

BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF HAWAII

---- In the Matter of ----)
PUBLIC UTILITIES COMMISSION)
Instituting a Proceeding to)
Investigate Distributed Energy))
Resource Policies)
_____)

DOCKET NO. 2014-0192

DECISION AND ORDER NO. 33258

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COMMISSION

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²Distributed energy resources include distributed generation, energy efficiency, demand response, electric vehicles, and distributed energy storage.

Hawaii ("State"), which will significantly advance the integration of DER throughout the State. The commission has approved revisions to interconnection standards for inclusion in the HECO Companies' Tariff Rule 14H and has approved new self-supply and grid-supply tariffs to expand customer options and ensure that customers can efficiently interconnect new DER systems that are configured to provide grid-supportive benefits. During Phase 2 of this proceeding, the commission will consider further modifications of DER policies to ensure Hawaii continues to benefit from the safe and reliable integration of these resources.

After review of the record in this docket, the commission has also capped the HECO Companies' net energy metering ("NEM") program at existing levels. This is necessary to ensure a smooth transition to a re-designed, market-based structure for distributed resources in Hawaii. Nothing about the NEM program will change for existing NEM customers or customers who have already applied and are waiting for approval. The HECO Companies will continue to process new interconnection applications as they normally would, and new customers will be able to apply for fast-track approval to interconnect their DER systems under the self-supply option or standard review for the grid-supply option.

This evolution in DER policies is essential given the extraordinary levels of distributed renewable energy already achieved in Hawaii, and the State's commitment to meet a

100% renewable portfolio standard by 2045. As Hawaii expands its portfolio of renewable energy, new market structures, including competitive markets, should be developed to assist the State in ensuring costs and benefits of all forms of renewable energy are appropriately considered. Creation of these markets for DER is a central objective of this proceeding.

Hawaii is at a critical juncture in pursuit of achieving a 100% renewable portfolio standard in the electric power sector. Extraordinarily high retail electricity prices, combined with dramatic cost declines in renewable energy and storage technologies, have combined to transform the competitive landscape facing the State's electric utilities. The availability and economic attractiveness of NEM in particular, has led to widespread adoption of DER among electricity customers statewide within the span of only a few years. Despite the planning, operational, technical, and regulatory challenges, no other utility in the country rivals Hawaii's electric utilities in their accomplishments integrating distributed renewable energy into the power system.

However, successes to date have not come easily or predictably to the utilities or their customers. Continuing frustration and confusion relating to the interconnection queue for thousands of customers waiting to install solar photovoltaic ("PV") and other forms of DER is

just one example of the challenges that the commission is addressing in this proceeding.³

It is abundantly clear that distributed energy resources can provide benefits to Hawaii. It is also clear, for both technical and economic reasons, that the policies established more than a decade ago must be adapted to address the reality of distributed energy resources as they exist today - and as they are likely to develop in the near future. The challenge facing the State now is ensuring that DER continues to scale in such a way that it benefits all customers as each utility advances towards 100% renewable energy.

The focus of Phase 1 of this docket is to establish a transitional market structure for distributed energy resources, one that will allow the Parties⁴ to this docket sufficient time to

³In addition to this proceeding, the commission is addressing numerous overlapping issues in parallel dockets. For example, the HECO Companies' Power Supply Improvement Plans ("PSIPs") are under review in Docket No. 2014-0183, while the Integrated Demand Response Portfolio is the subject of Docket No. 2007-0341.

⁴The Parties are the HECO Companies, KAUAI ISLAND UTILITY COOPERATIVE ("KIUC"), and the DEPARTMENT OF COMMERCE AND CONSUMER AFFAIRS, DIVISION OF CONSUMER ADVOCACY ("Consumer Advocate"), an ex officio party, pursuant to Hawaii Revised Statutes ("HRS") § 269-51 and Hawaii Administrative Rules ("HAR") § 6-61-62(a). Those entities whose motions to intervene in this proceeding have been granted are the "Intervenors". In this Order, the term "Parties" is used to refer to both Parties and Intervenors for convenience.

fully examine the issues inherent in expanding DER deployment statewide, such that these resources will continue to provide value to Hawaii in the future.⁵

By this Order, the commission instructs the HECO Companies to revise their interconnection rules and offer new tariffs to their customers that expand customer choice and provide new options for managing energy use, enable DER to provide technical and economic benefits to each island grid, and establish a foundation for further DER policy adjustments that will be made as part of Phase 2 of this proceeding.

I.

BACKGROUND

On August 21, 2014, the commission initiated this docket via Order No. 32269, "Instituting a Proceeding to Investigate Distributed Energy Resource Policies" ("Order No. 32269"), to investigate the technical, economic, and policy issues associated with DER as they pertain to the electric operations of each of the HECO Companies and KIUC.⁶ The docket seeks to resolve

⁵See Instituting a Proceeding To Investigate Distributed Energy Resource Policies, Docket No. 2014-0192, Order No. 32737 ("Order No. 32737"), filed on March 31, 2015, at 1.

⁶See Instituting a Proceeding To Investigate Distributed Energy Resource Policies, Docket No. 2014-0192, Order No. 32269 ("Order No. 32269"), filed on August 21, 2014, at 1.

issues that have been identified and discussed in several previous commission orders related to the future of Hawaii's electric utilities in general and DER in particular,⁷ as well as the "Commission's Inclinations on the Future of Hawaii's Electric Utilities; Aligning the Utility Business Model with Customer Interests and Public Policy Goals" ("Inclinations"), which was filed as Exhibit A to Decision and Order No. 32052 in Docket No. 2012-0036.⁸

⁷This includes decisions in Docket No. 2002-0051, which modified the HECO Companies' Rule 14 by adding a new paragraph "H" and appendices that established interconnection standards; Docket No. 2003-0371, which the commission opened to investigate and establish guidelines for distributed generation development; Docket No. 2010-0015, which resolved issues related to the interconnection of distributed generating facilities operating in parallel with the utilities' electrical systems; and Docket No. 2011-0206, which was established to facilitate the Reliability Standards Working Group ("RSWG") process.

⁸In the Matter of PUBLIC UTILITIES COMMISSION Regarding Integrated Resource Planning, Docket No. 2012-0036, Decision and Order No. 32052, filed on April 28, 2014, ("Order No. 32052") Exhibit A, "Commission's Inclinations on the Future of Hawaii's Electric Utilities; Aligning the Utility Business Model with Customer Interests and Public Policy Goals."

In the Inclinations, the commission observed:

With approximately 10% of residential customers already operating rooftop PV systems, Hawaii is a frontrunner in the initial growth stage of DER.

. . .

Coupled with continued innovation in other distributed energy resources, such as electric vehicles and distributed energy storage, the utilities will need to plan proactively for future additions of DER. The rapid adoption of these technologies will require the utilities to design programs and develop distribution system infrastructure to optimize the system and maximize customer benefits.⁹

The Inclinations also highlighted the fact that “[c]urrent electric utility rate structures in Hawaii are not well suited for a future environment where there are significant quantities of variable renewable energy, customer-sited distributed energy resources and increasingly smart grid technologies,” nor do current rate structures “provide the correct market signals to customers and market actors to address periods with an excess supply of energy to the grid.”¹⁰

The commission was compelled to offer its Inclinations as a result of the failure of the HECO Companies to adequately

⁹Inclinations at 11, 15.

¹⁰Inclinations at 25.

address these critical issues in its Integrated Resource Planning ("IRP") process.¹¹

As a result, in Order No. 32053, "Ruling on the RSWG Work Product,"¹² ("Order No. 32053"), the commission required the HECO Companies to file a Distributed Generation Interconnection Plan ("DGIP"), stating that the "preferred course of action" is "a proactive approach to distributed generation planning . . . in a transparent manner with the opportunity for stakeholder participation."¹³ The commission resolved that "further information and analysis is necessary in order to analyze potential constraints that exist due to high penetration of solar PV systems" and instructed the HECO Companies to develop "strategies and plans to mitigate these constraints."¹⁴ The Ruling required that the HECO Companies develop a DGIP, which was required to include:

¹¹In Order No. 32052, the commission rejected the HECO Companies' IRP Report and Action Plan as fundamentally flawed and inconsistent with the IRP Framework and numerous commission orders governing the HECO Companies' planning process. See Docket No. 2012-0036.

¹²Instituting a Proceeding to Investigate the Implementation of Reliability Standards for Hawaiian Electric Company, Inc., Hawaii Electric Light Company, Inc., and Maui Electric Company, Limited, Docket No. 2011-0206, Order No. 32053, Ruling on RSWG Work Product, filed on April 28, 2014, at 62.

¹³Order No. 32053 at 50.

¹⁴Order No. 32053 at 50.

1) A "Distributed Generation Interconnection Capacity Analysis" to "proactively identify distribution circuit capacity to safely and reliably interconnect distributed generation resources and the system upgrade[] requirements necessary to increase circuit interconnection capability in major capacity increments;"¹⁵

2) An "Advanced DER Technology Utilization Plan" that "set[s] forth the near, medium and long-term plans by which customers would install, and utilities would utilize, advanced inverters, distributed energy storage, demand response and EVs to mitigate adverse grid impacts starting at the distribution level and up to the system level;"¹⁶ and

3) A "Distribution Circuit Improvement Implementation Plan" that "summarize[s] the specific strategies and action plans, including associated costs and schedule, to implement circuit upgrades and other mitigation measures to increase capacity of electrical grids to interconnect additional distributed generation."¹⁷

The commission also expressed its intention to open the instant docket to "address the technical, economic and policy issues associated with distributed energy resources,"¹⁸ noting that the DER docket would benefit from the work products of the RSWG,

¹⁵Order No. 32053 at 51.

¹⁶Order No. 32053 at 52-53.

¹⁷Order No. 32053 at 54-55.

¹⁸Order No. 32053 at 62.

the HECO Companies' DGIP, and other submittals related to distributed generation and interconnection issues.¹⁹

In Order No. 32503, the commission further observed:

The commission submits the distributed solar PV industry in Hawaii will, out of necessity due to their accomplishments thus far, have to migrate to a new business model, not unlike what is expected for the HECO Companies as a result of disruptive technologies. The distributed solar business model will need to shift from a customer-value proposition predicated upon customers avoiding the grid financially - but relying upon it physically and thereby creating circuit and system technical challenges - to a new model where the customer-value proposition is predicated upon how distributed solar PV benefits both individual customers and the overall electric system, and hopefully becomes a key contributor to Hawaii's grid modernization²⁰

Subsequently, when the commission initiated this docket, it invited "[a]ny interested individual, entity, agency or community or business organization [to] file a motion to intervene or participate without intervention in this docket."²¹ The commission's "Order Granting Motions to Intervene, Consolidating and Incorporating Related Dockets, and Establishing Statement of Issues and Procedural Schedule"²² included an attached

¹⁹See Order No. 32053 at 62.

²⁰Order No. 32053 at 49-50.

²¹Order No. 32269 at 6.

²²Order Granting Motions to Intervene, Consolidating and Incorporating Related Dockets, and Establishing Statement of Issue

Staff Report and Proposal ("Staff Report") that identified several high priority technical and economic challenges associated with continued growth in DER, offered policy suggestions for consideration by the Parties to the DER docket, and outlined a roadmap for addressing these challenges and designing new policies to facilitate the next wave of DER deployment in Hawaii.²³

The Staff Report also addressed the HECO Companies' DGIP, which was filed on August 26, 2014,²⁴ finding that despite the clear requirements that the commission had set forth for the DGIP in Order No. 32053, "the utility's proposed plans [did] not adequately address the immediate or long-term issues associated with integrating distributed energy resources and achieving the state's energy goals."²⁵ The Staff Report stated that;

and Procedural Schedule, Docket No. 2014-0192, Order No. 32737 ("Order No. 32737"), filed on March 15, 2015, at 23.

²³See Staff Report at 1. This included addressing system-level issues such as PV over-generation and grid resiliency during contingency events, and distribution-level issues such as reducing contingency risks on circuits with high levels of solar PV, and minimizing oversupply of solar energy during midday hours, as well as addressing economic integration challenges. Staff Report at 17-30.

²⁴Docket No. 2011-0206, "HECO Companies' Distributed Generation Interconnection Plan," filed on August 26, 2014, transferred to Docket No. 2014-0192 via Order No. 32292, filed on September 12, 2014.

²⁵Staff Report at 12. See Order No. 32737 at 30 ("The Staff Report, among other things, provides a preliminary review of the

[d]espite the significant flaws in the DGIP filing, [c]ommission staff does not believe ordering a complete redo of the plans at this time would promote a speedy resolution of the near-term technical and economic issues associated with further interconnection of distributed generation. Instead, the proposed docket work scope described in [the Staff Report] is intended to help focus the efforts of the Parties to resolve the current interconnection queue and establish new pathways for further DER development.²⁶

To achieve "urgent resolution of the interconnection backlog and re-establishment of clarity and certainty in the DER market in Hawaii,"²⁷ Order No. 32737 set forth proposed DER policy docket issues and a scope of work²⁸ through the attached Staff Report, and adopted a procedural schedule for the instant docket.²⁹

To foster effective and efficient resolution of DER issues, the commission has repeatedly made clear its requirement that "participation [must] reflect a high standard of quality, relevance, and timeliness"³⁰ and that "[i]ntervenors and

HECO Companies' DGIP and suggests that the DGIP is not sufficiently responsive to the requirements set out in Order No. 32053.").

²⁶Staff Report at 13.

²⁷Staff Report at 42.

²⁸Staff Report at 41-50.

²⁹Order No. 32737 at 44-46.

³⁰Order No. 32737 at 23.

participants will not be allowed to broaden the issues or to unduly delay the proceeding."³¹ The commission set forth its intention to:

preclude any attempts to broaden the issues or to unduly delay the proceeding, and reconsider any Intervenor's participation in this docket if, at any time during the course of this proceeding, the commission determines that any Intervenor is attempting to unreasonably broaden the pertinent issues established by the commission in this docket, is unduly delaying the proceeding, or is failing to meaningfully participate and assist the commission in the development of the record in this docket.³²

The commission emphasized the necessity of collaboration, mandating that "the standard of conduct in this docket and the technical conferences . . . is productive collaboration based on reasonable dialogue."³³

II.

PROCEDURAL HISTORY

On August 21, 2014, the commission issued Order No. 32269 initiating this proceeding.³⁴

³¹Order No. 32269 at 8.

³²Order No. 32737 at 23-24.

³³Order No. 32737 at 43.

³⁴The HECO Companies, KIUC, and the Consumer Advocate were named individually as parties to this proceeding.

The HECO Companies subsequently filed their DGIP in Docket No. 2011-0206, and by "Order No. 32292 Transferring Distributed Generation Interconnection Plan to Docket No. 2014-0192" ("Order No. 32292"), the commission transferred the DGIP from Docket No. 2011-0206, into the instant proceeding for review.

Between August 25, 2014, and September 10, 2014, ten (10) motions for intervention were timely filed in this docket.³⁵

Thereafter, on September 12, 2014, the commission issued "Order No. 32293 Inviting Public Comment on the HECO Companies' Distributed Generation Interconnection Plan" ("Order No. 32293"). The commission received over 700 pages of comments from the public, including from entities who requested intervention in this proceeding.

³⁵The motions were filed by the following entities: Hawaii Solar Energy Association ("HSEA") on August 25, 2014; Life of the Land ("LOL") on September 2, 2014; Renewable Energy Action Coalition of Hawaii, Inc. ("REACH") on September 9, 2014; Hawaii Renewable Energy Alliance ("HREA") on September 9, 2014; Hawaii PV Coalition ("HPVC") on September 9, 2014; The Alliance for Solar Choice ("TASC") on September 10, 2014; Sunpower Corporation ("Sunpower") on September 10, 2014; Department of Business, Economic Development, and Tourism ("DBEDT") on September 10, 2014; Blue Planet Foundation ("Blue Planet") on September 10, 2014; and Ron Hooson on September 11, 2014.

The commission subsequently issued information requests ("IRs") to the HECO Companies on September 30, 2014. The HECO Companies provided timely responses to the commission's IRs on October 10, 2014, and supplemental responses on October 31, 2014.

On January 20, 2015, the HECO Companies filed a "Motion for Approval of NEM Program Modification and Establishment of Transitional Distributed Generation Program Tariff" ("Motion for Approval"), for commission approval to: (1) reinstitute a program capacity cap for the NEM program; (2) allow customers who are currently waiting for interconnection approval and those who may apply for interconnection until March 20, 2015, to interconnect under the NEM program; (3) approve an interim Transitional Distributed Generation ("TDG") tariff; (4) approve an interconnection agreement for the TDG tariff; and (5) allow the HECO Companies to modify Tariff Rule 14H³⁶ via a 30-day tariff filing. On January 27, 2015, the Consumer Advocate

³⁶Tariff Rule 14H relates to service connections to facilities on customers' premises, primarily interconnection of distributed generating facilities operating in parallel with the HECO Companies' electric systems.

responded to the Motion for Approval by filing a protest,³⁷ while several other entities filed comments opposing the motion.³⁸

On February 27, 2015, the commission's Chairman and the HECO Companies' President signed a letter agreement, wherein they agreed, among other things, that the sixty (60) day timeline proposed by the HECO Companies would not provide sufficient time for commission and stakeholder review of the Companies' motion, and that regardless of whether the commission has ruled (favorably or otherwise) on the Companies' proposal for policy changes, the Companies have an affirmative duty to interconnect customers consistent with existing policy.³⁹

Thereafter, on March 31, 2015, the commission issued Order No. 32737, by which it: (1) granted Intervenor status to all entities that filed a motion to intervene; (2) consolidated

³⁷Consumer Advocate's "Protest of Hawaiian Electric Companies' Motion for Approval of NEM Program Modifications and Establishment of Transitional Distributed Generation Program Tariff, filed on January 27, 2015."

³⁸The comments include: Blue Planet's letter in response to HECO Companies' Motion for Approval; (2) TASC's, HSEA's, HPVC's and Sunpower's "Request for Party Status and Opposition" to HECO Companies' Motion for Approval (joined by HREA on January 27, 2015); and (3) DBEDT's "Response" to HECO Companies' Motion for Approval.

³⁹See Letter Agreement by and between Randy Iwase and Alan Oshima, dated February 27, 2015, available at: <http://puc.hawaii.gov/wp-content/uploads/2015/03/NewRelease.20150227.pdf>.

Docket No. 2014-0130 into this docket; (3) incorporated by reference in this docket the evidentiary record of Docket No. 2011-0206, related to the First and Second Stipulations of the PV Subgroup; (4) ordered the HECO Companies to comply with certain directives and requirements; and (5) established a preliminary Statement of Issues and Procedural Schedule to govern this proceeding. Pursuant to the Procedural Schedule, the Parties were required to file Initial Comments on the Statement of Issues ("Initial Comments") within twenty (20) days of the date of the order, or by April 20, 2015. Initial Comments were timely filed by several entities.⁴⁰

Subsequently, the commission issued "Order No. 32849 Confirming Statement of Issues" ("Order No. 32849") on May 15, 2015, wherein it: (1) determined that the modifications proposed by the Parties were implicit in, and subsumed by, the issues as stated in Order No. 32737; and, as such (2) confirmed that the issues identified in Order No. 32737 for resolution in Phase 1 of this proceeding would remain unchanged.

⁴⁰REACH's "Initial Comments on the Statement of Issues"; HPVC's, HSEA's, TASC's, and Sunpower's "Comments on Statement of Issues"; HECO Companies' "Comments on the Statement of Issues"; HREA's "Joinder to [HPVC's, HSEA's, TASC's, and Sunpower's] Comments on Statement of Issues"; and the Consumer Advocate's "Initial Comments on Order No. 32737's Statement of Issues."

Pursuant to Order No. 32737, the Parties were also required to file: (1) Preliminary Statements of Position ("PSOP") by June 1, 2015; and (2) a jointly filed stipulated resolution of the Phase 1 issues by June 29, 2015, with instructions to file joint or individual Final Statements of Position ("FSOP") if they were unable to agree to a stipulated resolution of the issues.

On June 1, 2015, REACH, KIUC, the HECO Companies, DBEDT, and the Consumer Advocate filed PSOPs; HSEA, HPVC, HREA, Ron Hooson, LOL, Sunpower, and TASC (collectively the "Joint Parties") filed a joint "Statement of Position;" and Blue Planet filed a "Joinder" to the Joint Parties' Statement of Position.

On June 29, 2015, REACH, KIUC, HECO Companies, DBEDT, the Consumer Advocate, and the Joint Parties filed FSOPs; Blue Planet filed a "Joinder" to the Joint Parties' FSOP; and, all of the Parties to this proceeding, with the exception of KIUC, filed a "Stipulation Setting Forth Proposed Revisions to Rule 14H".

Thereafter, two separate motions were filed: (1) TASC's July 2, 2015 "Motion of the Alliance for Solar Choice to Initiate Formal Evidentiary Hearings" ("Motion to Initiate Hearings");⁴¹

⁴¹On July 10, 2015, KIUC and the HECO Companies filed responses opposing TASC's Motion to Initiate Hearings. Blue Planet filed a "Statement of No Position" on the Motion. On July 13, 2015, DBEDT and the Consumer Advocate filed responses opposing the

and (2) the HECO Companies' July 10, 2015 "Hawaiian Electric Companies' Motion for Order Requesting Removal of the Alliance for Solar Choice from Proceeding" ("Motion to Remove").⁴² Both motions are individually addressed herein.

III.

STATEMENT OF ISSUES

In Order No. 32737, the commission identified the following issues for resolution in Phase 1 of this proceeding:⁴³

1. Have the HECO Companies met their commitments and responsibilities to clear the interconnection backlog and enable continued DER growth?
 - a. What options to improve the HECO Companies' performance with respect to processing customer interconnection applications should be considered in Phase 1 of this docket?
2. What near-term revisions to applicable interconnection-related tariffs should be made to expedite the interconnection process, mitigate DER integration challenges, and enable beneficial DER investment, deployment, and customer choice?

