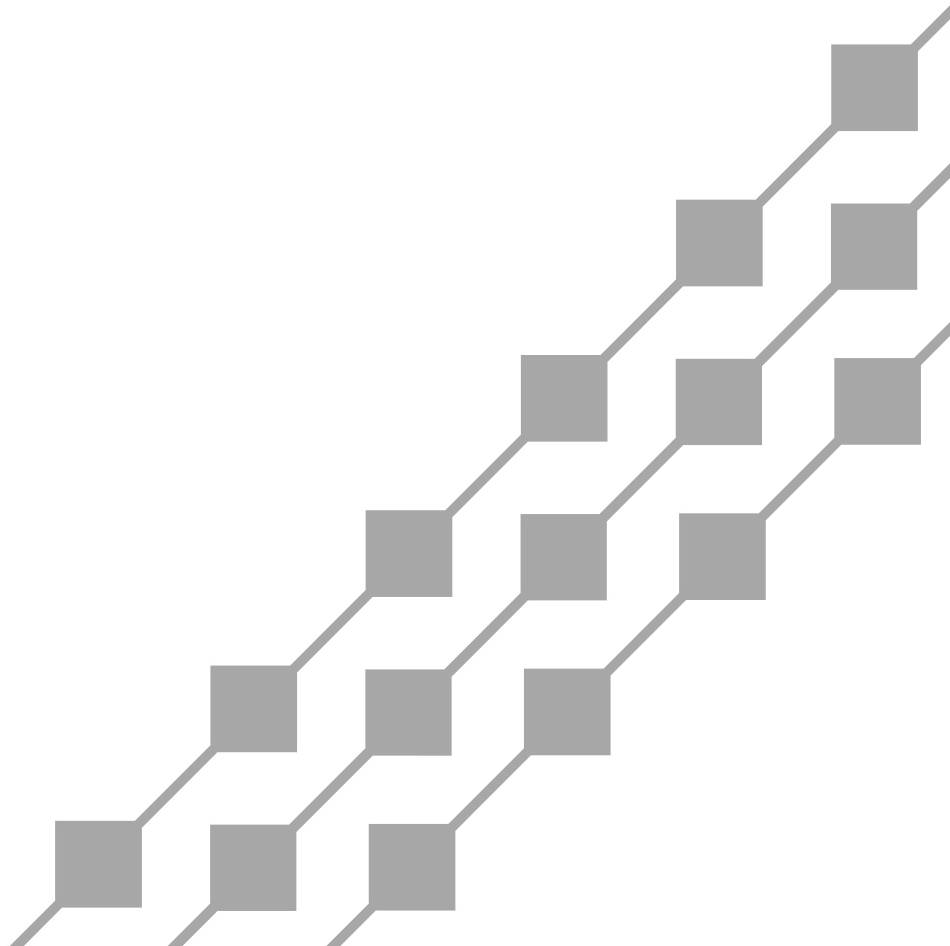
1. Capitalized terms used in this section are as defined in Rule No. XX, Microgrid Services Tariff.
2. During Grid-Connected Mode, the Microgrid will be operated in parallel with the Company's System.
3. A Customer may operate ~~their~~-its Generating Facility as a Customer Microgrid ~~and-or~~ be a Pparticipant in a Hybrid Microgrid.
4. A Customer who intends to operate ~~their~~-its Generating Facility ~~as within a~~ Customer Microgrid, or as a Pparticipant in a Hybrid Microgrid, shall notify the Company in ~~their~~-its application through the Customer Interconnection Tool.
5. A Customer who operates ~~their~~-its Generating Facility as a Microgrid after ~~obtaining~~-obtaining ~~interconnection~~-interconnection approval from the Company shall update ~~their~~-its application through the Customer Interconnection Tool. Such ~~notifeation~~-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.