Motion; and the Joint Parties filed a "Statement of No Position" on the Motion.

⁴²Responses opposing HECO Companies' Motion to Remove were filed by the following parties: REACH on July 15, 2015; TASC on July 16, 2015; and the Joint Parties on July 20, 2015. On July 17, 2015, KIUC filed a "no position" response to the Motion.

⁴³Order No. 32737 at 36-38.

- a. What high priority revisions under consideration by the PV Subgroup of the RSWG should be made to Rule 14H?
 - b. What additional revisions previously under consideration by the Parties to Docket No. 2014-0130 should be incorporated into Rule 14H, if any?
 - c. How should a customer self-supply option be technically specified, such that a customer opting to self-supply with minimal grid impact may be permitted to interconnect immediately without need for lengthy review or study?
 - d. What revisions to applicable interconnection-related tariffs should be made to accommodate a customer self-supply option?
 - e. What other high priority revisions should be made to applicable interconnection-related tariffs to enable customer choice and continued DER deployment, including mandatory requirements for advanced inverter functionality?
 - f. Whether it is necessary or appropriate to include screening criteria for system-level grid integration issues in the interconnection review process?
3. How should existing HECO Companies and KIUC DER policies and programs be modified to create new DER market choices while a longer-term DER market structure is established?
- a. How should a tariff to enable a customer self-supply option be specified?

- b. How should a tariff to enable a customer grid-supply option be specified?
- c. What other tariff(s) should be developed to create new DER market choices while a longer-term DER market structure is established? How should any proposed tariff(s) be specified?
- d. What modifications should be made, if any, to the Net Energy Metering Program to ensure DER will be acquired cost-effectively until a longer-term DER market structure can be established?
- e. To what extent, if any, are non-participating customers detrimentally or positively impacted from customer DER deployment options discussed in Issues 2 and 3?

IV.

POSITIONS OF THE PARTIES

All fifteen Parties filed FSOPs. The HECO Companies (collectively), KIUC, the Consumer Advocate, DBEDT, and REACH each filed individual FSOPs. HPVC, LOL, HSEA, HREA, Ron Hooson, TASC, and Sunpower ("Joint Parties") filed a joint FSOP, and Blue Planet filed a joinder to the Joint Parties' FSOP.

A.

HECO Companies' Interconnection Queue

The HECO Companies, Consumer Advocate, Joint Parties, and REACH agree that the HECO Companies met their commitment to clear the 2,749 NEM applications from the October 22, 2014 queue.⁴⁴ The Joint Parties state that 4,323 NEM applications "remain unexecuted" in the post-October 22, 2014 queue.⁴⁵ The HECO Companies state they have "conditionally approved 4,176 out of roughly 5,700 customers in the post October 2014 queue."⁴⁶ Blue Planet, DBEDT, and KIUC did not comment on this issue in their FSOPs.

The HECO Companies claim that pursuant to Ordering Paragraph 4 in Order No. 32737, they developed and submitted weekly and monthly reports to commission staff and the Parties on the status of the interconnection backlog.⁴⁷ The HECO Companies also assert that they have created and launched an on-line Integrated Interconnection Queue ("IIQ") for customers to monitor status and progress of their interconnection application. In addition to

⁴⁴See HECO FSOP at 19, Consumer Advocate FSOP at 5, Joint Parties FSOP at 62, REACH FSOP at 13.

⁴⁵Joint Parties FSOP at 62.

⁴⁶HECO FSOP at 20.

⁴⁷See Order No. 32737 in Docket 2014-0192 at 46; HECO FSOP at 21.

proposed Rule 14H modifications, the HECO Companies also developed a detailed Interconnection Improvement Program ("IIP") with the intent to provide an improved customer experience through greater transparency and quicker processing speed.⁴⁸

The Consumer Advocate states that there is a need for an on-going process to allow "continuous evaluation of interconnection and pricing tariffs associated with DER."⁴⁹ The Joint Parties add that in addition to an on-line portal for application tracking, the HECO Companies should disclose status and justification for each project that requires an Interconnection Requirements Study ("IRS") to improve transparency to both customers and solar contractors.⁵⁰

B.

Revisions to Applicable Interconnection Standards

Issue 2 concerns what near-term revisions to applicable interconnection-related tariffs should be made to expedite the interconnection process, mitigate DER integration challenges, and enable beneficial DER investment, deployment, and customer choice.

⁴⁸See HECO FSOP at 23.

⁴⁹Consumer Advocate FSOP at 7.

⁵⁰See Joint Parties FSOP at 63.

1.

What high priority revisions under consideration by the PV Subgroup of the RSWG should be made to Rule 14H

Pursuant to Order No. 32737, the Parties filed a joint "Stipulation Setting Forth Proposed Revisions to Rule 14H" in Docket 2014-0192 on June 29, 2015 ("PV Subgroup Stipulation" or "Stipulation"). The Stipulation highlights several high priority revisions, including: (1) new transient over-voltage requirements ("TrOV-2 requirements") that mandate high speed performance of PV inverter equipment during certain abnormal grid conditions; (2) expanded frequency and voltage ride-through settings, which enable DER systems to remain connected and provide grid support during grid emergencies; and (3) revised return to service settings, which would govern reconnection of DER systems after disconnection. The Stipulation also includes several comments and caveats agreed to by the signatories.⁵¹ In addition to the PV Subgroup Stipulation, several Parties have proposed further revisions to Rule 14H as part of their respective FSOPs, as discussed below.

⁵¹Stipulation Setting Forth Proposed Revisions to Rule 14H, filed on June 29, 2015, in Docket No. 2014-0192 at 9-15.

2.

What additional revisions previously under consideration by the Parties to Docket No. 2014-0130 should be incorporated into Rule 14H, if any?

The HECO Companies reiterate the positions taken in their Reply Statement of Position ("RSOP") (filed on February 19, 2015 in Docket No. 2014-0130), which includes modifications to (1) allow expedited interconnection of non-export systems with "momentary parallel operation" of less than 100 milliseconds; (2) allow systems with momentary parallel operation to be deemed "non-exporting" and remove reverse power protection requirements; and (3) remove "certain proposed definitions" from Rule 14H for clarity.⁵²

The Consumer Advocate provides separate revisions to Rule 14H, attached to its FSOP. Overall, the revisions are intended to (1) clarify that Rule 14H applies to interconnection and not just "parallel" operations; (2) provide a "screening process to address system impact of high penetration on solar resources on system daily load;" and (3) provide a screening process for non-export and export "right size[d]" systems with advanced inverter functions to allow a quicker review process.⁵³ The Consumer Advocate also provides additional recommended

⁵²HECO FSOP at 49-50.

⁵³Consumer Advocate FSOP at 10-11 and Attachment B.

next-step action items, which include "revisions to customer agreements, testing, monitoring, [and] assessment of costs."⁵⁴

KIUC asserts that any additional modifications or revisions in this proceeding should not be applicable to KIUC's Tariff No. 2 because KIUC has "substantially different" operations and systems and any such modifications may be "too prescriptive and limit KIUC's ability to work with individual members on an interconnection solution."⁵⁵

3.

How should a customer self-supply option be technically specified, such that a customer opting to self-supply with minimal grid impact may be permitted to interconnect immediately without need for lengthy review or study?

The HECO Companies propose detailed technical specifications for self-supply systems, including the following: (1) the maximum system size shall not be more than one hundred kilowatts (100 kW); (2) all of the system output shall be consumed by the customer-generator's load; (3) inadvertent export is not permitted, except for less than ten (10) seconds of reverse power flow at no more than two percent (2%) of the inverter rating, not more than twice per day; (4) the system must be in compliance

⁵⁴Consumer Advocate FSOP at 11 and Attachment B.

⁵⁵KIUC FSOP at 11.

with proposed advanced inverter requirements set forth in Rule 14H, Appendix III; and (5) energy storage must be available on a daily basis.⁵⁶

The Joint Parties propose the following technical specifications for self-supply systems: (1) the maximum system size shall be no more than two-hundred and fifty kilowatts (250 kW); (2) inadvertent export is not permitted, except for less than sixty (60) seconds of reverse power flow, not more than twice per day; (3) such systems must use advanced meters to monitor compliance; and (4) non-exporting systems must abide by the HECO Companies' updated expanded voltage and frequency ride-through settings. In addition, the Joint Parties recommend that inverter manufacturers be allowed to submit self-certification for non-export functions in the interim, while the national standards and testing procedures are developed, and until certification pursuant to standards developed by Underwriters Laboratories, Inc. ("UL") becomes available.⁵⁷

KIUC states that they have not encountered self-supply systems, but maintains that no further modifications to KIUC's Tariff No. 2 are necessary at this time because its existing

⁵⁶See HECO FSOP at 51-52.

⁵⁷The Joint Parties claim this is anticipated within a year. See Joint Parties FSOP at 52-56.

interpretation of self-supply systems would require: (1) no export capability; (2) inclusion of an advanced meter to assist with proper system sizing; (3) use of a reverse power relay for larger systems to prevent and monitor inadvertent export; and (4) ability for "dynamic real-time load following of the customer load whereby the net output to the grid would be zero on a real time basis."⁵⁸

No other Parties provided comprehensive technical specifications for a self-supply option, but rather commented on individual technical matters addressed in Issues 2d, 2e, and 2f.

4.

What revisions to applicable
interconnection-related tariffs should be made
to accommodate a customer self-supply option?

The HECO Companies propose revisions to Rule 14H to establish advanced inverter standards, implement a circuit hosting capacity analysis, and establish system-level screening for new DER systems.⁵⁹ The HECO Companies further propose that qualifying self-supply systems could bypass certain interconnection review screens.⁶⁰

⁵⁸KIUC FSOP at 11-12.

⁵⁹See HECO FSOP at 27-44.

⁶⁰See HECO FSOP at 6, Figure 10.

The Joint Parties recommend an "expedited review process" for self-supply systems, which would only require application of a limited subset of Rule 14H screens that test for safety and reliability issues that may be impacted by self-supply systems.⁶¹ In addition, the Joint Parties believe self-supply systems should be "presumptively allowed to interconnect even on highly penetrated circuits without being subject to an interconnection requirements study."⁶²

The HECO Companies "strongly disagree with the notion that Self-Supply systems may be interconnected to a circuit with only superficial consideration," and, instead, propose the option of a "minimal impact Self-Supply system . . . that has a hosting capacity of zero (0) and upon passing a less extensive initial technical review, which does not include penetration screens, may be interconnected on an expedited basis."⁶³

The Consumer Advocate proposes several screen options in the "Initial Technical Review Screen 2" (for proposed inverter-based systems with advanced inverter functions), and emphasizes that the Reverse Power Protection and Minimum Power

⁶¹See Joint Parties FSOP at 58.

⁶²Joint Parties FSOP at 58.

⁶³HECO FSOP at 62.

Protection screens "appear feasible" to prevent export.⁶⁴ The Consumer Advocate also points to California's Rule 21 for developing additional screens for "inadvertent export."⁶⁵

DBEDT recommends that the commission "consider a flexible process by which the [HECO] Companies define a reasonable, maximum amount of "inadvertent" energy and/or timeframe to which Self-Supply system providers can self-certify."⁶⁶ DBEDT also references California, and suggests that besides allowing inadvertent export, the other four options from Rule 21 could be "potentially viable" for self-supply systems.⁶⁷

Similar to their response to Issue 2c, KIUC contends that no revisions are necessary to KIUC Tariff No. 2 at this time, as KIUC "evaluates each customer's proposed system customer self-supply option on a case-to-case basis . . . and determines what, if any, upgrades, controls, relays, or other requirement needs to be met in order to facilitate an interconnection that does not place KIUC grid safety or reliability at risk."⁶⁸

⁶⁴See Consumer Advocate FSOP at 12. See also Consumer Advocate FSOP, Attachment B Exhibit A at 4.

⁶⁵Consumer Advocate FSOP at 12.

⁶⁶DBEDT FSOP at 7.

⁶⁷DBEDT FSOP at 8.

⁶⁸KIUC FSOP at 12-13.

5.

What other high priority revisions should be made to applicable interconnection-related tariffs to enable customer choice and continued DER deployment, including mandatory requirements for advanced inverter functionality?

The Joint Parties list two interconnection-related issues that require additional discussion and collaboration: (1) development of additional proposed advanced inverter functions, settings, and implementation timelines, and (2) the HECO Companies' "hosting capacity" analysis to update penetration limits.

With respect to advanced inverter functionality, the HECO Companies propose adopting California's Rule 21 Smart Inverter Working Group recommendations, with modifications, to establish advanced inverter standards for Hawaii.⁶⁹ KIUC states it already has a streamlined process in Tariff No. 2 "including technology advancements in inverter functionality."⁷⁰

REACH proposes a circuit hosting capacity analysis to differentiate between a primary (grid-supply) and a secondary (self-supply) hosting capacity and further proposes details the methodology based on generating capacity.⁷¹

⁶⁹HECO FSOP at 36 and Exhibit 5.

⁷⁰KIUC FSOP at 13.

⁷¹See REACH FSOP at 15-16 and Attachment A.

The remaining Parties address Issue 2e as part of their positions on Issues 2a, 2b, 2c, and 2d.

6.

Whether it is necessary or appropriate to include screening criteria for system-level grid integration issues in the interconnection review process?

The HECO Companies, Consumer Advocate, and REACH agree that screening criteria for system-level grid integration issues are necessary and appropriate. The HECO Companies believe that establishing this type of screen for each island grid in a hosting capacity analysis would serve to "balance reliability, safety, and cost-effective service to all customers."⁷² DBEDT is supportive of developing system-level screens, but recognizes this may take additional time.⁷³ KIUC asserts that its current tariff "contemplates all levels of grid impacts" and therefore does not require modification.⁷⁴ The Joint Parties and Blue Planet did not comment on this specific issue.

⁷²HECO FSOP at 63; Consumer Advocate FSOP at 10; REACH FSOP at 16.

⁷³See DBEDT FSOP at 4.

⁷⁴KIUC FSOP at 14.

C.

Modifications to Existing DER Policies and Programs

1.

How should a tariff to enable a customer self-supply
option be specified?

The Consumer Advocate and REACH specifically state that no additional tariff is necessary if self-supply systems do not export notable amounts of energy to the grid.⁷⁵ DBEDT's FSOP summarizes the general consensus of the Parties that "all inadvertent export is uncompensated."⁷⁶ The HECO Companies affirm this concept in their FSOP, but assert that a tariff is necessary that specifies "zero compensation for any export," and also raises the minimum bill, from \$17 per month to \$25 per month for new DER customers only (for both self-supply and grid-supply options).⁷⁷

With respect to raising the minimum bill, the Consumer Advocate supports a \$25 minimum bill for customers who applied for NEM approval after June 1, 2015. Additionally, the Consumer Advocate supports "implementing a new minimum charge applicable to all existing customers," but states

⁷⁵See Consumer Advocate FSOP at 13, REACH FSOP at 17.

⁷⁶DBEDT FSOP at 7.

⁷⁷HECO FSOP at 67.

that implementing such a change requires additional regulatory procedures and is unlikely to be feasible in Phase 1.⁷⁸

The Joint Parties similarly propose an increase to the minimum bill (for both DER and non-DER customers), and reference the HECO Companies' customer-related costs (from its last rate case in 2011) of \$25.31.⁷⁹ DBEDT states it "would not oppose an increase in the minimum bill to \$25 . . . applicable to interim DER customers" but believes further analysis on the minimum bill amount is necessary to allow DER to grow cost-effectively.⁸⁰

KIUC believes its current interconnection-related tariff (KIUC Tariff No. 2) "is sufficiently flexible to address a customer's desire to supply its own load with or without the capability of energy export."⁸¹

2.

How should a tariff to enable a customer
grid-supply option be specified?

The HECO Companies propose a "Grid-Supply tariff" with fixed residential export credit rates ranging from 18 to 29.8 cents

⁷⁸Consumer Advocate FSOP at 17.

⁷⁹See Joint Parties FSOP at 15.

⁸⁰DBEDT FSOP at 11.

⁸¹KIUC FSOP at 16.

per kilowatt-hour ("kWh"), and commercial and industrial credit rates ranging from 16.2 to 30.2 cents per kWh, varying by individual island grid. The proposed residential credit rate is 18.0 cents per kWh for Oahu, 22.5 cents per kWh for Hawaii, 23.1 cents per kWh for Maui, 27.5 cents per kWh for Molokai, and 29.5 cents per kWh for Lanai.⁸²

The HECO Companies state that the proposed Grid-Supply tariff would be implemented in a fashion similar to the existing NEM program, as eligible customers would "receive an energy credit, equivalent to the export credit rates set forth above, to offset energy charges on their monthly bills, and any excess energy credits in a month will rollover with a twelve (12) month reconciliation period."⁸³ The Consumer Advocate supports the HECO Companies' proposal of a reduced export credit rate (referencing HECO's proposed residential export rate of 18.0 cents per kWh for Oahu), but as a pilot with rates subject to change and predicated on system right-sizing.⁸⁴ DBEDT supports the HECO Companies' tariff structure as a "meaningful rate design transition step."⁸⁵

⁸²See HECO FSOP at 74-75 and Exhibit 4.

⁸³HECO FSOP at 76.

⁸⁴See Consumer Advocate FSOP at 14.

⁸⁵DBEDT FSOP at 10.

In contrast to the HECO Companies' proposal, the Joint Parties' propose to reduce the NEM energy credit rate by way of an interim "tolling revenue mechanism" of approximately 3.9 cents per kWh, which would be subtracted from the retail rate for new DER customers in high-penetration areas. The tolling mechanism would be triggered by a thirty percent (30%) system penetration threshold.⁸⁶ As discussed above (in Issue 3a), the HECO Companies, Joint Parties, Consumer Advocate, and DBEDT propose a revised minimum bill of roughly \$25, with varying conditions, applicable to both the self-supply and grid-supply options.

REACH proposes a "Transitional Net Energy Metering tariff" ("T-NEM"), which references a value of distributed generation ("DG") methodology (summation of multiple avoided costs, including environmental, distribution, transmission, operations and maintenance, fuel, and generating capacity) to calculate the appropriate export rate.⁸⁷

KIUC maintains the stance that no modifications to KICU's Tariff No. 2 are needed at this time, but acknowledges

⁸⁶Calculated as the "total NEM nameplate as a percentage of the highest recorded peak demand in 2014." See Joint Parties FSOP at 25. "NEM penetration is currently at or near the proposed 30% system peak threshold everywhere but Lanai." See Joint Parties FSOP at 26.

⁸⁷See REACH FSOP at 10-11.

technical challenges with purposefully oversized customer-owned systems. To address this issue, KIUC either (1) rejects interconnection of such systems, or (2) allows interconnection subject to curtailment at KIUC's discretion based on utility system need.⁸⁸

3.

What other tariff(s) should be developed to create new DER market choices while a longer-term DER market structure is established? How should any proposed tariff(s) be specified?

All of the Parties are, in general, supportive of a time-of-use ("TOU") tariff to provide DER customers with more effective pricing signals to drive efficient electricity consumption behavior.

The HECO Companies propose a TOU pilot option available to residential DER customers in current advanced metering infrastructure ("AMI") pilot areas (on Oahu only) as part of Phase 1 of this docket, limited to 500 customers over a span of three years. The on-peak rate would be 36.0 cents per kWh between 4pm and 9pm, and the off-peak rate would be 24.0 cents per kWh for all other hours.⁸⁹

⁸⁸See KIUC FSOP at 17.

⁸⁹See HECO FSOP at 85-87 and Attachment 17.

The Joint Parties' provide two TOU proposals in their FSOP: a two-period design and an alternative three-period design. The two-tier design consists of an on-peak rate of 45.7 cents per kWh between 2pm and 8pm, and an off-peak rate of 18.8 cents per kWh for all other hours.⁹⁰ The three-tier design consists of an on-peak rate of 41.2 cents per kWh between 4pm and 10pm, a mid-peak rate of 31.4 cents per kWh between 2pm and 4pm, and an off-peak rate of 18.2 cents per kWh for all other hours.⁹¹ Blue Planet supports the Joint Parties' TOU proposals and adds that the tariff could "automatically adjust up and down as the cost of other energy resources rises or falls."⁹² Blue Planet supports the Joint Parties' TOU and tolling mechanism proposals, because pricing is derived from a "broader palette of energy costs, resources, incentives, and opportunities" rather than "tying DERs pricing to utility-scale renewable generation."⁹³

The Consumer Advocate, DBEDT, and REACH support TOU structures in concept but state that additional time and planning is necessary, likely in Phase 2 of this proceeding, to develop an

⁹⁰See Joint Parties FSOP at 22 and Amended Beach Decl. at 4.

⁹¹See Joint Parties FSOP, Amended Beach Decl. at 5.

⁹²Blue Planet FSOP at 5.

⁹³Blue Planet FSOP at 12.

appropriate pricing structure specific to Hawaii's needs.⁹⁴ The Consumer Advocate raises concerns with the Joint Parties' TOU proposal as it "may exacerbate system cost and reliability issues."⁹⁵

KIUC states it is considering an interim TOU rate option to allow more rooftop PV, "to the extent technically feasible and possible."⁹⁶ KIUC also states it is considering re-designing some of the legacy rate structures (from Kauai Electric) to be "more responsive to a future regulatory and ratemaking environment of increased customer-sited generation."⁹⁷

On June 22, 2015, KIUC filed "Transmittal No. 2015-01," proposing to establish "TOU-R," a Time-of-Use Solar Rate Pilot Program.⁹⁸ In addition, on July 31, 2015, HECO filed "Transmittal

⁹⁴See Consumer Advocate FSOP at 14. See also DBEDT FSOP at 11; REACH FSOP at 12.

⁹⁵Consumer Advocate FSOP at 14.

⁹⁶KIUC FSOP at 15.

⁹⁷KIUC FSOP at 15.

⁹⁸Transmittal No. 2015-01, filed on June 22, 2015. KIUC requested that the proposed Schedule TOU-R take effect on July 23, 2015. Thereafter, on June 25, July 7, and August 7, 2015, KIUC filed certain amendments to Transmittal No. 2015-01, primarily related to extending the transmittal's effective date. On September 21, 2015, the commission issued Decision and Order No. 33146 approving, with conditions, KIUC's request to establish a pilot TOU solar rate.

No. 15-08," proposing revised TOU rates for electric vehicle owners and electric vehicle charging.⁹⁹

4.

What modifications should be made, if any, to the NEM Program to ensure DER will be acquired cost-effectively until a longer-term DER market structure can be established?

The HECO Companies, Consumer Advocate, and DBEDT recommend that the existing NEM program in its current form should be closed to new applicants, with varying conditions.¹⁰⁰ The Consumer Advocate contends that the current NEM program "overcompensates participants for energy provided to the grid and future DER customers have no incentive to sign up for alternative, more market-based plans."¹⁰¹ The Consumer Advocate references KIUC's process in Docket 2006-0084, where KIUC was allowed to close its original NEM program and implemented a new NEM pilot program with a reduced export credit rate.¹⁰²

⁹⁹Transmittal No. 15-08, filed on July 31, 2015. On September 25, 2015, the commission issued Decision and Order No. 33165 approving in part, denying in part, and suspending in part HECO's request.

¹⁰⁰See HECO FSOP at 89; Consumer Advocate FSOP at 15; DBEDT FSOP at 13.

¹⁰¹Consumer Advocate FSOP at 15.

¹⁰²Consumer Advocate FSOP at 13.

The Consumer Advocate suggests limiting the HECO Companies' NEM program to participants with complete and valid applications in the queue as of June 1, 2015, with an option to allow "a specified number of additional MW rooftop PV capacity."¹⁰³ Similarly, DBEDT supports a "near term, date certain deadline, potentially at the time of a commission decision on Phase 1, plus an incremental number of MW."¹⁰⁴ The HECO Companies suggest closing NEM upon commission approval of the self-supply and grid-supply customer options from this proceeding.¹⁰⁵

The Joint Parties state that the NEM credit rate should be reduced from the retail electricity rate via a "tolling mechanism,"¹⁰⁶ but claim that closing NEM is unnecessary. The Joint Parties further claim that closing NEM will raise customers' taxes and jeopardize access to the federal investment tax credit.¹⁰⁷ Blue Planet suggests that NEM remain "unaltered" for new customers until a TOU rate structure is available.¹⁰⁸ REACH and KIUC did not provide comments about closing the

¹⁰³Consumer Advocate FSOP at 15.

¹⁰⁴DBEDT FSOP at 13.

¹⁰⁵See HECO FSOP at 89.

¹⁰⁶See Joint Parties FSOP at 25.

¹⁰⁷See Joint Parties FSOP at 38.

¹⁰⁸Blue Planet FSOP at 6.

HECO Companies' NEM program in its current form, but reiterated their positions on Issue 3b.

5.

To what extent, if any, are non-participating customers detrimentally or positively impacted from customer DER deployment options discussed in Issues 2 and 3.

The HECO Companies believe that their approach is "best for all customers since it . . . makes the price paid for DER more cost-effective and tackles mispriced energy issues to achieve fairer and lower costs of electricity for all customers."¹⁰⁹

The Consumer Advocate reiterates that if "NEM is allowed to continue, the interconnection measures discussed in Issue 2 could continue to adversely affect non-participants" especially if "interconnection solutions are implemented before the pricing corrections are made . . . [because] even with non-export options, there is cost-shifting where if non-export customers are allowed to net their usage, fixed costs will not be fully recovered from those customers."¹¹⁰

The Joint Parties claim that their proposal for a TOU rate addresses the commission's directive in Order No. 32737

¹⁰⁹HECO Companies FSOP at 93.

¹¹⁰Consumer Advocate FSOP at 15.

to "allow DER to continue to grow cost-effectively in the future without adversely affecting non-participating customers."¹¹¹

Blue Planet emphasizes the need for a cost-benefit analysis for all customers, as the cost-shift assumptions made by the HECO Companies do not provide "an accurate measure of relative impacts of DERs" on all customers.¹¹²

DBEDT recommends a TOU pilot to provide "accurate prices for all customers [to] serve as a means by which to fairly and reasonably allocate DER integration costs."¹¹³

REACH believes its T-NEM tariff proposal would "positively impact non-participating customers by valuing DG energy at a rate that does not subsidize DG customers at the expense of non-DG customers."¹¹⁴

KIUC believes "public interest is not well served as more participating customers deploy DER and still rely on KIUC's grid because the utility's fixed costs (which should be reasonably and fairly allocated to all interconnected customers)

¹¹¹Joint Parties FSOP at 66 (referencing Order No. 32737 at 33-34).

¹¹²Blue Planet FSOP at 8.

¹¹³DBEDT FSOP at 20.

¹¹⁴REACH FSOP at 19.

will increase to the non-participating customers at the expense of the participating customers' savings."¹¹⁵

V.

DISCUSSION

A.

Commission Authority

The commission's general supervision over all public utilities is set forth in HRS Chapter 269.

HRS § 269-6 states in relevant part:

General powers and duties. (a) The public utilities commission shall have the general supervision hereinafter set forth over all public utilities, and shall perform the duties and exercise the powers imposed or conferred upon it by this chapter

(b) The public utilities commission shall consider the need to reduce the State's reliance on fossil fuels through energy efficiency and increased renewable energy generation in exercising its authority and duties under this chapter. . . . The commission may determine that short-term costs or direct costs that are higher than alternatives relying more heavily on fossil fuels are reasonable, considering the impacts resulting from the use of fossil fuels.¹¹⁶

Similarly, HRS §§ 269-7(a) and (c) confer upon the commission broad authority to investigate any aspect of the

¹¹⁵KIUC FSOP at 21.

¹¹⁶HRS § 269-6(a) and (b).

conditions, operations, rates, charges, property, finances, transactions, relationships, practices, or services involving a public utility. HRS §§ 269-7(a) and (c) provide:

(a) The public utilities commission and each commissioner shall have the power to examine the condition of each public utility, the manner in which it is operated with reference to the safety or accommodation of the public, the safety, working hours, and wages of its employees, the fares and rates charged by it, the value of its physical property, the issuance by it of stocks and bonds, and the disposition of the proceeds thereof, the amount and disposition of its income, and all its financial transactions, its business relations with other persons, companies, or corporations, its compliance with all applicable state and federal laws and with the provisions of its franchise, charter, and articles of association, if any, its classifications, rules, regulations, practices, and service, and all matters of every nature affecting the relations and transactions between it and the public or persons or corporations.

. . .

(c) Any investigation may be made by the commission on its own motion, and shall be made when requested by the public utility to be investigated, or by any person upon a sworn written complaint to the commission, setting forth any prima facie cause of complaint. A majority of the commission shall constitute a quorum.¹¹⁷

¹¹⁷HRS § 269-7(a) and (c) (emphasis added); see also HRS §269-15 and HAR § 6-61-71 (also setting forth the commission's investigatory authority).

In exercising its authority and duties under Chapter 269 of the HRS, the commission shall also consider “the costs and benefits of a diverse fossil fuel portfolio and of maximizing the efficiency of all electric utility assets to lower and stabilize the cost of electricity.”¹¹⁸

Moreover, while it is well-settled that “[a]dministrative agencies are created by the legislature, and the legislature determines the bounds of the agency’s authority[,]”¹¹⁹ it is also well established that “an administrative agency’s authority includes those implied powers that are reasonably necessary to carry out the powers expressly granted. The reason for implied powers is that, as a practical matter, the legislature cannot foresee all the problems incidental to carrying out the duties and responsibilities of the agency.” Haole v. State, 111 Hawaii 144, 152, 140 P.3d 377, 385 (Haw. 2006) (quoting Morgan v. Planning Dep’t, County of Kauai, 104 Hawaii 173, 184, 86 P.3d 982, 993 (Haw. 2004)).

¹¹⁸HRS § 269-6(c).

¹¹⁹Paul’s Elec. Serv., Inc. v. Befitel, 104 Hawaii 412, 417, 91 P.3d 494, 499 (Haw. 2004).

NEM Legislative History

Hawaii's first statute to address NEM was enacted in 1996 and codified as HRS § 269-16.21. Its purpose was to "encourage private investment in renewable energy resources, stimulate in-state economic growth, [and] enhance the continued diversification of Hawaii's energy resource mix" ¹²⁰ It contained basic provisions that required every electric utility in the State that offered residential electrical service to develop a standard contract or tariff for NEM, and set the total rated generated capacity limit at 0.1 percent (0.1%) of the utility's peak demand.¹²¹ It also defined "net energy metering" to mean "using a non-time differentiated meter to measure the electricity supplied by a utility and another non-time differentiated meter to measure the electricity generated by an eligible customer-generator ("ECG") and fed back to the utility over an entire billing period."¹²²

During the 2001 Legislative Session, the NEM statute was amended and codified as HRS §§ 269-101-111, repealing the NEM statute language in HRS § 269-16.21. The Legislature of the State

¹²⁰S.B. 2405, Section 1, 1996 Session Laws of Hawaii.

¹²¹See HRS § 269-16.219(a) (1996).

¹²²HRS § 269-1 (1996).

of Hawaii ("Legislature") replaced and expanded upon the former NEM provisions in HRS § 269-16.21 to broaden the definition of ECGs, expand NEM contract requirements, and provide for monthly billing and an annual reconciliation period, during which the utility was required to review the electricity consumed or generated by the ECG during the relevant period and determine whether the ECG was a net consumer or net producer of electricity.¹²³ It required every electric utility to develop a standard contract or tariff to provide for NEM and make NEM available to ECGs on a first-come-first-served basis, "until the time that the total rated generating capacity produced by eligible customer-generators equals 0.5 percent of the electric utility's system peak demand."¹²⁴

The Legislature amended the NEM statute again in 2004, to include "government entities" in the definition of ECGs,¹²⁵ and to increase the metered residential or commercial customer

¹²³See HRS §§ 269-101, -102, -106 (2001).

¹²⁴HRS § 269-102.

¹²⁵According to House Standing Committee Report 7-04, this was to "ensur[e] that government entities will be able to participate in [NEM]." H. Stand. Comm. Rep. No. 7-04, in 2004 House Journal, at 1419.

capacity to not more than fifty (50) kilowatts ("kW") (up from ten (10) kW in the previous version of the statute).¹²⁶

In 2005, the Legislature again amended the NEM statute (via Act 104, S.B. No. 1003), by, among other things, adding a new section (§ 269-101.5), under which the commission "may increase the maximum allowable capacity that eligible customer-generators may have to an amount greater than fifty kilowatts by rule or order."¹²⁷

HRS §269-102(a) was amended by adding provisions to allow the commission to "increase, by rule or order, the total rated generating capacity produced by eligible customer-generators to an amount above .5 per cent of the electric utility's system peak demand,"¹²⁸ and to "amend the rate structure or standard contract or tariff by rule or order."¹²⁹

While the maximum allowable capacity of eligible customer-generators was ultimately increased (to 0.5 percent (0.5%) of system peak demand), the Senate Commerce, Consumer Protection and Housing Committee opined that "the full

¹²⁶See HRS §§ 269-101, -111.

¹²⁷HRS §269-101.5 (2005).

¹²⁸HRS § 269-102(a) (2005).

¹²⁹HRS § 269-102(c) (2005).

effect of the increase in the cap ha[d] not yet been ascertained, thus the propriety of the removal of the cap [was] unclear. . . ."¹³⁰

Under HRS § 269-104, an electric utility was "not obligated to provide net energy metering to additional customer-generators in its service area when the combined total peak generating capacity of all eligible customer-generators served by all the electric utilities in that service area furnishing net energy metering to eligible customer-generators equals .5 per cent of the system peak demand of those electric utilities." The section, however, was amended in 2005, to allow the commission to "increase, by rule or order, the allowable percentage of the electric utility's system peak demand produced from eligible customer-generators in the electric utility's service area," effectively obligating the electric utility to provide net energy metering to additional eligible customer-generators in that service area up to any increased percentage amount, as determined by the commission.¹³¹

By way of Act 150 (2008), H.B. No. 2550 HD2 SD2 CD1 ("Act 150"), the Legislature further amended the NEM statute in 2008. Pursuant to Act 150, HRS § 269-102 was amended to allow the

¹³⁰S. Stand. Comm. Rep. No. 935, in 2005 Senate Journal, at 1474.

¹³¹HRS § 269-104 (2005).

commission to modify, by rule or order, "the total rated generating capacity produced by eligible customer-generators[,]" provided that the commission ensure that a percentage thereof be reserved for electricity produced by eligible residential or small commercial customer-generators. The amendment further allows the commission to define, by rule or order, the maximum capacity for eligible residential or small commercial customer-generators.¹³²

In recommending passage of Act 150, the Senate Committee on Commerce, Consumer Protection, and Affordable Housing, in support of the measure, stated:

Although it is important that the State decrease its dependence on imported fossil fuels by using renewable energy technologies, your Committee believes that further study is necessary to prevent detrimental customer subsidization and system safety impacts before goals are mandated.¹³³

Furthermore, the Senate Committee on Energy and Environment stated, in part:

. . . the PUC requires the flexibility to evaluate and set the thresholds for the total rated generating capacity. . . applicable to the net energy metering program. Given the relatively small size of systems on certain islands, the PUC

¹³²See HRS § 269-102(a) (2008).

¹³³S. Stand. Comm. Rep. No. 3298, in 2008 Senate Journal, available at: http://capitol.hawaii.gov/session2008/commreports/hb2550_sd2_sscr3298.pdf (emphasis added). Per the 2008 Senate Journal, "[d]ue to a publication error, the table of Senate Standing Committee Reports (SSCR) [in the 2008 Senate Journal] was incomplete. . . Full text can be found at the Hawaii State Legislature web page <http://www.capitol.hawaii.gov/>."

also requires the authority to evaluate the applicability of the thresholds on an island-by-island or utility grid basis to ensure the thresholds are reasonable

. . . .

[The] Committee finds that the authority given to the PUC by this measure will enable it to monitor, evaluate, and adjust the parameters of the net-energy metering program . . . for the benefit of the people of the State.¹³⁴

2.

Past Commission Decisions Regarding the HECO Companies' and KIUC's NEM Programs

a.

HECO Companies' NEM Program

On April 10, 2006, the commission opened an investigative proceeding to address whether the commission should further increase the maximum generating capacity of ECGs to more than fifty (50) kilowatts, per its authority under HRS § 269 - 101.5, and the total rated generating capacity produced by ECGs to above 0.5 percent (0.5%) of an electric utility's system peak demand, per its authority granted by the Legislature under HRS § 269-102.¹³⁵

¹³⁴S. Stand. Comm. Rep. No. 3140, in 2008 Senate Journal, available at: http://capitol.hawaii.gov/session2008/commreports/hb2550_sd1_sscr3140.pdf (emphasis added).

¹³⁵Instituting a Proceeding Under Hawaii's Net Energy Metering Law, Hawaii Revised Statutes §§ 269-101 - 269-111, to Investigate

In response, the HECO Companies and KIUC filed stipulations that altered the total allowable rated generating capacity and increased the maximum generating capacity of ECGs under NEM, which the commission approved in an order filed on March 13, 2008.¹³⁶ The HECO Companies' stipulation increased the maximum size of ECGs from 50 kW to 100 kW, and the system cap from 0.5% to 1.0% of system peak demand.¹³⁷ The KIUC stipulation stated that the maximum size of KIUC's ECGs should be 50 kW and the total rated generating capacity limit was increased from 0.5% to 1.0% of KIUC's peak demand.¹³⁸ The stipulations addressed in

Increasing (1) the Maximum Capacity of Eligible Customer-Generators to More Than Fifty Kilowatts, and (2) the Total Rated Generating Capacity Produced by Eligible Customer-Generators to an Amount Above 0.5 Percent of Peak Demand, Docket No. 2006-0084, Order No. 22380, filed on April 10, 2006.

¹³⁶Docket No. 2006-0084, Decision and Order No. 24089 ("Order No. 24089"), filed on March 13, 2008.

¹³⁷Order No. 24089 at 7. "[T]he parties to the HECO Companies' Stipulation agreed to reserve 40% of the 1.0% system peak demand for small systems that have a NEM generator size of 10kW or less, leaving 60% of the 1.0% system peak demand for systems with a NEM generator size of over 10kW on HECO's grid," and "[f]or the HELCO and MECO grids, the parties [] agreed to reserve 50% of the 1.0% system peak demand for small systems that have a NEM generator size of 10kW or less, leaving 50% of the 1.0% system peak demand for systems with a NEM generator size of over 10kW." Id.

¹³⁸Order No. 24089 at 10. The 1.0% of KIUC's peak demand was allocated such that 50% was reserved for systems that were 10kW or smaller, and the remaining 50% was for systems that were greater than 10kW but less than 50kW. Id. KIUC's NEM program was fully subscribed by 2009. "KIUC 2009 Annual NEM Program Activity Summary," filed on May 17, 2010, available at: <http://puc.hawaii.gov/wp-content/uploads/2013/07/NEM-KIUC->

Order No. 24089 also established the mechanism by which the HECO Companies and KIUC would review their NEM limits within each utility's IRP process.¹³⁹ In its order approving the stipulations, the commission reasoned that "the Parties' agreed-upon NEM limits . . . appear reasonable" and "the proposed increase of the system peak demand limit to 1.0% for KIUC and the HECO Companies should allow for growth in NEM for a reasonable time period."¹⁴⁰

Order No. 24089 also required the HECO Companies and KIUC to "design and propose NEM Pilot Programs for the commission's review and approval," and set forth a number of parameters for the Pilot Programs, including, that the utilities should "[e]valuate the effects of further increasing the NEM unit size and system

2009.pdf. KIUC also established a "Schedule Q" tariff in 2008, under which ECGs are compensated for electricity delivered to KIUC at a rate determined each calendar year based on KIUC's cost of fuel and budget heat rate. Schedule Q does not have a generating capacity cap or close date. KIUC Tariff No. 1, Schedule "Q" Modified, Ninth Revised Sheet 98, effective September 20, 2012.

¹³⁹Order No. 24089 at 8-9, 10-11. "IRP is the planning process required of each electric utility in the State of Hawaii to systematically and thoroughly develop long-range plans for meeting Hawaii's future energy needs. As set forth in the commission's Framework for Integrated Resource Planning, the goal of IRP 'is the identification of the resources or the mix of resources for meeting near and long term consumer energy needs in an efficient and reliable manner at the lowest reasonable cost.'" Id. at 2 (quoting Docket No. 6617, Decision and Order No. 11630, filed on May 22, 1992, at 3).

¹⁴⁰Order No. 24089 at 16.

capacity limits beyond those that are established in this Decision and Order," design the Pilot Programs "for a limited number of participants, with nominal generating unit sizes of at least 100 kW to 500kW . . ." and "to provide sufficient economic incentives to encourage participation while identifying and implementing any safeguards necessary to assure the safety, reliability, and power quality of the utility system," and allowing the utilities to "propose an alternative rate structure for the NEM Pilot Program."¹⁴¹ The commission stated that the purpose of the NEM Pilot Programs was to "allow the commission to consider the impact of incorporating more NEM generation, and facilitate future commission decisions concerning NEM"¹⁴²

On October 20, 2008, the Governor of the State of Hawaii, DBEDT, the HECO Companies, and the Consumer Advocate signed an "Energy Agreement," which set forth their resolution to "move more decisively and irreversibly away from imported fossil fuel for electricity and transportation and towards indigenously produced renewable energy and an ethic of energy efficiency."¹⁴³ Among other

¹⁴¹Order No. 24089 at 19-20.

¹⁴²Order No. 24089 at 19.

¹⁴³Energy Agreement Among the State of Hawaii, Division of Consumer Advocacy of the Department of Commerce and Consumer Affairs, and the Hawaiian Electric Companies ("Energy Agreement"), dated October 20, 2008, available at: <http://files.hawaii.gov/dcca/dca/HCEI/HECI%20Agreement.pdf>.

things, the Energy Agreement addressed NEM, setting forth the "agreement that there should be no system-wide caps on net energy metering at any of the Hawaiian Electric utilities."¹⁴⁴

Instead, the Energy Agreement provided:

- 1) "Distributed generation interconnection will be limited on a per-circuit basis, where generation [] feeding into the circuit shall be limited to no more than 15% of peak circuit demand for all distribution level circuits of 12kV or lower;"
- 2) "New DG requests shall be processed and interconnected on a first-come, first-served basis unless the Commission specifies some other method;" and
- 3) "For those circuits where interconnection requests (particularly for PV) approach the 15% limit, the utility will perform and complete within 60-days after receipt of an interconnection request, a circuit-specific analysis to determine whether the limit can be increased."¹⁴⁵

On December 26, 2008, the commission ordered the HECO Companies and the Consumer Advocate to file a proposed NEM plan "outside of the [IRP] process, for considering any future increases to the NEM limits for the HECO Companies."¹⁴⁶ The HECO Companies and Consumer Advocate filed their proposed

¹⁴⁴Energy Agreement at 28.

¹⁴⁵Energy Agreement at 28.