**Hawaiian
Electric**

Next Steps



Action Item List

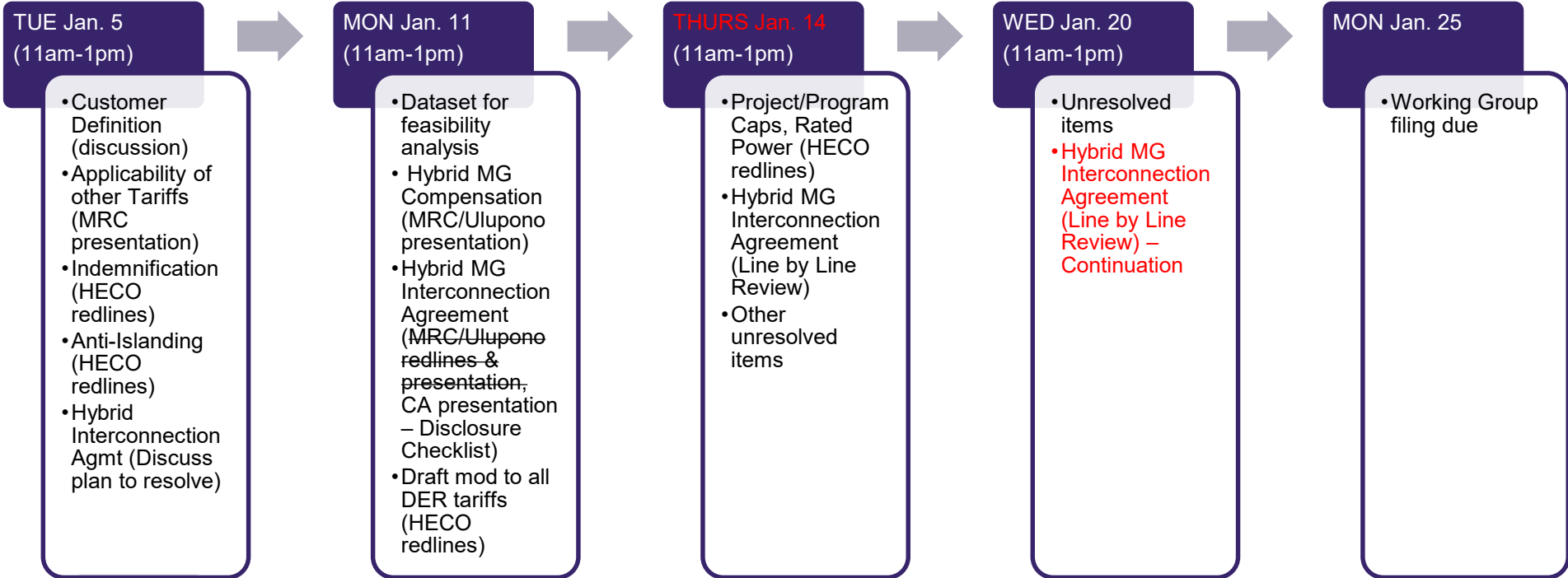
#	Title	Owner	Action	Target	Status
1	Customer MG Interconnection Agreement	n/a	None	n/a	n/a
2	Definition of Customer	ALL	WG Discuss	1/5	Open
3	Applicability of other Tariffs (i.e., Rule 15)	MRC	Present to WG	1/5	Open
4	Indemnification	HECO	Review and propose changes	1/5	Open
5	Data set for feasibility analysis	HECO	Develop list	1/11	
6	Hybrid MG Compensation	MRC/Ulupono	Present to WG and provide redlines for discussion	1/11	
7	Hybrid MG App Interconnection Queue	n/a	None	n/a	n/a
8	Project/Program Caps, Rated Power	HECO	Review and provide redlines	1/18	
9	Anti-Islanding Provisions	HECO	Review and provide redlines	1/5	Closed
10a	Hybrid MGO Interconnection Agmt	ALL	Review MRC Comments – IA Walk-through	1/14	
10b		HECO	Clarify phoneline and soft-start ramp rate	1/11	
10c		CA	Present position regarding checklist	1/11	
11	Draft Mod to Rule 24 and other DER pgms	HECO	Provide draft of all Tariffs w/ revisions	1/11	

Other items not identified in Items 1-11?

- ◆ Discuss PUC Redlines
 - Removal of “emergency events” from MG definition
- ◆ What action items should be placed (back to) the “parking lot”?



Proposed Timeline





Mahalo for your time.

<https://www.hawaiianelectric.com/about-us/our-vision-and-commitment/resilience/microgrid-services-tariff>