¹⁴⁶Order Approving, In Part, and Denying, In Part, Stipulations filed on December 3, 2008, filed on December 26, 2008, in Docket No. 2006-0084, at 2.

plans addressing the NEM provisions of the Energy Agreement on August 14, 2009, which required the HECO Companies to “[a]dopt a 15% per-circuit DG interconnection limitation designed to be consistent with Section 19 of the Energy Agreement,” “[a]ssess the removal of NEM system-wide caps,” “[d]evelop [Locational Value Maps] specific to each of the HECO Companies’ service territories,” and “[r]evis[e] their tariff rules accordingly.”¹⁴⁷

On January 7, 2010, the HECO Companies and the Consumer Advocate filed a stipulation proposing to eliminate NEM system-wide caps in favor of a 15% per-distribution circuit threshold for DG penetration,¹⁴⁸ which the commission approved in its “Order Regarding Net Metering Proposals” on January 13, 2011.¹⁴⁹ The commission determined that the stipulation “represents a reasonable approach to facilitating the continued development of NEM that is consistent with the [Hawaii Clean Energy Initiative], while allowing for the procurement of renewable energy resources via other mechanisms, such as feed-in tariffs (“FIT”).”¹⁵⁰

¹⁴⁷Order Approving, In Part, and Denying, In Part, Stipulations filed on December 3, 2008 at 9-10.

¹⁴⁸Order Approving, In Part, and Denying, In Part, Stipulations filed on December 3, 2008 at 11.

¹⁴⁹Docket No. 2006-0084, Order Regarding Net Metering Proposals, filed on January 13, 2011, at 19.

¹⁵⁰Order Regarding Net Metering Proposals at 10.

The commission further concluded that the stipulation was "consistent with the agreements reached in the Energy Agreement," and supported the HECO Companies' assertion that "additions of renewable energy generators at the distribution level could have an impact on overall grid reliability and responsiveness."¹⁵¹

b.

KIUC's NEM Pilot Program and Alternative Rate Structure

In response to Order No. 24089, on May 12, 2008, KIUC requested an extension of time to submit its proposed NEM Pilot Program to allow it to analyze its rate structure to determine "whether it would be prudent and/or necessary for KIUC to establish an alternate rate structure for its NEM Pilot Program," and if so, "what type of alternative rate structure is needed to adequately insulate KIUC's members from the effects of NEM's subsidy impact on general rates."¹⁵²

¹⁵¹Order Regarding Net Metering Proposals at 12.

¹⁵²"Kauai Island Utility Cooperative's Motion for Reconsideration of Portions of Decision and Order No. 24089, Filed On March 13, 2008; Memorandum in Support of Motion; Declaration of Randall J. Hee; and Certificate of Service," filed on May 12, 2008, at 8. The HECO Companies submitted a NEM Pilot Program proposal to the commission on April 28, 2008, and a revised NEM Pilot on February 14, 2011, but the commission ultimately dismissed the Companies' NEM Pilot and closed the docket stating that "[d]ue to changed circumstances, the commission believes that a NEM Pilot for the HECO Companies is no longer useful. The impacts of distributed generation on the HECO Companies' distribution systems were recently examined by the

On October 15, 2009, KIUC, the Consumer Advocate, HREA, and HSEA filed a stipulation regarding KIUC's NEM Pilot Program, which proposed:

- 1) "Paying the NEM Pilot Program participant a fixed \$.20 per kWh rate for excess energy that will apply for the 20 year term of the agreement, in lieu of the existing NEM compensation structure;
- 2) Operating the NEM Pilot Program on a first-come, first-served basis for three years, or until certain capacity limits are reached;
- 3) Expanding the NEM Pilot Program from the 50 kW to 200 kW range . . .;
- 4) Allowing for up to two megawatts ("MW") of alternating current ("AC") generation capacity from 50 kW to 200 kW facilities in the aggregate under the program; and
- 5) Allowing for up to one MW of AC generation capacity in the aggregate from facilities smaller than 50 kW, with 50% of the 1 MW going to participants of 10 kW to 50 kW in size and 50% going to participants less than 10 kW in size."¹⁵³

[RSWG] in Docket No. 2011-0206," and "[i]t is the [c]ommission's intent to evaluate and identify improvements for Hawaii's various renewable energy procurement methods that would include a review of the State's NEM program." Docket No. 2006-0084, Order No. 31167, Dismissing HECO Companies' Revised Net Energy Metering Pilot Program and Closing Docket, filed on April 10, 2013, at 4.

¹⁵³Order Regarding Net Metering Proposals at 17. See KIUC NEM Pilot Program Stipulated Proposal, Docket No. 2006-0084, filed on October 15, 2009 (emphasis added).

The commission approved KIUC's NEM Pilot Program, determining that "KIUC's proposed NEM Pilot Program conforms to the parameters in D&O No. 24089, and should aid KIUC in evaluating the economic and reliability impacts of including larger as-available generating units on KIUC's system," finding that "the \$.20 per kWh rate is sufficient compensation for participants in the program and that, with the proposed capacity limits, the pilot program should not have a significant adverse effect on non-participant ratepayers."¹⁵⁴ KIUC's NEM Pilot Program was made available on a "first come, first served basis" until the earlier of "three (3) years following the effective date of the 'NEM Pilot' tariff, or when [] two (2) megawatts ("MW") of AC generation capacity from such 50 kW to 200 KW facilities in the aggregate is reached."¹⁵⁵

KIUC's NEM Pilot Program stopped accepting new ECGs on June 3, 2014, three years after the date of the NEM Tariff filing,

¹⁵⁴Order Regarding Net Metering Proposals at 17-18. KIUC filed a motion for commission approval of changes to its tariff to implement its NEM Pilot Program on May 4, 2011, and the commission approved the tariff changes on June 21, 2011. See Docket No. 2006-0084, Order Granting KIUC's Motion for Approval of Changes to its Tariff to Implement its NEM Pilot Program and to Include Purchased Energy Costs in its ERAC, filed on June 21, 2011.

¹⁵⁵KIUC Tariff No. 1, Original Sheet 126, Schedule "NEM Pilot" Net Energy Metering Pilot Program, effective June 3, 2011.

with approximately 0.811 MW of total subscribed capacity.¹⁵⁶ Despite the closure of the NEM Pilot Program and the full subscription of KIUC's NEM program in 2009, customers with DER systems in KIUC's service territory are still able to sell energy produced on-site back to the utility under the Schedule Q tariff.¹⁵⁷

B.

Findings and Conclusions

At the outset, the commission notes that the focus of Phase 1 of this docket is to establish a transitional market structure for distributed energy resources, one that will allow the Parties sufficient time to fully examine the issues inherent in expanding DER deployment statewide, such that these resources will continue to provide value to Hawaii in the future.

To that end, the commission has reviewed the positions of the Parties with respect to the Phase 1 issues, and makes

¹⁵⁶"KIUC 2013 Annual NEM Program Activity Summary," Attachment D, filed on March 11, 2014, available at: <http://puc.hawaii.gov/wp-content/uploads/2013/07/KIUC-NEM-2013-ANNUAL-REPORT.pdf>.

¹⁵⁷See KIUC Tariff No. 1, Schedule "Q" Modified. KIUC's Schedule Q is available for customer-sited generating facilities (100 kW or less) that either (1) do not export energy to the grid, or (2) export energy for payment at a rate that varies monthly and approximates the cost of fuel for utility generation.

certain findings and conclusions, as discussed herein. As a result, the HECO Companies shall modify their interconnection rules and offer new tariffs to customers consistent with this Order.

Phase 2 of this proceeding, which will begin with a technical conference facilitated by commission staff (see Section V.C of this Order), will build upon the transitional market structure established herein to develop a set of longer-term policies to enable continued beneficial deployment of DER across the State. This will include an evaluation of opportunities to integrate and aggregate various forms of DER (e.g., solar PV, energy storage, demand response, etc.) to enhance their value, adoption of new technical requirements for safely and reliably interconnecting DER, as well as detailed consideration of regulatory policies (including rate design) appropriate for cost-effectively acquiring these resources. Given the unprecedented quantity of DER already interconnected to Hawaii's island grids, and the continued strong customer demand for these resources, the commission expects that Phase 2 will proceed on an expedited timeline.

Finally, the commission observes that KIUC repeatedly takes the position that no modifications to KIUC's interconnection tariffs or DER policies are necessary at this time. No other Party opposes KIUC's position in this regard. In Order No. 32269

establishing this proceeding, the commission required KIUC to actively participate as a Party to this docket, as it may be subject to any applicable commission decision issued in this proceeding. Here, the commission makes no finding as to the merits of KIUC's positions on the Phase 1 issues. Nonetheless, the commission reaffirms the requirements of Order No. 32269 as they pertain to KIUC.

1.

HECO Companies' Interconnection Queue

Issue 1 concerns whether the HECO Companies have met their commitments and responsibilities to clear the interconnection backlog and enable continued DER growth. The commission further requested that the Parties consider "what options to improve the HECO Companies' performance with respect to processing customer interconnection applications should be considered in Phase 1 of this docket."¹⁵⁸

On October 31, 2014, the HECO Companies committed to approving 2,500 of the 2,749 pending interconnection applications in the queue as of October 22, 2014 (for the island of Oahu) by April 30, 2015, and the remaining 249 customers by the end of

¹⁵⁸Order No. 32737 at 36.

2015.¹⁵⁹ According to the HECO Companies, of the 2,749 customers waiting as of October 22, 2014, all but 12 have been permitted to interconnect their systems as of June 29, 2015.¹⁶⁰

The Consumer Advocate contends that “[a]t this time, it appears that the HECO Companies have cleared the backlog to meet [their] commitment”¹⁶¹ and focuses the bulk of its FSOP on emerging interconnection issues (as discussed further below). The Joint Parties state that “[b]ased on the HECO Companies’ regular reports to the Commission and Joint Parties’ direct experience with the interconnection application process, it appears that the clearing of the pre-October 22, 201[4] backlog is on schedule.”¹⁶²

Thus, it appears the HECO Companies are making substantial progress in meeting their commitment to clear the backlog of interconnection applications. In addition, the Companies report they will make several improvements to the interconnection process in the coming months, including offering

¹⁵⁹HECO FSOP at 18.

¹⁶⁰In addition, the HECO Companies state that all customers in the queue for the HELCO and MECO systems as of October 22, 2014 have been approved for interconnection. HECO FSOP at 19.

¹⁶¹Consumer Advocate FSOP at 7.

¹⁶²Joint Parties FSOP at 62.

the ability to accept applications online, as further discussed below.

However, since October 22, 2014, the HECO Companies have received thousands of new interconnection applications. While HECO reports 2,488 new applications have been approved in 2015 on Oahu (and another 1,893 applications for HELCO and MECO), nonetheless, as of September 1, 2015, more than 3,900 applications sit waiting in the Companies' interconnection queue.¹⁶³

The Joint Parties also note the thousands of applications that remain in the queue and state that "the interconnection approval process itself continues to lack transparency, consistency, or accountability for the HECO Companies' ongoing failure to comply with Rule 14H's review schedule."¹⁶⁴ The Joint Parties further recommend that "[t]he HECO Companies should adhere to the review schedule established in their own tariffs. Greater transparency and communication are also needed to avoid customer confusion and unnecessary

¹⁶³HECO Companies Integrated Interconnection Queue Report, September 1, 2015.

¹⁶⁴Joint Parties FSOP at 62.

interruptions of the review schedule.”¹⁶⁵ The Joint Parties are also supportive of an “online portal” for application tracking.¹⁶⁶

The Consumer Advocate recommends that “with the on-going technological changes in DER, as well as other factors that affect DER deployment, there will be a need to revisit the adequacy of efforts by the utility [to efficiently process interconnection applications].”¹⁶⁷

For its part, the HECO Companies state that they have complied with the commission’s order to develop and submit weekly reports on the interconnection and monthly reports on energy storage and advanced inverter technologies.¹⁶⁸ Furthermore, the Companies claim that they have developed a detailed Interconnection Improvement Program to “provide greater transparency, improved processing of customer interconnection applications, and most of all, an improved customer experience.”¹⁶⁹ This will include an online software tool to “streamline the interconnection application process” and “support all interconnection programs to include existing NEM and

¹⁶⁵Joint Parties FSOP at 63.

¹⁶⁶Joint Parties FSOP at 63.

¹⁶⁷Consumer Advocate FSOP at 7.

¹⁶⁸HECO FSOP at 21.

¹⁶⁹HECO FSOP at 23.

[Standard Interconnection Agreements] as well as future programs across the Hawaiian Electric Companies.”¹⁷⁰ The HECO Companies state that this tool is in development and a “phased implementation” will “begin by the end of this year [2015].”¹⁷¹

In light of the continued delays experienced by customers requesting interconnection approval and the concerns noted by certain Parties discussed above, the commission concludes that continued monitoring of the HECO Companies’ performance is required.

Accordingly, the Companies shall continue to submit weekly reports on the interconnection queue for each service territory, as was previously ordered by the commission. In addition, these reports shall be expanded to cover each island grid separately. Furthermore, the reports shall be supplemented to indicate the maximum number of days an application has remained at each applicable step in the interconnection process (in addition to the average duration of all pending applications at each step). The Companies shall expand the data presented in the weekly report to include the self-supply and grid-supply options approved by commission in this Order, as well as any other interconnection

¹⁷⁰HECO FSOP at 25.

¹⁷¹HECO FSOP at 25.

option available to customers or that may be approved by the commission in the future (e.g., community-based renewable options, Schedule Q, TOU rates, etc.). Furthermore, the weekly report shall be supplemented to include the total rated capacity (MW_{ac}) of the executed systems and those in the queue.

The Companies shall continue to submit the weekly report electronically, and shall formally file a quarterly summary in this docket that summarizes the content of the weekly reports. The Companies shall work with commission staff to develop the appropriate format and content of the quarterly summary.

Finally, the commission notes that the HECO Companies are obligated under State law to process interconnection applications consistent with its tariff rules, which includes compliance with the timelines, transparency, and customer reporting requirements set forth therein.

After review of the record, the commission concludes that the HECO Companies have adequately responded to the commission's orders with respect to the interconnection queue, and have begun to take necessary steps to improve their interconnection processes. Therefore the commission will not, at this time, order further action by the HECO Companies to improve the efficiency of the interconnection process, other than regular reporting on the status of the interconnection queue, as set forth above. The HECO Companies will be active participants in Phase 2

of this proceeding, which will, in part, continue to address improvements to the interconnection process. The commission will monitor the Companies' success interconnecting DER systems and may take further action during Phase 2, as appropriate.

2.

Revisions to Applicable Interconnection Standards

In Order No. 32737, the commission instructed the Parties to consider what "near-term revisions to applicable interconnection-related tariffs should be made to expedite the interconnection process, mitigate DER integration challenges, and enable beneficial DER investment, deployment, and customer choice."¹⁷²

a.

Stipulated Revisions of the PV Subgroup
of the Reliability Standards Working Group

At the conclusion of the Reliability Standards Working Group docket,¹⁷³ the commission requested the PV Subgroup of the Reliability Standards Working Group consider what modifications to the HECO Companies' Tariff Rule 14H could be immediately agreed upon and implemented by the Parties to that docket. Over the past

¹⁷²See Order No. 32737 at 36.

¹⁷³See Docket No. 2011-0206.

year, the PV Subgroup has continued to discuss proposed revisions pursuant to the commission's request. In Order No. 32737, the commission instructed the Parties to this docket to finalize the work of the PV Subgroup and, if possible, submit a stipulation setting forth the Parties' agreement on proposed revisions to the HECO Companies' interconnection rules ("Stipulation").

The commission observes the Stipulation filed on June 29, 2015, was signed by all Parties to this docket (with the exception of KIUC).¹⁷⁴ As noted above, the Stipulation represents the combined efforts of dozens of individuals over hundreds of hours of collaborative discussion. The commission is appreciative of the efforts of stakeholders from around the country who have assisted the HECO Companies in considering these highly complex, technical issues and in developing appropriate solutions for Hawaii.

After review of the extensive record pertaining to the Stipulation and its development, the commission finds and concludes that most of the revisions proposed in the Stipulation are just and reasonable, are in the public interest, and should therefore be approved. However, the commission is concerned with inconsistencies between the Stipulation and the Final Statements

¹⁷⁴The Stipulated Agreement concerns the HECO Companies' interconnection standards; thus, KIUC did not sign the agreement.

of Position submitted by the Parties, and thus will require certain modifications as discussed herein. In addition, the commission declines to approve certain proposed revisions in the Stipulation that were agreed to by the Parties with reservations, as discussed below.

In short, the commission must consider the Stipulation in the full context of Docket No. 2014-0192, which encompasses other proposed revisions to interconnection standards, as well as new tariffs for enabling continued beneficial DER deployment. Therefore, after review of the docket record, the commission has harmonized the proposed revisions of the Stipulation with other approved DER policy changes. The approved revisions to Rule 14H (specifically, revisions to the Rule 14H Introduction and Appendix I sections) are attached to this Order as Exhibit A. By this Order, the HECO Companies are instructed to re-file clean and black-lined versions of Rule 14H, incorporating the approved revisions attached as Exhibit A, as well as further revisions to Appendix III consistent with the discussion of the interconnection review process herein.

(1).

Return-to-Service

With respect to return-to-service settings, data submitted by the HECO Companies shows that HECO, HELCO,

and MECO achieve varying levels of frequency stability on their respective grids, with numerous deviations even during steady state operations.¹⁷⁵ There are at least two concerns with the frequency performance of the HECO Companies' systems, related to the return-to-service setting proposed for Rule 14H.

First, given the routine and sometimes significant frequency deviations on the HECO Companies' grids, the proposed return-to-service setting may be too narrow to allow PV systems to re-connect in a timely manner, particularly during the morning when PV systems first begin producing electricity. During morning start-up, inverters will be monitoring the frequency on the grid, and are programmed to re-connect only if the grid frequency stays within a narrow band for at least five (5) continuous minutes.¹⁷⁶ If there is a frequency deviation outside this narrow band, the timer is reset and the inverter continues to monitor frequency. This process could delay energy production if the return-to-service setting is too narrow.

Second, during an emergency or transient condition, frequency decay or rise could be very rapid, and the large

¹⁷⁵See Monthly Curtailment Reports filed in Docket No. 2011-0206.

¹⁷⁶Some inverter models remain connected overnight, thus avoiding the need to "re-connect" in the morning under the return-to-service setting.

fluctuations may trigger automatic shutdown of PV inverters. Adjusting the frequency *ride-through* settings as proposed in the Stipulation is expected to help keep PV systems online and grid-connected, thereby helping to stabilize the grid and prevent cascading failure.

However, in the event that the frequency (or voltage) deviation is so great that PV systems can no longer support the grid and are required to shut down, the *return-to-service* setting will determine the manner and timing of the PV system re-connecting to the grid, as discussed above. If, after the grid has experienced a frequency deviation so great that PV systems have disconnected, and each inverter waits for the narrow return-to-service band to be satisfied, it is possible that many inverters (representing hundreds of megawatts) will attempt to re-connect simultaneously, which could have its own negative impacts on frequency stability of the grid.¹⁷⁷

The HECO Companies initially proposed shrinking the return-to-service frequency band to +/- 0.05 Hz (i.e., 0.05 Hz above or below the normal frequency of 60 Hz).

¹⁷⁷A related, but distinct, concern is that during certain N-1 conditions (e.g., severe or extended under frequency events), the system could significantly benefit from DER systems returning to service promptly, which may be precluded by a narrow return-to-service band.

Engineering standards developed by the Institute for Electrical and Electronics Engineers ("IEEE") call for a band +0.5 Hz and -0.7 Hz around the normal frequency of 60 Hz, so the Companies' initial proposal would narrow the band by more than 90%.¹⁷⁸ The HECO Companies' later modified their proposal to a band of +/- 0.1 Hz, and have suggested a larger band of +/- 0.3 Hz may be acceptable.¹⁷⁹ Furthermore, the Stipulation states that the Parties "agreed that . . . collaborative technical discussions should turn without delay to developing and implementing further revised [inverter] settings and performance requirements, which will incorporate advanced inverter functionality and more effectively address system stability and reliability requirements including [return-to-service] settings."¹⁸⁰ Such advanced inverter functions could include "a ramp rate control to enable PV generation to return to service at a gradual rate."¹⁸¹ In other words, discussions among the Parties are ongoing and superior technical solutions may soon be available that could ensure safe and reliable re-connection of PV inverters while

¹⁷⁸Stipulation at 12.

¹⁷⁹Stipulation Exhibit A at 33.

¹⁸⁰Stipulation at 13.

¹⁸¹Stipulation at 13.

avoiding the negative unintended consequences inherent in the HECO Companies' proposal.

After review of the Stipulation and the record in this docket, the commission finds that the HECO Companies have not sufficiently demonstrated the need to differ from the IEEE standards for return-to-service. Despite numerous requests from the Parties, the HECO Companies have not provided a technical basis demonstrating a narrower return-to-service standard would improve reliability or safety on their systems. Moreover, the Companies have not clarified why a narrower return-to-service band is preferable to a wider band, as has been adopted for KIUC.¹⁸² Furthermore, the narrow return-to-service band proposed by the HECO Companies could have the unintended consequence of exacerbating frequency instability during emergency grid conditions. Despite the months of discussions among the Parties, according to the Stipulation, the Parties "did not have the opportunity to address technical data or analysis on this issue in the time available."¹⁸³

Thus, the commission will not approve modification of the return-to-service requirement to differ from the IEEE standard, as proposed in the Stipulation.

¹⁸²See Stipulation at 12.

¹⁸³Stipulation at 12.

Nevertheless, the commission remains concerned that the IEEE standard for return to service may need to be modified to account for the unique needs of Hawaii's island grids. Thus, within thirty (30) days of the date of this Order, HECO shall (1) develop and present the technical basis for the need to deviate from IEEE standards in this regard, and (2) propose return-to-service standards consistent with best practices under discussion as part of the California Rule 21 process (such as ramp rate control standards and randomized re-connection standards) to mitigate these potential issues. Further revisions to interconnection standards to implement appropriate return-to-service settings for Hawaii may be adopted at any time during Phase 2 of this proceeding, if grid reliability or safety considerations warrant.

(2).

Self-Certification

The Consumer Advocate raises a concern related to self-certification by inverter manufacturers that their products meet the frequency and voltage ride through and trip requirements, as set forth in the Stipulation.¹⁸⁴ "The Consumer Advocate contends that as one of the priority items to be addressed during this

¹⁸⁴Consumer Advocate FSOP at 9.

transitional period before Phase 2 of this proceeding, additional time should be spent to further analyze when [Underwriter's Laboratories'] certification is necessary and how [such] certification, or lack thereof, may impact the customer."¹⁸⁵

The commission agrees that the question of whether UL certification of inverters utilizing advanced functionality should be required remains an open issue for consideration by the Parties.¹⁸⁶ However, at this time it is unknown whether or when the relevant standards setting organizations (e.g., IEEE and UL) will update national standards to enable such certification.¹⁸⁷ As the Consumer Advocate acknowledges, Hawaii is at the forefront of interconnecting DER to electric systems.¹⁸⁸ Thus, in the absence of national standards developed by IEEE and UL, it is imperative that the Parties work collaboratively to develop solutions that

¹⁸⁵Consumer Advocate FSOP at 9.

¹⁸⁶The commission clarifies the issue is *not* whether DER equipment should be UL certified. Permitting un-certified equipment to interconnect to the State's electric systems could expose utility employees and their customers to safety risks and the utilities themselves to liability risks. The issue is whether DER equipment should be certified to meet performance standards for advanced inverter functions above and beyond the normal safety and performance certification obtained by all equipment interconnected to the State's electric systems.

¹⁸⁷The commission also notes that the standards setting bodies may elect to develop standards for some, but not all, advanced inverter functions under consideration for Hawaii.

¹⁸⁸See Consumer Advocate FSOP at 9.

address the urgent needs in Hawaii, while remaining cognizant of the ongoing efforts in California and elsewhere on the mainland to update national, state, or utility-specific standards for DER equipment.

The commission will therefore allow the HECO Companies to continue to utilize a manufacturer self-certification process for certain advanced inverter functions, as discussed herein.

b.

Revisions Related to Docket No. 2014-0130

The commission instructed the Parties to identify any revisions to Rule 14H proposed in Docket No. 2014-0130 that should be incorporated into the high priority revisions under consideration in Phase 1 of this proceeding. None of the Parties recommends that any specific proposal from Docket No. 2014-0130 be adopted here. However, the FSOPs submitted by the HECO Companies, the Consumer Advocate, and other Parties have incorporated various concepts and certain interconnection language in their FSOPs similar to those revisions proposed in Docket No. 2014-0130.

For example, the HECO Companies state the "Companies' proposals for Self-Supply and Grid-Supply options in Phase 1 of this proceeding incorporate and account for the revisions previously considered in Docket No. 2014-0130 and should be

adopted by the [c]ommission in this proceeding.”¹⁸⁹ In addition, the Consumer Advocate provided “redline” revisions to Rule 14H as an attachment to its FSOP that encompass its additional proposed revisions, beyond those set forth in the Stipulation.

After review of the record in this docket and in Docket No. 2014-0130, the commission finds and concludes that the revisions proposed by the Parties’ in their FSOPs in this docket supersede or otherwise adequately represent the proposals made by the Parties in Docket No. 2014-0130, and are thus sufficient to allow the commission to resolve the issues under consideration in Phase 1. By this Order, the commission approves certain proposed revisions to the HECO Companies’ Tariff Rule 14H, as discussed in Sections V.B.2.c, V.B.2.d, and V.B.2.e, below.

c.

Technical Specification of a Self-Supply System Design

The HECO Companies propose that self-supply systems must comply with the following requirements:

- The maximum system size is 100 kW (generation);
- The system must be sized and designed such that all output of the self-supply system is consumed by the customer’s load;
- The system does not export to the grid, with the exception of “inadvertent export,” which shall be uncompensated and shall not exceed ten (10) seconds,

¹⁸⁹HECO FSOP at 50.

with a reverse power flow not exceeding two percent (2%) of the inverter rating;

- The system may employ one of five options to reasonably ensure non-export functionality;
- The inverter used must provide grid support consistent with the requirements proposed to be included in Rule 14H, Appendix III; and
- If energy storage is included in the self-supply system, the storage must be available daily to store energy produced by the system in excess of the customer's load.¹⁹⁰

The Companies also propose additional requirements for a self-supply system to qualify as "minimal" impact for purposes of passing the proposed hosting capacity screen in the interconnection review process under Rule 14H. However, as discussed further below in Section V.B.2.d.(1), given that the commission declines to approve the hosting capacity screen at this time, the commission declines to adopt the "reduced" or "minimal"-impact categorization of self-supply systems put forth by the HECO Companies in their FSOP in regards to the technical specification of self-supply systems.

With respect to the non-export functionality of self-supply systems, the HECO Companies further propose to require testing and validation of self-supply systems to ensure that they perform as expected.¹⁹¹ The HECO Companies acknowledge that a

¹⁹⁰See HECO FSOP at 51-53.

¹⁹¹See HECO FSOP at 56-57.

national standard for non-export functionality does not exist, and state that they would accept an "industry drafted test procedure(s), in the absence of a nationally recognized standard."¹⁹² Furthermore, the Companies propose a requirement that "non-export advanced inverter functionality [be] tested and witnessed by a Nationally Recognized Testing Laboratory."¹⁹³

With respect to the five options to reasonably ensure non-export functionality, the Consumer Advocate expresses reservations that allowing "inadvertent export" may not be reasonable at this time.¹⁹⁴ The Consumer Advocate observes that the five options proposed by the HECO Companies were modeled after California Rule 21, but notes that "other provisions in Rule 21 related to "inadvertent export" [were] not identified in this proceeding."¹⁹⁵ Thus, the Consumer Advocate proposes removing option 5, which would allow the use of advanced inverters and energy management systems to reasonably ensure non-export functionality.¹⁹⁶

¹⁹²HECO FSOP at 57.

¹⁹³HECO FSOP at 57.

¹⁹⁴Consumer Advocate FSOP at 11.

¹⁹⁵Consumer Advocate FSOP at 11.

¹⁹⁶See Consumer Advocate FSOP, Attachment B.

DBEDT states that "the greatest point of contention among the Parties in this proceeding on Self-Supply systems pertains to the technical specification of inadvertent export and the related verification that Self-Supply systems can meet such [a] specification, including related UL certification, which currently does not exist."¹⁹⁷ DBEDT notes that a "readily available commercial product [for a self-supply system] is still in its infancy" and observes that there is a "limited value proposition for . . . Self-Supply systems vs. Grid-Supply systems . . ." which may limit the potential for deployment of self-supply systems.¹⁹⁸

Thus, DBEDT recommends that: (1) the commission allow inadvertent export in the technical specification of self-supply systems and self-certification by system providers, and (2) the HECO Companies "establish a verification process (e.g., through metering) to ensure that the Self-Supply systems are performing as intended, to allow the Companies to take appropriate action should the Self-Supply systems not operate as intended, and to allow the Companies to gather data and relevant information

¹⁹⁷DBEDT FSOP at 7.

¹⁹⁸DBEDT FSOP at 7.

to greatly augment their experience with and understanding of Self-Supply systems.”¹⁹⁹

The Joint Parties state that the “fundamental criterion [of self-supply systems] is that any “inadvertent exports” that may occur will be uncompensated. This provides ample incentive for customers to limit any exports, which only amount to waste and a loss of their investment.”²⁰⁰ The Joint Parties are in general agreement with the HECO Companies’ proposed technical specification of self-supply systems, with the following exceptions:

- The maximum system size is 250 kW, in contrast to the HECO Companies’ proposal of 100 kW;
- Inadvertent export shall not exceed sixty (60) seconds, in contrast to the HECO Companies’ proposal of 10 seconds;
- Self-certification of self-supply systems should be done by inverter manufacturers by “providing information on the equipment and its non-export capability and a sworn certification that the equipment complies”, in contrast to the HECO Companies’ proposal for testing and validation at a Nationally Recognized Testing Laboratory; and
- Use of advanced meters to detect failure of non-export functionality.²⁰¹

¹⁹⁹DBEDT FSOP at 7-8.

²⁰⁰Joint Parties FSOP at 52.

²⁰¹See Joint Parties FSOP at 52-56.

In support of their recommendations, the Joint Parties state that (1) a 250 kW system size limit is the size threshold for [supervisory control and data acquisition "SCADA"] requirements in Rule 14H, which was derived from the IEEE 1547 standard, and is half the non-export size limit in California; (2) a sixty (60) second limit on inadvertent exports is the standard in California and is a conservative starting point, while a ten (10) second limit "would preclude available options" for "advanced inverter and/or storage non-export systems,"²⁰² and has not been supported or justified on technical grounds by the HECO Companies; (3) other jurisdictions do not test and certify equipment according to any non-export standard, and subjecting self-supply systems to onerous testing and verification requirements would unduly delay adoption of the self-supply option; and (4) monitoring self-supply systems to establish compliance with non-export requirements would allow for further investigation and enforcement when necessary, consistent with existing provisions of Rule 14H for disconnection of systems that violate interconnection standards.²⁰³

After review of the record, the commission finds and concludes that the technical specification of a self-supply system

²⁰²Joint Parties FSOP at 52.

²⁰³See Joint Parties FSOP at 52-56.

as proposed by the HECO Companies in their FSOP is reasonable and in the public interest, and should be approved, subject to modifications discussed further below.

First, the HECO Companies' proposed system size limit of 100 kW is reasonable, particularly given that the self-supply option has not previously been implemented in this manner in Hawaii. Customers who wish to interconnect larger self-supply systems still have the option to apply for interconnection under the HECO Companies' Standard Interconnection Agreement. Adjustments to the allowable system size may be considered in the future, after the HECO Companies have gained sufficient experience implementing self-supply systems in their service territories.

Second, the commission finds and concludes that uncompensated inadvertent export shall be allowed, provided that inadvertent export shall not exceed sixty (60) seconds, no more than twice per day, as proposed by the Joint Parties. While the HECO Companies advocate for a ten (10) second limit, the Joint Parties assert a ten second limit may preclude certain market options for enabling non-export functionality, and argue a sixty second limit is consistent with requirements of California's Rule 21.²⁰⁴ After review, the commission will adopt a sixty (60) second limit as a starting point

²⁰⁴See Joint Parties FSOP at 52.

for the technical specification of a self-supply system. Furthermore, the HECO Companies' proposed requirement that reverse power flow not exceed two percent (2%) of the inverter rating was not discussed among the Parties during Phase 1, nor have the HECO Companies provided sufficient support for such a requirement specifically applicable to self-supply systems. Thus, the two percent limit shall not be included in the technical specification of self-supply systems.

Third, the five options to reasonably ensure non-export (other than inadvertent export) proposed by the HECO Companies should be approved, with the modification that the "separate reverse power or underpower protective function" as part of option 5 shall not be required. The commission finds that a reverse power or underpower protective requirement may have the unintended consequence of blocking a self-supply system from providing frequency support by injecting power into the grid (such as, e.g., through the frequency-watt function) during emergency conditions, and could preclude the self-supply system from providing grid supportive functions to the power system. To be clear, the ability to provide grid-supportive functions when needed, including frequency response, both by injecting or curtailing power, is a fundamental feature of the customer self-supply option. Any non-export functionality of the

self-supply system shall be subordinate to the ability to provide grid support when needed.

Therefore, the commission concludes that such a reverse power or underpower requirement should be avoided in order to allow self-supply systems to provide such grid support. Further, no option designed to ensure non-export should hinder the ability to provide grid supportive functions when needed, including frequency response. The technical specification of self-supply system requirements must accommodate desirable advanced inverter functions, particularly functions such as expanded frequency and voltage ride through and frequency-watt, for example, in order to minimize any such unintended consequences.

Fourth, given that a UL certification for the specific function of limiting energy exports does not currently exist, inverter manufacturers shall be permitted to self-certify. Self-certification shall include a sworn statement from each such manufacturer, that each qualifying inverter model meets the technical requirements of Rule 14H and the self-supply tariff, including non-export requirements.

Within thirty (30) days of the date of this Order, the HECO Companies shall develop and prominently post on their respective websites a list of inverter models for which the Companies have received such self-certification from the manufacturer.

At this time, the self-certification process shall not require testing or verification at a Nationally Recognized Testing Laboratory prior to installation. Instead, the HECO Companies shall develop an appropriate monitoring and corrective action protocol for self-supply systems that will examine whether any inadvertent exports exceed what is allowed under the self-supply technical specification. If the HECO Companies determine that inadvertent exports may exceed allowable levels, the Companies shall work with the applicable customer to examine the cause of any such violations and determine appropriate corrective action. The HECO Companies shall be permitted to disconnect a self-supply system that persistently violates applicable interconnection standards or otherwise poses a threat to safety or reliability, consistent with existing provisions of Rule 14H.

Fifth, the proposed requirements related to self-supply systems that incorporate energy storage are unnecessary and unreasonable given the numerous other requirements in the self-supply technical specification that preclude the self-supply system from exporting energy to the grid, except when needed during contingency events or as otherwise required under Rule 14H. Thus, the commission will not approve such requirements.

Sixth, the commission clarifies that self-supply systems are required to meet the revised interconnection standards approved by the commission herein, including advanced inverter

functionality specified in Section 4A of Appendix I to Rule 14H, at the time of interconnection. The commission finds and concludes this requirement is reasonable given the expedited interconnection review afforded the self-supply option. Compliance with advanced inverter requirements will ensure self-supply systems are capable of providing necessary grid-supportive functions consistent with the approved revisions to Rule 14H.

The approved technical specification of a self-supply system is included as part of the approved revisions to Rule 14H, attached to this Order as Exhibit A.

d.

Revisions to Accommodate a Self-Supply System

The HECO Companies “propose to revise Rule 14H to (1) establish comprehensive advanced inverter standards (2) add circuit hosting capacity analysis to the interconnection process, and (3) establish system-level screening.”²⁰⁵ Here, the commission will address the circuit hosting capacity analysis proposed by the HECO Companies as well as the proposed revisions to Rule 14H specific to enabling a customer self-supply option. Proposed revisions related to advanced inverter standards are addressed in

²⁰⁵HECO FSOP at 27.

Section V.B.2.e., below, while the issue of system-level screening is addressed in Section V.B.2.f.

For the reasons discussed herein, the commission will approve the proposed revisions to Rule 14H to enable a customer self-supply option proposed by the HECO Companies, subject to modifications to address certain concerns raised by the Parties.

(1).

Hosting Capacity Analysis

In their FSOP, the HECO Companies propose to introduce a new screen into the interconnection review process referred to as the "circuit hosting capacity" test, which would replace existing screens that test whether the customer is applying for interconnection on a heavily saturated distribution circuit.²⁰⁶ The HECO Companies state that use of the circuit hosting capacity "eliminates the need for rigorous and lengthy analysis for each rooftop PV application."²⁰⁷

According to the HECO Companies, the proposed hosting capacity analysis "identifies the safe circuit-level capacity under the assumption that advanced inverter-based voltage

²⁰⁶See HECO FSOP at 47.

²⁰⁷HECO FSOP at 33.

regulation and other functions are available to cost-effectively mitigate DER integration challenges”²⁰⁸ The Companies have performed this analysis for the HECO service territory, the results of which are included in the HECO Companies’ FSOP as Exhibit 9. According to the Companies, the circuit hosting capacity set forth in Exhibit 9 specifies “the amount of small roof-top PV that can be interconnected onto the circuit regardless of the location of the PV, and without the need to perform additional studies or identify circuit upgrades.”²⁰⁹

The HECO Companies explain that, at this time:

The present Rule 14H process requires the submission of a complete interconnection application together with relevant data and then an Initial Technical Review. If any of the Initial Technical Review screens is failed, Supplemental Review is required. If any of the Supplemental Review screens are failed, an Interconnection Requirements Study (“IRS”) may be requested and paid for by the applicant in order for the interconnection evaluation process to continue.

In Supplemental Review, one of the screens tests whether the proposed quantity of generation is greater than 50% of the Line Section minimum kW load during the period when the proposed generation is available (including noon on Sunday for solar PV systems). As the Companies gained more insight on circuit performance and reliability through studies and actual experience, this threshold has been increased.²¹⁰

²⁰⁸HECO FSOP at 27.

²⁰⁹HECO FSOP at 31.

²¹⁰HECO FSOP at 28-29.

The Companies maintain that, "[b]ased on the Companies' experience with [distribution circuits with high levels of installed DER], the original screens that collectively constitute the technical review process are no longer effective."²¹¹ Thus, "the Companies propose to incorporate circuit hosting capacity analysis to more accurately evaluate all potential impacts of DG."²¹² Furthermore, the Companies claim that "[t]he hosting capacity analysis will provide interconnection time certainty to DER customers" and "may significantly reduce interconnection times."²¹³

DBEDT states that it supports the HECO Companies' "hosting capacity" screen in concept but would like greater transparency on the "modeling methodology, assumptions and results, and implementation plan."²¹⁴ DBEDT explains that "despite a number of substantive conversations . . . between the Companies and Parties, comprehensive documentation has not been provided by the Companies to the Parties . . . with sufficient time for critical evaluation and discussion" ²¹⁵

²¹¹HECO FSOP at 30.

²¹²HECO FSOP at 30 (footnote omitted).

²¹³HECO FSOP at 43.

²¹⁴DBEDT FSOP at 3.

²¹⁵DBEDT FSOP at 3-4.

The Joint Parties state that the hosting capacity analysis, as described by the HECO Companies during Phase 1 discussions, "seems similar to the 'Proactive Approach' that the PV-DG Subgroup unanimously recommended and the RSWG Technical Review Committee endorsed as a 'best practice'."²¹⁶ The Joint Parties further state "these proposals have made progress and seem to be headed in a constructive direction."²¹⁷

However, the Joint Parties state that they "have not had an opportunity to review any concrete details of the hosting capacity proposal, including any final outputs of the analysis" and that "without further information, the parties were unable to proceed to any next steps of evaluating the merits of the proposal"²¹⁸ Nonetheless, the Joint Parties state they are willing to "continue the discussions going forward to flesh out the hosting capacity concept and other potential further improvements to the interconnection process."²¹⁹

Here, the commission clarifies it is supportive of the HECO Companies' hosting capacity analysis. In Order No. 32053, issued April 24, 2014 in Docket No. 2011-0206, the commission

²¹⁶Joint Parties FSOP at 61 (footnote omitted).

²¹⁷Joint Parties FSOP at 48.

²¹⁸Joint Parties FSOP at 61-62.

²¹⁹Joint Parties FSOP at 62.

ordered the HECO Companies to develop a Distributed Generation Interconnection Plan, which was required to include, among other things, a Distributed Generation Interconnection Capacity Analysis, which "shall proactively identify distribution circuit capacity to safely and reliably interconnect distributed generation resources and the system upgrade[] requirements necessary to increase circuit interconnection capability in major capacity increments."²²⁰ Notwithstanding the commission's prior order, the DGIP included no such analysis. Thus, the commission views the "hosting capacity analysis" presented in the HECO Companies' FSOP to be an incremental improvement over the deficient DGIP.

However, after review of the record, the commission finds that there are numerous unresolved technical questions related to the proposed hosting capacity approach. Furthermore, the HECO Companies presented the complete hosting capacity methodology and results for the first time in its FSOP. Thus, no other Party to this proceeding has had an opportunity to review the proposed hosting capacity analysis and offer comments for the commission's consideration. Therefore, the commission will defer adopting the hosting capacity screen in Rule 14H until

²²⁰Order No. 32053, filed on April 24, 2014, in Docket No. 2011-0206, at 51.

the Parties have had sufficient time to review and comment on the proposed methodology.

The commission observes that the HECO Companies have not completed the modeling work to assess the hosting capacity of the HELCO and MECO systems. Until the hosting capacity analysis can be developed and performed for HELCO and MECO systems, the Companies propose that HELCO and MECO "continue to review interconnection applications up to the 250% DML threshold."²²¹ This is the same threshold as is currently utilized for screening interconnection applications for all three of the HECO Companies.

Given that the HECO Companies propose to continue to utilize the same circuit-level screening process for HELCO and MECO as is currently in place, the commission finds and concludes that it is reasonable to retain the current screening process for the HECO system as well, until the commission approves a hosting capacity methodology.²²² Further review of the Companies' hosting capacity methodology will be conducted in Phase 2 of this proceeding.

²²¹HECO FSOP at 33.

²²²The commission observes that based on the Companies' analysis in Exhibit 9 of its FSOP, the existing screening threshold (250% of DML) may be a reasonable, if conservative, proxy for the Companies' hosting capacity analysis. See HECO FSOP, Exhibit 9 at 22-49.

In light of this, the commission declines to adopt the “reduced” or “minimal”-impact categorization of self-supply systems put forth by the HECO Companies in their FSOP.²²³ Until the commission approves a hosting capacity screen for inclusion in Rule 14H, qualifying self-supply systems shall be permitted to proceed directly to interconnection approval, provided they pass the applicable screens in the Initial Technical Review process. Moreover, within 60 days of the date of this Order, the HECO Companies shall complete the circuit-level hosting capacity analysis for all islands in the Companies’ service territories, and submit the results of such analysis for consideration by the Parties and the commission in this docket.

(2).

Expedited Review of Self-Supply Systems

The commission reiterates that the revisions to Rule 14H under consideration in Phase 1 are intended, in part, to improve the efficiency of the interconnection process. With respect to the customer self-supply option, the self-supply tariff is intended to enable a customer opting to supply some or all of its own electricity needs to do so, providing the customer chooses to design a self-supply system to provide grid-supportive benefits.

²²³See HECO FSOP at 53-54, and Exhibit 3 at 29-32.

The commission observes that unless a self-supply system receives expedited interconnection approval, there may be a diminished incentive to provide such grid-supportive benefits to the system. Thus, after review of the record, and as discussed further below, the commission approves revisions to Rule 14H proposed by the HECO Companies to bypass certain steps in the interconnection review process for self-supply systems that meet the required technical standards.

The HECO Companies propose that self-supply systems would bypass screens 6, 8, 10, and 11 of the Initial Technical Review, with inverter-based self-supply systems also bypassing screen 7.²²⁴

Similarly, the Consumer Advocate proposes that self-supply systems be permitted to bypass certain interconnection screens, provided such systems meet the technical specification established in the applicable tariffs.²²⁵

²²⁴HECO FSOP at 61. The screen numbers refer to the HECO Companies' proposed revised interconnection process, not Rule 14H as it currently exists. Thus, the Companies propose that self-supply systems utilizing advanced inverters should bypass the following initial technical review screens: Export Power/Voltage Regulation (6), Line Section $\leq$ 15% (7), Voltage Drop/Flicker (8), Short Circuit Contribution Ratio (10), and Short Circuit Interrupting Capability (11).

²²⁵See Consumer Advocate FSOP, Attachment B.

As discussed above, DBEDT states that interconnection of self-supply systems could be a "viable option provided by the [HECO] Companies under a Fast Tracked process with the intention of enabling greater customer choice and the greater opportunity for the interconnection of distributed energy resources."²²⁶ In addition to bypassing certain screens in the Initial Technical Review, as proposed by the HECO Companies, DBEDT suggests "Self-Supply systems could be afforded a faster interconnection review timeframe by the Companies in comparison to Grid-Supply systems . . . " and that "Self-Supply systems could serve as the 'system of last resort' to interconnect in already highly saturated and technically challenging circuits."²²⁷

The Joint Parties state that "utility interconnection rules should be updated to provide a real fast-track pathway for [self-supply] systems."²²⁸ The Joint Parties further recommend that a "limited subset of Rule 14H screens should be applied in an expedited review process since, although unlikely, non-export systems could potentially affect [] aspects of safety, reliability and power quality. . . ."²²⁹

²²⁶DBEDT FSOP at 8.

²²⁷DBEDT FSOP at 8.

²²⁸Joint Parties FSOP at 57.

²²⁹Joint Parties FSOP at 58.

The Joint Parties conclude "discussions have continued for over a year without the HECO Companies providing any valid basis for treating non-export systems differently from other changes in load or restricting the customers' choice to control and serve their own load. The time has come to move forward and enable customer self-supply options on a fast-track basis, as the Commission has ordered."²³⁰

With respect to the interconnection screens in Rule 14H, the commission approves the HECO Companies' proposal to allow self-supply systems to bypass the following interconnection screens: Export Power/Voltage Regulation, Voltage Drop/Flicker, Short Circuit Contribution Ratio, and Short Circuit Interrupting Capability. Inverter-based self-supply systems shall also pass the Line Section $\leq$ 15% screen. As a result, the commission instructs the HECO Companies to revise and re-file clean and black-lined versions of their respective Tariff Rule 14H incorporating the modifications approved and attached as Exhibit A to this Order, as well as further revisions to Appendix III of Rule 14H consistent with the discussion of the interconnection review process herein.

²³⁰Joint Parties FSOP at 59.

e.

Other High Priority Revisions to Interconnection Standards

(1).

Advanced Inverter Functions

According to the Companies, “[g]iven the state of inverter technology, customer demand for DER, and the finite available capacity on the distribution system, comprehensive advanced inverter requirements should be adopted without delay to promote beneficial DER investment, deployment, and customer choice.”²³¹ These requirements are intended to enable DER to “provide grid supportive functionality . . . to address the safety and reliability needs” of Hawaii’s island grids.²³²

Certain of these proposed revisions are the product of numerous discussions between the HECO Companies, the Parties to this docket, and other stakeholders, including representatives of the inverter manufacturing industry. The Companies state that they “collaborated with several inverter manufacturers . . . to adopt advanced inverter standards already defined in [California] Rule 21, and transition the Hawaii market to advanced inverter equipment.”²³³ The Companies further maintain that an

²³¹HECO FSOP at 27-28

²³²HECO FSOP at 36.

²³³HECO FSOP at 37.

ad-hoc group of inverter manufacturers have supported the proposed standards, including two manufacturers who have submitted letters of support included in the Companies' FSOP.²³⁴

The HECO Companies propose that the majority of the advanced inverter standards should take effect January 1, 2016, which the Companies' state "sends a clear signal to the industry that advanced inverters are desired in Hawaii, and provides the industry the needed time to prepare for, and implement the Companies' requirements for advanced inverters."²³⁵ Thus, under the Companies' proposal, "non-advanced" or "legacy" inverters would be allowed to interconnect until the advanced inverter standards take effect beginning next year.

Beginning January 1, 2016, the Companies propose that interconnection applications with inverter-based technologies shall:

comply with the eleven (11) advanced inverter requirements [specified in HECO's proposed revisions to Rule 14H], and be certified to UL-1741 Supplement SA, or (2) upon interconnection approval, comply with fixed power factor, voltage ride-through, and frequency ride-through requirements, with the capability to be updated, at the expense of the Generating Facility Owner, with the remaining advanced inverter requirements no later than twelve (12) months after the date the Supplement SA of UL-1741 is approved by the full UL-1741 Standards Technical Panel (STP).

²³⁴See HECO FSOP, Exhibits 12 and 13.

²³⁵HECO FSOP at 39.

Following such date, advanced inverter standards shall apply for interconnection of all inverter based technologies. The Companies encourage and support the installation of advanced inverter technologies prior to these dates as it is expected that certain inverter manufacturers will be able to bring new advanced inverter products to the market sooner than December 31, 2015.²³⁶ (footnote therein omitted)

DBEDT states that it would be supportive of "implementation of Fixed Power Factor in a reasonable time frame should the Fixed Power Factor specification be acceptable to [inverter manufacturers], a reasonable self-certification option [] as an interim solution while UL certification for Fixed Power Factor is obtained, a streamlined and dynamic process under Rule 14H [] to make changes to Fixed Power Factor should electric grid circumstances change, and [a requirement that] other Parties in this proceeding be consulted by the Companies on the overall implementation plan."²³⁷

Similarly, DBEDT states that with respect to additional advanced inverter functions beyond fixed power factor, "due to the urgency for action, DBEDT believes that if the Companies are able to get positive written affirmation from [inverter manufacturers] that inverter manufacturers are able to the meet the Companies' proposed advanced/smart inverter functionality, then it would be

²³⁶HECO FSOP at 40.

²³⁷DBEDT FSOP at 4-5.

appropriate for the Commission to assert its authority to allow the Companies to implement such inverter functionality under a prompt timeframe and reasonable implementation plan that would pull in the perspectives of other Parties from this proceeding.”²³⁸

With respect to advanced functions that require communications, such as remote configurability to revise inverter settings, the ability to remotely disconnect during grid emergencies, and access to DER system performance data, DBEDT states it “is not able to fully endorse the implementation of such functionality” due to the lack of comprehensive supporting documentation and sufficient time for review.²³⁹

The Joint Parties acknowledge that enabling advanced inverter functions is “crucial in operating a grid with 100% renewable energy,”²⁴⁰ consistent with the requirements of Act 97, which establishes a 100% renewable energy portfolio standard for Hawaii. The Joint Parties further state that “such technologies will lead the next evolution in customer-focused energy services,” concluding that “interconnection rules and policies should enable them to support the grid.”²⁴¹ In addition, the Joint Parties do

²³⁸DBEDT FSOP at 5.

²³⁹DBEDT FSOP at 5-6.

²⁴⁰Joint Parties FSOP at 7.

²⁴¹Joint Parties FSOP at 51.

not advocate waiting for national standards for advanced inverters to be established, instead stating the Joint Parties "support and recommend a [self-certification] process for self-supply systems to enable customer choice and 'accommodate the potential benefits of distributed energy storage' and other advanced DER functions."²⁴² Furthermore, the Joint Parties "recognize the need to finalize the advanced inverter proposal and move expeditiously to provide these functions and grid benefits in Hawaii."²⁴³

Nonetheless, the Joint Parties claim that the Phase 1 schedule did not allow sufficient time to "vet" the HECO Companies' advanced inverter standards.²⁴⁴ According to the Joint Parties, this is due to fear that requiring certain advanced functions could have economic impacts on the Joint Parties, such as "affect[ing] power production and revenue" or resulting in costs due to "stranded inventory."²⁴⁵

After review of the record, the commission finds and concludes that it is well established that advanced inverter functions are essential to continued beneficial deployment of DER in Hawaii. The commission further finds that the economic

²⁴²Joint Parties FSOP at 53 (quoting Order No. 32737, footnote omitted).

²⁴³Joint Parties FSOP at 61.

²⁴⁴Joint Parties FSOP at 60.

²⁴⁵Joint Parties FSOP at 60-61.

concerns raised by the Joint Parties are not sufficient to continue to delay the establishment of advanced inverter standards in the HECO Companies' service territories. Under the HECO Companies' proposal, the implementation of these standards will occur over several months, allowing solar installers and integrators time to move outdated inventory to the mainland or other locations where such inverter equipment may still be acceptable for safe and reliable interconnection of DER systems. In sum, the commission finds and concludes that the advanced inverter standards proposed by the HECO Companies are reasonable and in the public interest and should be approved, subject to the following clarifications.

First, if determined to be necessary to ensure safety, reliability, or continued beneficial deployment of DER, the HECO Companies may propose, and the commission may approve, activation of certain advanced inverter functions prior to the date specified by the HECO Companies in their FSOP (i.e., prior to "12 months after approval of the Supplement SA of UL-1741 by the full UL-1741 Standards Technical Panel"). In other words, the advanced inverter functions that are required to be *available* by January 1, 2016 may be required to be *activated* sooner than "12 months after approval of Supplement SA."

This clarification is necessary because it may not be in the public interest to delay enabling these functions, particularly if continued delay would preclude interconnection of

additional DER systems for safety or reliability reasons. Thus, the commission clarifies that the implementation timeline proposed by the HECO Companies may need to be accelerated, depending on future conditions and the needs of each island power system.

Second, according to the HECO Companies' proposal, the volt-watt and frequency-watt functions proposed to be included in Rule 14H are not required to be activated until "12 months after approval of the Supplement SA of UL-1741 by the full UL-1741 Standards Technical Panel."²⁴⁶ Nonetheless, the HECO Companies' proposed revisions include settings proposed for both functions (see Sections 4A.g.iii and 4A.h.ii).

The commission clarifies that while customers may opt to provide such services in accordance with the settings proposed by the HECO Companies, such settings are subject to further review during Phase 2 of this proceeding, and may be adjusted as a result of such review (in addition, the timing of any requirement for activation of these functions may change, as discussed above). The HECO Companies shall continue discussions with the Parties and other stakeholders in Phase 2 of this proceeding to develop appropriate settings and timeline for activation of the volt-watt and frequency-watt functions.

²⁴⁶HECO FSOP, Exhibit 2 at 30.

Third, the commission clarifies that in contrast to advanced inverter functions 1-9, which can be enabled and operate autonomously, functions 10 and 11²⁴⁷ require communications capability between the utility and the inverter. The commission is not aware that any communications infrastructure or protocols have been established in Hawaii that could enable these functions in the manner described in the HECO Companies' FSOP.²⁴⁸ Thus, while the commission finds these functions to be desirable, the commission observes that it is likely that substantial additional effort will be required to activate these functions beyond simply developing a standard for each function and associated testing and certification protocols.

Fourth, after review of the record, the commission finds and concludes that requirements for upgradeability of inverter settings are reasonable and in the public interest, subject to the clarification that any subsequent proposals to change the interconnection rules or standards shall continue to be subject to the commission's prior approval.²⁴⁹

²⁴⁷As numbered in Figure 6 of the HECO Companies' FSOP, at 38.

²⁴⁸It should be noted that, in contrast to the HECO Companies, certain solar companies and inverter manufacturers do possess extensive communications infrastructure with individual DER systems.

²⁴⁹The commission notes that remotely programmable inverters (and, in general, any form of DER that requires or enables

Given that the revised interconnection standards approved herein will not require updated inverter settings on new equipment until January 1, 2016, the commission acknowledges that some quantity of "legacy" inverters will be installed between now and the end of the year. "Legacy" inverters (which the commission defines as those inverters which do not possess the capability to meet the January 1, 2016 interconnection standards approved herein) may need to be updated in the future to meet new reliability standards as the grid evolves. The commission intends to evaluate the impact of legacy inverters on the grid as part of Phase 2 of this docket and in Docket No. 2014-0183.

Fifth, the HECO Companies shall collaborate with inverter manufacturers and with the Parties to this docket (and other stakeholders, as appropriate) during Phase 2 to develop a reasonable self-certification process for the advanced inverter functions approved for inclusion in Rule 14H, which, after approval by the commission, shall remain in effect until national standards are established, unless otherwise ordered by the commission.

Sixth, in order to expedite the implementation of necessary advanced inverter functions, the HECO Companies shall

networked control) are vulnerable to "cyberattack" and may be compromised by malicious individuals or entities. The commission views the security and resilience of Hawaii's power systems as a critical responsibility of the State's electric utilities.

continue their collaboration with inverter manufacturers to develop a test plan for the highest priority advanced inverter functions that do not yet have UL certification. The Companies shall submit the test plan to the commission for approval no later than December 15, 2015. Upon approval, the HECO Companies shall test a variety of inverters to assess their performance with respect to the high priority advanced inverter functions, and submit a report summarizing the test results to the commission no later than six (6) months after the test plan is approved by the commission.

Seventh, the HECO Companies shall maintain a list of inverter models that are deemed to meet the interconnection standards established in Rule 14H (inclusive of requirements for overvoltage trip), and shall prominently post the qualified inverter list to the Companies' respective websites to improve the transparency of the interconnection process for customers and DER system providers.

(2).

Additional High Priority Revisions to Interconnection Standards

The Consumer Advocate proposes certain additional revisions to Rule 14H, which would "clarify that Rule 14H [applies] to the interconnection of DER, rather than the 'parallel' operation of the DER system, which is consistent with other jurisdictions.

This proposed change should mitigate future confusion on what is considered 'parallel.'"²⁵⁰

The commission finds these clarifications to be reasonable and in the public interest, and will approve modifications to that effect, as shown in Exhibit A.

The commission notes that in approving the Consumer Advocate's proposed revisions, certain inconsistencies with the HECO Companies' proposed revisions must be reconciled. The commission has reviewed instances where the Consumer Advocate's proposed revisions conflict with those proposed by the Companies and, as discussed above, has determined that the Consumer Advocate's proposed revisions should be approved. Thus, the approved revisions (see Exhibit A, attached) reconcile conflicts between the revisions proposed by the Consumer Advocate and those proposed by the HECO Companies.

In addition, the commission observes that the HECO Companies have proposed in their FSOP that certain new interconnection standards (namely the frequency and voltage ride through and trip settings),²⁵¹ should take effect beginning October 1, 2015, followed by requirements for additional advanced

²⁵⁰Consumer Advocate FSOP at 10. See also, Consumer Advocate FSOP, Attachment B.

²⁵¹See HECO FSOP at 38.

inverter functions as of January 1, 2016, as discussed above. However, the proposed revisions to Rule 14H, attached to the HECO Companies' FSOP as Exhibit 2, specify that frequency and voltage ride through and trip settings take effect January 1, 2016.²⁵² In addition, the Companies' FSOP requires that inverters comply with the so-called "Anti-islanding TrOV-2 standard," which is not defined in the FSOP but has a purported effective date of implementation of February 9, 2015. Notwithstanding the effective date proposed by the Companies in their FSOP (which has already occurred), the HECO Companies' proposed revisions to Rule 14H appear to specify this standard would take effect January 1, 2016.²⁵³

After review, the commission finds and concludes that these inconsistencies should be corrected. Thus, the commission will approve the proposed revisions with the modification that both the frequency/voltage ride through and trip settings and the anti-islanding (TrOV-2) performance standard shall be required as of October 1, 2015, as shown in the approved revisions to Rule 14H attached to this Order as Exhibit A.

²⁵²See HECO FSOP, Exhibit 2 at 23 and 30.

²⁵³See HECO FSOP, Exhibit 2 at 23, 30, 32-33.

Finally, the commission observes that the HECO Companies' have proposed numerous additional revisions to Rule 14H Appendix III that, in some cases, are not revealed or discussed in their FSOP.²⁵⁴ Given that the Companies have not provided support or basis for these revisions, the commission will only approve certain of these revisions that are clearly reasonable and in the public interest.

First, the HECO Companies' proposal to remove interconnection review timelines from Rule 14H Appendix III is clearly unreasonable and not in the public interest. The HECO Companies shall continue to adhere to the existing requirements in Rule 14H.

Second, the HECO Companies' proposal to modify language related to dispute resolution in Rule 14H Appendix III has not been adequately supported, and is not be approved.

Third, the HECO Companies propose new language for the introduction section of Rule 14H relating to non-export systems that are not designed to operate in parallel with the utility's distribution system. The commission finds these proposed additions are unnecessary given the other approved revisions to Rule 14H, which clarify that all distributed generation facilities that are interconnected to the utility's distribution system must

²⁵⁴See, e.g., HECO FSOP, Exhibit 2 at 58.

receive interconnection review and approval by the utility, pursuant to the interconnection standards and processes established in Rule 14H. Thus, these proposed additions are not included in the approved revisions to Rule 14H, attached to this Order as Exhibit A.

Fourth, as proposed by the HECO Companies, "non-export" systems (i.e., systems that are interconnected but do not operate in parallel with the distribution system for more than 100 ms) are required to notify the Companies by submitting a technical description of the non-export generating facilities (Rule 14H Appendix II-B). While these systems will be examined by the HECO Companies, they are not subject to the Initial Technical Review under Rule 14H Appendix III and, thus, do not require a separate interconnection screen. Interconnection of these systems entails a different registration form and such systems can be treated accordingly by the HECO Companies.

After review of the record, the commission instructs the HECO Companies to revise and re-file clean and black-lined versions of their respective Tariff Rule 14H incorporating the modifications approved and attached as Exhibit A to this Order, as well as further revisions to Appendix III of Rule 14H consistent with the discussion of the interconnection review process herein.

f.

System-level Screening Criteria

The commission observes that despite the HECO Companies' repeated assertions of *distribution-level* technical integration challenges over the past several years, subsequent modeling and testing has shown the risks to be small, with numerous mitigation options.²⁵⁵

In contrast, the commission remains concerned that *system-level* integration challenges represent a fundamental constraint on near-term continued DER deployment

²⁵⁵For example, HECO's recent concern over possible temporary over-voltage during contingency events was found to already be mitigated by most modern PV system inverters automatically with no further action required. See A. Nelson et al. "Inverter Load Rejection Over-Voltage Testing SolarCity CRADA Task 1a Final Report" NREL: Golden CO, February 2015. The commission observes that when this concern was first raised by the HECO Companies nearly two years ago, the commission strongly advised the Companies to investigate the capabilities of the inverters to rapidly and autonomously disconnect to mitigate any transient overvoltage conditions. The commission further observes it is well established that the power electronics used in many forms of DER can be configured to eliminate technical issues at the source. During emergencies, DER can remain grid-connected when that is desirable, or immediately disconnect when necessary (or even form islanded grids at the household or neighborhood level). Various forms of DER have been demonstrated to provide grid support equal to or better than conventional technologies. See, e.g., ERCOT EAA Workshop 2 Presentation, available at: [http://www.ercot.com/content/meetings/other/keydocs/2014/0619-EEAWorkshop/EEA Workshop 2 Presentation.ppt](http://www.ercot.com/content/meetings/other/keydocs/2014/0619-EEAWorkshop/EEA%20Workshop%20Presentation.ppt)

on Hawaii's island grids.²⁵⁶ It is troubling that the Companies still have not presented a rigorous and thoughtful approach to evaluating system-level constraints, including appropriate planning criteria and characterization of available grid-supportive distributed energy resources to alleviate such constraints.

The HECO Companies state that "the establishment of system level screens for each unique island grid . . . is necessary in Phase 1" and claims that "to address the urgency of establishing system-level limits, the Companies are currently conducting studies through an independent, third party consultant and intend to present those findings to the [c]ommission as soon as those studies are completed."²⁵⁷ However, despite admitting that the Companies have not yet developed a technical basis for establishing system level capacity limits, the HECO Companies have nonetheless proposed that a system-level hosting capacity screen be inserted into Rule 14H.

After review, in light of the fact that the Companies have not yet proposed any actual screening criteria, the commission

²⁵⁶On certain islands (e.g., Molokai), system operators are already experiencing significant system-level integration challenges.

²⁵⁷HECO FSOP at 64.

will not allow Rule 14H to be revised to include a system-level hosting capacity screen at this time.

Given the importance of the HECO Companies' own systems and operations to evaluating system-level hosting capacity, the commission will further consider this issue in Phase 2 and in the context of the Power Supply Improvement Plans, under review in Docket No. 2014-0183. Furthermore, as discussed below, the commission will establish a program participation cap for the grid-supply tariff option, in part to address the commission's concerns with respect to system-level hosting capacity of each island grid. The program participation cap for the grid-supply option will be evaluated during Phase 2, as additional analysis of this issue is presented and discussed among the Parties to this docket. Moreover, within sixty (60) days of the date of this Order, the HECO Companies shall file in this docket a proposed methodology and resulting system-level hosting capacity for each island grid in the Companies' service territories.

3.

Modifications to Existing DER Policies and Programs

In Order No. 32737, the commission instructed the Parties to consider how existing HECO Companies and KIUC DER policies and programs should be modified to create new DER market

choices while a longer-term DER market structure is established.²⁵⁸ This issue includes the creation of new customer options to manage energy use (self-supply and grid-supply tariffs) as well as possible modifications to the HECO Companies' NEM program.

As described in the Staff Report attached to Order No. 32737, the self-supply and grid-supply options "represent two fundamental value propositions of distributed resources" and are "intended to provide customer choice, enable continued interconnection of DER systems, and offer value to the electric systems of the State."²⁵⁹ Commission staff reasoned that

[w]ith proper design, these new development options can address many near-term technical concerns with further interconnection of DER systems, institute a more certain and timely interconnection process for systems that utilize advanced technologies to mitigate grid-integration challenges, and establish pricing for future grid-supply energy systems that is more aligned with the economic value these resources supply to the electric grid.²⁶⁰

²⁵⁸Order No. 32737 at 37.

²⁵⁹Staff Report at 33.

²⁶⁰Staff Report at 33.

a.

Customer Self-Supply Option

In the Staff Report attached to Order No. 32737, commission staff explain that the self-supply option "should enable customer choice in energy production and consumption, using a limited- or non-export DER system that can also provide value-added grid service capabilities."²⁶¹ Furthermore, the self-supply option "acknowledges customers' clear desire and ability to control their energy consumption using a variety of cost-effective technologies available today."²⁶² Because these systems can offer grid-supportive functions and are designed to prevent export of energy to the grid, commission staff states that "these systems should be accorded a fast-track interconnection process under applicable interconnection rules, including on heavily saturated distribution circuits that otherwise would not permit interconnection"²⁶³

The HECO Companies propose that the customer self-supply option should offer "a non-export solution for customers that provides the benefit of using PV to meet their own energy needs and allows a limited amount of inadvertent export to the grid,

²⁶¹Staff Report at 34.

²⁶²Staff Report at 34.

²⁶³Staff Report at 34.

with zero compensation for any export, and the implementation of available advanced functionalities to provide support for the grid.”²⁶⁴ The HECO Companies’ proposed self-supply tariff is attached to its FSOP as Exhibit 3.

In addition, the HECO Companies propose to increase the minimum bill for customers opting to interconnect a self-supply system to \$25 per month for residential customers and to \$50 per month for small commercial customers.²⁶⁵ According to the HECO Companies, the minimum bill should in fact be higher than proposed, but the proposed increase to the minimum bill is reasonable “until a detailed examination of costs of service can be conducted in Phase 2.”²⁶⁶ The HECO Companies do not propose any adjustment to the minimum bill for large commercial customers opting to interconnect under the proposed self-supply tariff because they are currently subject to demand charges, which, according to the Companies, obviate the need to update the minimum bill.²⁶⁷

The Consumer Advocate agrees that that customers interconnecting under the self-supply tariff should pay a minimum

²⁶⁴HECO FSOP at 67.

²⁶⁵See HECO FSOP at 69.

²⁶⁶HECO FSOP at 70.

²⁶⁷See HECO FSOP at 70.

bill of \$25.²⁶⁸ In addition, the Consumer Advocate recommends "a detailed examination of Hawaiian Electric's cost of service is necessary and should be conducted as part of Phase 2" ²⁶⁹

Similarly, DBEDT states it "would not oppose an increase in the minimum bill to \$25 that would be applicable to interim DER customers. However, DBEDT is concerned that a minimum bill will not provide a long term solution and believes closer scrutiny of the minimum bill is necessary in Phase 2 of this proceeding." ²⁷⁰

The Joint Parties advocate for an increased minimum bill (to \$25.31 for a residential customer); however, the Joint Parties suggest the updated minimum bill should apply to all customers, not just those opting for self-supply (or grid-supply). ²⁷¹ According to the Joint Parties, increasing the minimum bill for DER customers "discriminates within a rate class on a basis unrelated to a customer's electricity usage and cost of service." ²⁷²

While the Consumer Advocate "believes a minimum bill based on updated information is appropriately assessed on all customers (and not only DER customers or new DER customers),

²⁶⁸See Consumer Advocate FSOP at 13.

²⁶⁹Consumer Advocate FSOP at 16.

²⁷⁰DBEDT FSOP at 11.

²⁷¹Joint Parties FSOP at 15.

²⁷²Joint Parties FSOP at 15-16.

implementing a new minimum charge applicable to all existing customers requires regulatory procedures that would not be completed within the Phase 1 timeframe.”²⁷³ The HECO Companies state that “raising the minimum bill for all customers would require review in a contested case hearing, preceded by a public hearing, pursuant to HRS §§ 269-12 and [-]16” and is thus “more appropriately addressed in Phase 2.”²⁷⁴

After review of the record in this docket, the commission finds a self-supply option to be reasonable and in the public interest, and thus will approve the HECO Companies proposed self-supply tariff, with certain modifications as discussed herein. While some Parties assert that a tariff to enable a self-supply option is not needed, and that a customer self-supply option can be established by revising provisions of Rule 14H to allow for expedited interconnection of qualifying systems,²⁷⁵ the commission finds and concludes that a self-supply tariff is superior to simply writing the requirements for a self-supply system directly into the interconnection standards in Rule 14H. Without a new tariff, customers interconnecting a self-supply system would be subject to the existing applicable rate schedule.

²⁷³Consumer Advocate FSOP at 17.

²⁷⁴HECO FSOP at 73.

²⁷⁵See, e.g., Consumer Advocate FSOP at 13 and Joint Parties FSOP at 51.

This would not allow the flexibility to allow customers with self-supply systems to be subject to an updated minimum bill, for example, nor would it enable self-supply systems to offer (and be compensated for) grid-supportive benefits in the future. Flexibility and adaptability to evolving technology and grid requirements are fundamental aspects of the self-supply option.

Furthermore, the commission finds and concludes that the Joint Parties misread the plain language of applicable law and commission rules in suggesting an increase to the minimum bill for all customers could be made in this docket without a public hearing. Thus, while the commission is supportive of appropriately specifying a minimum bill for all customers, it is infeasible and inappropriate to make such a change for all customers at this time. As a result, the commission will approve a minimum bill of \$25 for residential customers and \$50 for small commercial customers interconnecting under the self-supply tariff, as proposed by the HECO Companies, but will not impose such new charges on all customers, as proposed by the Joint Parties. The commission will consider further adjustments to the minimum bill as part of Phase 2 of this docket.

The commission further finds that certain aspects of the Companies' proposed self-supply tariff are unreasonable or otherwise unsupported by the record in this docket. Thus, the commission will not approve the proposed self-supply

tariff in its entirety, but rather has modified the proposed self-supply tariff to ensure the tariff remains in the public interest. The approved self-supply tariff is attached to this Order as Exhibit B.

First, with respect to paragraph 1 of Appendix I to the self-supply tariff, the tariff language shall be clarified to note that export of power is allowed during contingency events, pursuant to the technical specification of the self-supply system and applicable provisions of Rule 14H. The self-supply option is not intended to limit export of power when such export would provide grid-supportive benefits.

Second, with respect to paragraph 6.b of Appendix I to the self-supply tariff, the requirement that customers shall ensure that their self-supply system does not cause the customer to be considered a public utility under State law shall be retained; however, the restriction that the self-supply system "shall not serve any other electric load" is unnecessary and shall not be included in the self-supply tariff. Customers who design self-supply systems to serve their own isolated loads, for example, should not be prevented from doing so, absent some other safety or reliability impact.

Third, with respect to paragraph 8 of Appendix I to the self-supply tariff, the tariff language shall be modified to clarify that customers shall not deliver reactive power, *except as*

provided under Rule 14H, or unless the customer and the utility have otherwise agreed in writing.

Fourth, with respect to paragraph 10 of Appendix I to the self-supply tariff, the HECO Companies shall provide written approval to operate a self-supply system within fifteen (15) business days of receipt of a copy of the final governmental inspection or approval of the self-supply system, rather than within thirty (30) business days, as proposed by the Companies.

Fifth, paragraph 11.d of Appendix I to the self-supply tariff, shall be modified to clarify that the requirement for interconnection review of energy storage devices is conditioned upon the energy storage system being interconnected to the utility system.

Sixth, with respect to Paragraph 11.e of Appendix I to the proposed self-supply tariff, the commission finds and concludes that a requirement to install additional equipment or modify existing equipment shall be conditioned upon the HECO Companies providing a written explanation of the need for such installation or modification. Such installation or modification shall be made upon mutual agreement of the Company and the customer. The commission has therefore modified the applicable language as shown in Exhibit B, attached to this Order.

Seventh, the proposed self-supply tariff includes references to "Exhibit D: Company Owned Interconnection

Facilities;" however, the proposed tariff does not include an actual Exhibit D. The commission concludes that the referenced but missing Exhibit D is intended to include a standard form similar to what is included as part of the proposed grid-supply tariff. Thus, the commission has reproduced Exhibit D from the proposed grid-supply tariff and included it as part of the approved self-supply tariff.

Eighth, with respect to paragraph 18 of Appendix I to the self-supply tariff, the HECO Companies shall not be entitled to "any information" related to customers, but shall be entitled to request self-supply system data reasonably needed to ensure safe and reliable operation of the self-supply system or the Companies' system. Thus, the commission has removed the reference to "any information" in the approved self-supply tariff and clarified that the Companies may make requests for "information related to the Customer-Generating Facility" reasonably needed for the safety and reliability of the grid.

Ninth, with respect to paragraph 19 of Appendix I to the proposed self-supply tariff,²⁷⁶ the commission finds and concludes that a requirement to provide "additional information" shall be modified to clarify that the information must be

²⁷⁶Note: while this paragraph is actually labeled "1" in the proposed self-supply tariff, the commission has corrected this error in the approved tariff language attached to this order.

"reasonably necessary" to serve the customer or to ensure safety or reliability of each Company's system.

Tenth, Exhibit C shall only be required of self-supply systems greater than 10 kW, consistent with the requirements of Rule 18 and the proposed grid-supply tariff.

Eleventh, Appendix II to the proposed self-supply tariff shall be modified to reflect the discussion of the technical specification of a self-supply system in Section V.B.2.c and V.B.2.d, above.

Twelfth, in order to provide further clarity regarding the terms offered under the self-supply tariff, the commission has modified the "Notice and Disclaimer" included as Exhibit A to the proposed self-supply tariff.

b.

Customer Grid-Supply Option

The grid-supply option is intended to provide customers with the option to export excess energy to the grid in exchange for energy credits against the customer's bill, to the extent such energy export provides benefits to the electric system. The grid-supply option is therefore functionally similar to the existing NEM program (see, e.g., HECO's Tariff Rule 18), with the difference that the energy credit rate under the grid-supply option need not be tied to the retail electricity price, but rather can

be set at a rate that approximates the relative value of such exported energy to the system.

The commission emphasizes that the grid-supply tariff is intended as an interim measure to provide new customer options and enable continued beneficial deployment of DER in Hawaii. Further adjustments to DER policies, including the grid-supply tariff, will be considered as part of Phase 2 of this proceeding.

The HECO Companies propose to establish a new tariff to enable a customer grid-supply option, which they attach to their FSOP as Exhibit 4. The Companies claim that their proposed grid-supply tariff is intended to "increase cost-effectiveness, establish more accurate market based price signals, and address fairness for all customers."²⁷⁷

Consistent with the commission's direction, the Companies' proposed grid-supply tariff is similar to the existing NEM program tariff in many respects, with one important difference being the proposed determination of credits for excess energy delivered to the grid by customers under the grid-supply tariff.

Under the NEM program, each kWh of energy exported to the grid is credited against customers' bills at a rate equivalent to the effective retail rate. Instead of the variable rate credit

²⁷⁷HECO FSOP at 74 (emphasis in original).

offered under the NEM program, the proposed grid-supply tariff would credit customers' bills at a fixed rate, which the Companies propose should be established by computing "the 12 months ended June 2015 average Base Fuel Energy and Energy Cost Adjustment rate plus a portion of the contribution to fixed costs embedded in the retail rate."²⁷⁸ According to the HECO Companies, this results in an effective credit between \$0.180/kWh - \$0.298/kWh for residential customers, depending on which island the customers resides (the credit for commercial customers would range from \$0.162/kWh - \$0.302/kWh).²⁷⁹

Table 1. HECO Companies' Proposed Fixed Credit Rates for Grid Supply Tariff (cents/kWh)

	Rate Schedule				
	R	G	J	P	DS
Oahu	18.0	17.7	16.9	16.4	16.2
Hawaii	22.5	22.9	21.6	20.9	N/A
Mauai	23.1	23.3	22.5	22.0	N/A
Lanai	29.8	30.2	29.8	29.3	N/A
Molokai	27.5	28.5	27.1	25.7	N/A

The HECO Companies further propose that the grid-supply tariff credit be fixed for a period of five (5) years, with the

²⁷⁸HECO FSOP at 74-75.

²⁷⁹See HECO FSOP at 75.

credit thereafter subject to change at the discretion of the commission.²⁸⁰

The Consumer Advocate believes that "it is imperative that the compensation rate for DER generation be more closely aligned with the prices of Hawaiian Electric's low-cost renewable energy alternatives to mitigate the increases in costs borne by non-participants and to ensure cost-effective renewable energy procurement."²⁸¹

The Consumer Advocate states that a credit "that would appropriately reflect the competitive, wholesale value of renewable energy provided to the grid would be no more than \$0.16/kWh and likely less given that the energy provided by DER systems is currently must-take and cannot be controlled."²⁸² Nonetheless, the Consumer Advocate recommends that the tariff reflect a credit of \$0.18/kWh for exported DER generation "as part of the transition between the NEM program and a more competitive, wholesale rate,"²⁸³ provided the DER system is "right-sized," which could include a reduced credit for exports above a certain

²⁸⁰See HECO FSOP at 77 and 80. See also HECO FSOP Exhibit 4.

²⁸¹Consumer Advocate FSOP at 21.

²⁸²Consumer Advocate FSOP at 21 (emphasis added).

²⁸³Consumer Advocate FSOP at 21.

threshold.²⁸⁴ In addition, the Consumer Advocate states that a grid-supply tariff should include a \$25 minimum bill, consistent with its recommendation for a self-supply tariff.²⁸⁵

DBEDT states that establishing an export credit "at less than retail provides a correlated time based price signal" that will encourage DER customers to shift load to the middle of the day, in order to offset purchases from the utility (for which they effectively receive a credit at the higher retail rate), rather than export that energy at the reduced export credit rate under the grid-supply tariff.²⁸⁶ DBEDT points out that this also provides an incentive to utilize battery storage to help reduce exports.²⁸⁷

The Joint Parties "agree with the [c]ommission that NEM's success creates a 'need to clear the existing interconnection queue backlog, assist in providing needed grid-supportive capabilities, enable customer choice, and allow DER to continue to grow cost-effectively in the future without adversely affecting

²⁸⁴Consumer Advocate FSOP at 14.

²⁸⁵Consumer Advocate FSOP at 17.

²⁸⁶DBEDT FSOP at 10.

²⁸⁷DBEDT FSOP at 10.

non-participating customers.'"²⁸⁸ Thus, the Joint Parties recommend "significant advancements within the NEM framework that promote these goals and address both technical and economic challenges" ²⁸⁹ With respect to the grid-supply option, the Joint Parties propose (1) an increase to the minimum bill; and (2) a reduction in the NEM credit rate for new customers interconnecting on islands that are highly saturated with existing DER systems.²⁹⁰

In support of their recommendation regarding increasing the minimum bill, the Joint Parties state that the minimum bill should be set "so each customer covers the specific costs he or she causes the utility to incur in order to establish and maintain service. Revising the minimum bill not only guarantees the utility a higher minimum revenue level from each customer than it currently receives but also ensures DER customers and others with net consumption of zero contribute appropriately to system cost recovery."²⁹¹ Accordingly, the Joint Parties propose increasing

²⁸⁸Joint Parties FSOP at 4 (quoting Order No. 32737 at 33-34, footnote omitted).

²⁸⁹Joint Parties FSOP at 4.

²⁹⁰See Joint Parties FSOP at 5. The Joint Parties also propose an opt-in TOU rate design, which the commission addresses in Section V.B.3.c, below.

²⁹¹Joint Parties FSOP at 14 (footnote omitted).

the minimum bill "to reflect the [HECO] Companies stated customer-related costs of \$25.31 per customer-month (for a single phase residential customer)."²⁹²

Furthermore, the Joint Parties assert that the updated minimum bill should apply to all customers, not just those opting for a self-supply or grid-supply option.²⁹³ However, as discussed above, the commission finds and concludes that State law and commission rules preclude increasing the minimum bill for all customers in Phase 1 of this proceeding. As a result, the commission will approve a minimum bill of \$25 for residential customers and \$50 for small commercial customers interconnecting under the either the self-supply or grid-supply tariff, as proposed by the HECO Companies, but will not impose such new charges on all customers, as proposed by the Joint Parties. As suggested by several Parties, the commission will consider further adjustments to the minimum bill as part of Phase 2 of this docket.

With respect to the grid-supply option, the Joint Parties recommend that "as an interim measure until adequate cost-benefit and cost-of-service studies are completed in Phase 2, Joint Parties propose to effectively adjust the NEM credit a

²⁹²Joint Parties FSOP at 15 (footnote omitted).

²⁹³See Joint Parties FSOP at 15-16.

customer receives for exported power via tolling revenue mechanism applied against the retail rate.”²⁹⁴ According to the Joint Parties:

[t]he mechanism would be set at the full amount of the transmission and distribution (“T&D”) rate components foregone by the utility when customers generate their own energy and export it to the grid. The concept is to take an overly conservative approach in the interim period and offset any T&D revenues that would otherwise have not been recovered as a result of volumetric NEM credits for exported power.²⁹⁵

This tolling mechanism would only apply to customers interconnecting on islands where the total capacity of existing NEM systems “as a percentage of ‘the highest recorded peak demand in 2014’ reaches 30% in a specific utility’s service territory. . . ,”²⁹⁶ which would apply to all islands with the exception of Lanai.²⁹⁷ According to the Joint Parties, the tolling mechanism should amount to 3.9 cents per kWh, which would be a reduction to the credit for exported power from the retail rate.²⁹⁸

After reviewing the entire record, the commission finds and concludes that the HECO Companies’ proposed grid-supply tariff

²⁹⁴Joint Parties FSOP at 24-25.

²⁹⁵Joint Parties FSOP at 25.

²⁹⁶Joint Parties FSOP at 25 (footnote omitted).

²⁹⁷See Joint Parties FSOP at 26.

²⁹⁸See Joint Parties FSOP at 26.

is reasonable and in the public interest, and should be approved with certain additional modifications as discussed further below. The approved grid-supply tariff is attached to this Order as Exhibit C.

First, the commission finds and concludes that the grid-supply option shall credit exported energy at a fixed rate equal to the 12 month average on-peak avoided cost ending in June 2015 for each island grid. The commission finds and concludes that the 12 month average on-peak avoided cost is a reasonable interim approximation of the relative value of energy exported to the grid and should be approved for Phase 1 of this proceeding.

Table 2. Average On-Peak Avoided Cost (cents/kWh)²⁹⁹

Island	On-Peak Avoided Cost (12 mo. ending June 2015)
Oahu	15.07
Hawaii	15.14
Maui	17.16
Molokai	24.07
Lanai	27.88

²⁹⁹See HECO Companies' Monthly Avoided Energy Cost, available at: <http://www.heco.com/vcmcontent/StaticFiles/FileScan/PDF/EnergyServices/Tariffs/HECO/AvoidCost.pdf>.

The commission agrees with the Consumer Advocate's position that the energy credit rate for DER generation that is exported to the grid should be more closely aligned with the costs of other renewable energy alternatives. In Order No. 32737, the Staff Report and Proposal stated:

Looking to the future, large amounts of utility-scale renewable energy are expected to be brought online within the next several years. Absent technological advances that have not yet materialized, there is a finite amount of grid capacity in the interim for unscheduled or uncontrolled solar PV energy export. Under high penetrations, distributed PV will force the curtailment of utility-scale PV or other renewable resources.

It is economically suboptimal to curtail other renewable projects if they can deliver equivalent energy at a substantially lower price point.³⁰⁰ Not only would curtailment of lower-cost utility-scale renewable energy penalize non-participating customers by effectively increasing rates, it could also undermine the future of utility-scale installations by creating economic uncertainty (due to unknown levels of curtailment) for project developers.³⁰¹

³⁰⁰See Decision and Order No. 32053 in Docket No. 2011-0206 at 42. It should be noted that both wind and solar PV (distributed and utility-scale) are actually near-zero marginal cost resources. A truly optimized power system would treat these resources accordingly. Contract and tariff pricing would then be adjusted to reflect the true economics of these resources. As discussed herein, dynamic pricing and demand response programs can help to signal to customers the cost and value of these resources.

³⁰¹Staff Report and Proposal at 31-32.

The commission has recently approved power purchase agreements ("PPAs") for new utility-scale PV projects on Oahu with energy pricing that ranges between 13.5 and 14.5 cents per kWh, and proposals for even lower-cost solar projects (11.06 cents per kWh) on Maui are currently before the commission.³⁰² The commission further observes that KIUC has submitted a PPA for consideration by the commission that would, according to KIUC, acquire a dispatchable utility-scale solar resource for 13.9 to 14.5 cents per kWh.³⁰³

After review of the current market conditions reflected in these PPAs, the commission finds and concludes the energy credit rate offered under the approved grid-supply tariff is a reasonable approximation of the relative value of energy exported to the grid from such systems, and is appropriate for an interim transitional market structure.

Furthermore, the energy credit rate established in the transitional grid-supply tariff will partially mitigate the economic challenges noted in the Staff Report and Proposal.

³⁰²See, e.g., Docket Nos. 2014-0357 and 2015-0224.

³⁰³See Application for Approval of Power Purchase Agreement with SolarCity Corporation, to Include Costs in Kauai Island Utility Cooperative's Energy Rate Adjustment Clause, and Related Matters, Docket No. 2015-0331, Application, Exhibits 1 through 8, Verification, filed September 10, 2015, at 5 and 7.

By more closely aligning the credit rate for energy exported to the grid from DER systems with the market for other similar renewable resources, the HECO Companies can procure a more cost-effective renewable energy supply portfolio and reduce energy supply costs for all customers, including non-participating customers.³⁰⁴ Moreover, the commission cautions that the interim credit rates approved herein should not be construed as a "market" or threshold price for unscheduled energy export in the HECO Companies service territories. The cost of renewable energy is widely expected to continue to decline in the future, and the commission expects that, going forward, such cost improvements will be reflected in the price paid by ratepayers for such energy.

The commission further finds and concludes that the Joint Parties proposal to establish an export credit rate by partially discounting the effective retail rate is inappropriate and does not offer a compelling quantification of the value of DER. The average on-peak avoided cost is a reasonable approximation of such value, which will allow the Parties to this docket the opportunity to consider improvements to the methodology in Phase 2 of this proceeding.

³⁰⁴Furthermore, the fixed export credit rate is consistent with the requirements of HRS § 269-27.2, to the extent applicable.

Furthermore, the Joint Parties have offered no evidence that solar installers or DER customers would be unreasonably impacted by energy credit rates in the range of 15 to 27 cents per kWh. In contrast, the Consumer Advocate and DBEDT offer estimates that suggest that the approved grid-supply energy credit rates are still substantially higher than the levelized cost of installing residential solar today, after considering the substantial tax credits available in Hawaii.³⁰⁵ The grid-supply option is not intended to unduly subsidize participating customers.

Therefore, the commission orders that the credit for exported energy under the grid-supply tariff shall be established at a rate equal to the average on-peak avoided cost for the 12 months ending in June 2015, which varies for each island grid from 15.07 to 27.88 cents per kWh. The commission agrees with many of the Parties that further investigation of the costs and benefits of DER should be part of Phase 2 of this proceeding.

³⁰⁵According to the Consumer Advocate's calculations (based on the National Renewable Energy Laboratory PVWatts model), the levelized cost of energy of a 6 kW residential PV system in Hawaii (assuming a \$4/Watt installation cost) is estimated to be \$0.10/kWh, after state and federal tax credits. Without federal tax credits, the levelized cost is estimated to be \$0.17/kWh. To the extent that solar installers are able to achieve installation costs below \$4/Watt, the value of the grid-supply option relative to the levelized installation cost will be even greater. See Consumer Advocate Preliminary Statement of Position, filed June 1, 2015, at 20. See also, DBEDT FSOP at 15.

Second, the commission finds and concludes that the credit rate for exported energy under the grid-supply option should be guaranteed for two (2) years, rather than five (5) years as the HECO Companies propose. The grid-supply option is intended as a transitional option for customers who wish to interconnect DER systems that export uncontrolled energy onto the grid, regardless of whether the power system can economically or physically accommodate such exports. While the grid-supply tariff will offer a lower energy credit rate than the NEM program, the credit rate will be fixed, rather than varying over time with fluctuations in the retail rate, thus providing additional value to participants. The commission finds and concludes that a two (2) year fixed rate is reasonable for the transitional grid-supply tariff, given the benefits, costs, and risks for the HECO Companies, DER customers, and non-participating customers.

In addition, in order to provide further clarity regarding the export credit rate offered under the grid-supply tariff, the commission has modified the "Notice and Disclaimer" included as Exhibit A to the proposed grid-supply tariff.

Third, the commission finds and concludes that it is prudent to establish an initial cap on the availability of the grid-supply tariff option. The commission finds and concludes that unconstrained growth in the grid-supply option is not in the

public interest, given the finite capacity of each island grid to accommodate uncontrolled export of energy during mid-day hours.³⁰⁶

Furthermore, an initial cap on the availability of the grid-supply tariff is reasonable given that the grid-supply tariff is intended as a transitional option for customers wishing to interconnect systems that export excess energy to the grid, offered for an interim period, giving the Parties to this docket an opportunity to comprehensively consider the complex and inter-related technical and economic issues associated with establishing a market structure to acquire beneficial DER in Phase 2 of this proceeding.

After review, the commission determines that the cap should initially be set at twenty-five (25) MW_{ac} for the HECO service territory, and five (5) MW_{ac} each for the HELCO and MECO service territories. This level of additional capacity is deemed reasonable for the transitional grid-supply option.

The commission finds and concludes it is not in the public interest to allow unconstrained growth in the grid-supply option, particularly if such growth comes at the expense of future opportunities to acquire even lower-cost renewable energy from other sources, or prevents the HECO Companies

³⁰⁶See, e.g., Decision and Order No. 33037, filed July 31, 2015 in Docket No. 2014-0357, at 38-46.

from offering community-based renewable energy options for their customers. Such an outcome would be contrary to the Legislature's intent when it established existing State energy policy (e.g., the community-based renewable energy, RPS, and grid-modernization statutes).³⁰⁷ As discussed above,

³⁰⁷In 2015, the Hawaii Legislature enacted a Community-Based Renewable Energy statute (Act 100 (2015)), to "make the benefits of renewable energy generation more accessible to a greater number of Hawaii residents," including "residential and business renters, occupants of residential and commercial buildings with shaded or improperly oriented roofs, and other groups who are unable to access the benefits of onsite clean energy generation." 2015 Haw. Sess. Laws Act 100, § 1, eff. June 8, 2015. It requires that by October 1, 2015, "[e]ach electric utility in the State [] file a proposed community-based renewable energy tariff or tariffs with the public utilities commission." Id. at § 2.

The Hawaii Legislature also amended the State's RPS law in 2015 via Act 97, which requires that by December 31, 2045 "[e]ach electric utility company that sells electricity for consumption in the State shall establish a renewable portfolio standard of [o]ne hundred per cent of its net electricity sales," because "[a] stronger local economy depends on a transition away from imported fuels and toward renewable local resources that provide a secure source of affordable energy" and "ensure maximum long-term benefit to Hawaii's economy" 2015 Haw. Sess. Laws Act 97, § 2, eff. June 8, 2015.

In addition, Hawaii's grid modernization statute, enacted in 2013, directs the commission to "consider the value of improving electrical generation, transmission, and distribution systems and infrastructure within the State through the use of advanced grid modernization technology in order to improve the overall reliability and operational efficiency of the Hawaii electric system." It also requires the commission to balance "technical, economic, environmental, and cultural considerations" based on, among other things, "[e]nabling a diverse portfolio of renewable energy resources, [d]etermining fair compensation for electric grid services and other benefits provided to customers and for electric grid services and other benefits provided by distributed

the commission has recently approved new contracts for significantly lower-cost utility-scale renewable energy (between 13.5 and 14.5 cents per kWh, compared to approved grid-supply credit rates between 15.07 and 27.88 cents per kWh), which will soon be complemented with community-based renewable energy options for customers who may not have the ability to invest in DER systems, as ordered by the Legislature in Act 100 (2015), as well as time-of-use pricing and new DER tariffs established in Phase 2 of this docket.

Moreover, by establishing the self-supply tariff option, which has no such participation cap, customers will have the opportunity for fast-tracked interconnection of DER systems that do not rely on exporting excess energy to the grid, and thus have reduced technical impacts compared to grid-supply systems.

The commission will retain the ability to adjust the transitional grid-supply tariff cap to accommodate other offerings that may become available to customers in this interim time period, and may consider adjustments to the grid-supply tariff caps in Phase 2 of this proceeding. In addition, the commission intends to review the progress of the HECO Companies in making available community-based renewable energy options to their customers

generation customers . . .” and “[m]aintaining or enhancing grid reliability and safety through modernization of the State’s electric grids.” HRS § 269-145.5(a).

pursuant to Act 100, and may modify the grid-supply tariff as a result of such review, as appropriate.

Fourth, the commission finds and concludes that references throughout the HECO Companies' proposed grid-supply tariff to the purchase of energy are inappropriate for the type of energy exchange contemplated in the grid-supply option. The Companies will not be purchasing energy from customers under the grid-supply tariff. Thus, the commission does not approve such language and has stricken such references from the grid-supply tariff approved by the commission and attached to this Order as Exhibit C.

Fifth, references to curtailment priority of energy exported under the grid-supply tariff are not reasonable or necessary at this time. Furthermore, the commission finds and concludes that curtailment to allow the HECO Companies to avoid cycling their own baseload or other fossil fuel generating units is unreasonable and not in the public interest at this time. Therefore, the commission has removed such references from the grid-supply tariff approved herein. However, the commission cautions that while reference to curtailment priority is not reasonable or necessary, it must be observed that service pursuant to the grid-supply tariff can be curtailed in accordance with the terms and procedures in the tariff.

Sixth, with respect to paragraph 7 of Appendix I to the proposed grid-supply tariff, the HECO Companies shall provide written approval to operate a grid-supply system within fifteen (15) business days of receipt of a copy of the final inspection or approval of the grid-supply system, which has been issued by the governmental authority having jurisdiction to inspect and approve the installation, rather than within thirty (30) business days as proposed by the Companies.

Seventh, paragraph 8.d of Appendix I to the grid-supply tariff, which refers to interconnection review of battery storage systems, is unnecessary given the modifications to Rule 14H approved herein. Thus, such language shall not be included in the grid-supply tariff.

Eighth, with respect to paragraph 19 of Appendix I to the grid-supply tariff, the HECO Companies shall not be entitled to "any information," but shall only be entitled to request grid-supply system data reasonably needed to ensure safe and reliable operation of the grid-supply system or the Companies' systems. Thus, the commission has removed the reference to "any information" and modified the requirement in the approved grid-supply tariff.

Ninth, the commission finds and concludes that, consistent with the discussion above, Exhibit E to the HECO Companies' proposed grid-supply tariff is inappropriate

for the grid-supply option and not in the public interest, and shall not be included in the grid-supply tariff. Approved language relating to energy credits for exported energy shall be incorporated directly into the grid-supply tariff itself, as shown in Exhibit C, attached to this Order.

Tenth, with respect to Paragraph 8.e of Appendix I to the proposed grid-supply tariff, the commission finds and concludes that a requirement to install additional equipment or modify existing equipment shall be conditioned upon the HECO Companies providing a written explanation of the need for such installation or modification. Such installation or modification shall be made upon mutual agreement of the HECO Companies and the customer. The commission has therefore modified the applicable language as shown in Exhibit C, attached to this Order.

Eleventh, with respect to paragraph 20 of Appendix I to the proposed grid-supply tariff, the commission finds and concludes that a requirement to provide "additional information" shall be modified to clarify that the information must be "reasonably necessary" to serve the customer or to ensure safety or reliability of the Companies' systems.

Twelfth, with respect to the Joint Parties' concern that a flat energy credit rate will encourage customers to "oversize"

their DER systems,³⁰⁸ thereby exacerbating adverse technical impacts of such systems, the commission finds and concludes that the Companies shall perform a monthly reconciliation of energy exports and energy purchases that compares exported energy from the customer's grid-supply system to the customer's energy purchases from the utility.

A customer may only receive grid-supply credits in a given month up to the amount of energy purchases made in that month. Any energy exported by a customer in excess of that customer's purchases from the utility in that month shall be forfeited and shall not be carried over to the next month.³⁰⁹

Thus, there will be no carry-over of energy credits month to month throughout the year. The commission finds and concludes that this requirement will provide a reasonable incentive for customers to "right-size" generation capacity and avoid technical impacts associated with excessive over-generation during peak solar hours.

³⁰⁸See Joint Parties FSOP at 17-18.

³⁰⁹For example, if a customer purchases 500 kWh of electricity, but exports 600 kWh in that month, the customer will receive a grid-supply credit for 500 kWh, and will forfeit the excess 100 kWh.

c.

Other Tariffs to Create New DER Market Choices

As discussed above, the commission instructed the Parties to collaborate to develop new customer options, including *self-supply* and *grid-supply* tariffs, as interim market pathways for new DER systems while the Parties consider comprehensive re-design of DER policies in Phase 2 of this proceeding.

The commission intentionally did not limit the number or type of tariffs that could be developed by the Parties and submitted for consideration in Phase 1. Instead, the commission encouraged the development of creative solutions, particularly those that can address both technical and economic challenges of integrating DER systems to the grid.

In this regard, all of the Parties are, in general, supportive of a TOU tariff to provide DER customers with more effective pricing signals to drive efficient electricity consumption (and production) decisions. Both the HECO Companies and the Joint Parties propose specific TOU rate designs and implementation approaches. In addition, DBEDT offers a rigorous approach to developing an effective TOU pricing structure for Hawaii.

The HECO Companies' propose a pilot TOU option available to residential customers in current Advanced Metering

Infrastructure ("AMI") pilot areas (Oahu only) as part of Phase 1, limited to 500 customers in certain neighborhoods over a span of three years. The on-peak rate would be 36.0 cents per kWh between 4pm and 9pm, and the off-peak rate would be 24.0 cents per kWh for all other hours.³¹⁰

The Joint Parties' provide two TOU proposals in their FSOP, a two-period design and an alternative three-period design. The two-period design consists of an on-peak rate of 45.7 cents per kWh between 2pm and 8pm, and an off-peak rate of 18.8 cents per kWh for all other hours.³¹¹ The three-period design consists of an on-peak rate of 41.2 cents per kWh between 4pm and 10pm, a mid-peak rate of 31.4 cents per kWh between 2pm and 4pm, and an off-peak rate of 18.2 cents per kWh for all other hours.³¹² Blue Planet supports the Joint Parties' TOU proposals and adds the tariff could "automatically adjust up and down as the cost of other energy resources rises or falls."³¹³

The Consumer Advocate, DBEDT, and REACH support TOU structures in concept but state that additional time and planning is necessary, likely in Phase 2 of this proceeding,

³¹⁰See HECO FSOP at 85-87 and Attachment 17.

³¹¹See Joint Parties FSOP at 22, Amended Beach Decl. at 4.

³¹²See Joint Parties FSOP, Amended Beach Decl. at 5.

³¹³See Blue Planet FSOP at 5.

to develop an appropriate pricing structure specific to Hawaii's needs.³¹⁴ The Consumer Advocate states that it "recognizes the benefits of [TOU] pricing" but states that "further analysis is necessary to develop process and time period that will provide appropriate economic signals."³¹⁵ The Consumer Advocate asserts that "the TOU scheme proposed by the Joint Parties may exacerbate system cost and reliability issues," concluding "the Consumer Advocate cannot at this time recommend a TOU tariff for immediate implementation in the interim period."³¹⁶

KIUC states that it is considering an interim TOU rate option to allow more PV, "to the extent technically feasible and possible."³¹⁷ KIUC also states it is considering re-designing some of the legacy rate structures (from Kauai Electric) to be "more responsive to a future regulatory and ratemaking environment of increased customer-sited generation."³¹⁸

³¹⁴See Consumer Advocate FSOP at 14; DBEDT FSOP at 11, REACH FSOP at 12.

³¹⁵Consumer Advocate FSOP at 14.

³¹⁶Consumer Advocate FSOP at 14.

³¹⁷KIUC FSOP at 15.

³¹⁸KIUC FSOP at 15.

Outside of this docket, on June 22, 2015, KIUC filed Transmittal No. 2015-01, proposing to establish TOU-R, a Time-of-Use Solar Rate Pilot Program.³¹⁹ Subsequently, on July 31, 2015 the HECO Companies filed Transmittal No. 15-08, proposing a new TOU rate offered to owners of electric vehicles.³²⁰

After review of the record, the commission finds that a TOU rate option could provide significant benefits to customers and to each island power system and should be offered by the HECO Companies and KIUC. However, the commission finds that the proposals presented by the Parties in this docket are not reasonable and should not be approved as submitted. Thus, the commission will instruct the HECO Companies to re-file a TOU tariff option within thirty (30) days of the date of this order, modifying their original proposal consistent with the guidance provided herein.

First, the commission is disappointed with the HECO Companies' apparent ambivalence towards establishing an effective TOU option for DER customers. The HECO Companies already

³¹⁹Transmittal No. 2015-01, filed on June 22, 2015. On September 21, 2015, the commission issued Decision and Order No. 33146 approving, with conditions, KIUC's request to establish a pilot TOU solar rate.

³²⁰Transmittal No. 15-08, filed on July 31, 2015. On September 25, 2015, the commission issued Decision and Order No. 33165 approving in part, denying in part, and suspending in part HECO's request.

offer TOU options for eligible customers, including those with electric vehicles, which have been available to such customers for years. It is unclear why the Companies would suggest limiting a TOU rate design for DER customers to 500 participants or insist that the TOU rate only be offered to customers who are located near existing "Smart Grid" infrastructure, which encompasses only a few neighborhoods on Oahu. The Companies have offered no evidence that a customer on a TOU rate structure should now require a "smart" meter, such as what the HECO Companies are contemplating for its anticipated "Smart Grid" proposal.

The commission finds and concludes there should be no requirement that customers who wish to opt-in to a TOU rate must live in Oahu neighborhoods where the Companies have been testing elements of its anticipated "Smart Grid" investment proposal. The TOU rate should be available to any otherwise eligible customer on all islands served by the HECO Companies. Absent a compelling need, the HECO Companies shall meter and bill customer usage under the TOU tariff as they normally would any other TOU customer.

Second, the TOU rate design shall have three time periods, corresponding to the overall system peak period, a mid-day period, and an off-peak period. While slightly more complex than the proposed two-period designs, the three-period design is superior because it sends important signals related to

both peak demand as well as "peak supply" (i.e., mid-day hours when abundant solar resources are typically available).

Third, the mid-day period rate shall be set at the marginal cost of generation for those hours. The peak period rate shall be computed by combining fixed generation, transmission, and distribution costs. The off-peak rate shall be established according to marginal generation costs but adjusted such that the overall revenue requirement impact is neutral (for an average residential customer that does not change consumption behavior in response to the TOU rate structure).

Fourth, the rates shall be established by using projected marginal generation costs in 2017. Every component of the TOU rate design, except the mid-day rate, should adjust along with changes to underlying system costs (including surcharges and adjustments such as the energy cost adjustment clause, revenue adjustment mechanism, public benefits fee, etc.). The commission finds and concludes this approach is consistent with the operation of the HECO Companies' current TOU tariffs, will align the TOU option with near-term expected system needs, both from an economic and technical perspective, and will extend the effective "life" of the rates established under the TOU option.

Fifth, the HECO Companies shall re-compute the TOU rates annually, and shall file a tariff transmittal with the first annual

update of the TOU rates with the commission beginning no later than December 1, 2016.

By this Order, the commission instructs the HECO Companies to re-file their TOU rate proposal with modifications consistent with the guidance provided herein, using the most recent data available to the Companies related to expected system costs in 2017.

The HECO Companies shall re-file their TOU proposal within thirty (30) days of the date of this Order. Thereafter, Parties shall have ten (10) days to file any comments on the proposed TOU rate option. The new TOU option shall take effect upon approval by the commission.

The commission will consider further revisions, adjustments, or additions to DER tariffs to enable continued beneficial DER deployment throughout Phase 2 of this proceeding.

d.

Modifications to the NEM Program

In Order No. 32737, the commission acknowledged that "there are many difficult issues that must be resolved in order to ensure a re-designed regulatory approach achieves a flexible, efficient, fair, and cost-effective DER market structure."³²¹

³²¹Order No. 32737 at 43.

Nonetheless, the commission instructed the Parties to this docket to collaborate and develop a "path forward" that transitions from existing DER policies (including the NEM program) to a longer-term DER market structure.³²²

As discussed above, by this Order, the commission is approving new options for customers who wish to invest in distributed energy resources for the benefit of themselves and the overall electric system. These options (customer *self-supply*, customer *grid-supply*, and an opt-in time-of-use rate) are interim measures intended to allow continued beneficial deployment of DER while a comprehensive evaluation of DER policies can be accomplished in Phase 2 of this proceeding.

The commission also requested that the Parties consider "what modifications should be made, if any, to the NEM Program to ensure DER will be acquired cost-effectively until a longer-term DER market structure can be established."³²³

The HECO Companies recommend that "once the proposed Self-Supply and Grid-Supply options are approved by the Commission in Phase 1 of this proceeding, . . . the Commission [should]

³²²See Order No. 32737 at 43-44.

³²³See Section III: Statement of Issues.

contemporaneously declare the existing NEM program fully subscribed pursuant to its existing statutory authority.”³²⁴

The Consumer Advocate observes that “future DER customers have no incentive to sign up for alternative, more market-based plans while the NEM Program remains in place”³²⁵ and states unequivocally that “participation in the current [[NEM Program]] must be capped.”³²⁶ The Consumer Advocate further recommends the commission “adopt an order that the existing NEM program be capped by limiting the program’s capacity to reflect the capacity requested by participants with complete and valid applications who are in the queue as of June 1, 2015.”³²⁷

DBEDT “acknowledges there should be an orderly closure of the current NEM program”³²⁸ Both DBEDT and the Consumer Advocate suggest the commission could consider allowing some incremental additional DER capacity under the NEM program prior to the final close of the program to new participants.

The Joint Parties state that adopting their recommendations for Phase 1, including an increased minimum

³²⁴HECO FSOP at 7-8.

³²⁵Consumer Advocate FSOP at 15.

³²⁶Consumer Advocate FSOP at 15.

³²⁷Consumer Advocate FSOP at 15.

³²⁸DBEDT FSOP at 13.

bill and a reduction in the NEM export credit rate, "all but avoids the need to draft provisions governing a transition [away from NEM] at this time."³²⁹ The Joint Parties claim that closing NEM in Phase 1 "will create substantial uncertainty" in the DER market among customers and DER system installers.

First, the commission finds and concludes that the Joint Parties' proposal to reduce the NEM program energy credit rates is contrary to State law. Clearly, the energy credit rate established in the NEM program must comply with applicable State law, and in this regard, HRS § 269-102(b) provides, in part, that,

³²⁹Joint Parties FSOP at 63.

Each net energy metering contract or tariff shall be identical, with respect to rate structure, to the contract or tariff to which the same customer would be assigned if the customer was not an eligible customer-generator. The charges for all retail rate components for eligible customer-generators shall be based exclusively on the eligible customer-generator's net kilowatt-hour consumption over a monthly billing period.³³⁰

These requirements do not allow the commission the flexibility to establish a "tolling mechanism" to discount energy credits received under the NEM program, as proposed by the Joint Parties. Rather, in Hawaii, excess energy exported to the grid under the NEM program must be credited to customers at the retail rate.

Second, the commission finds that the Joint Parties' claim that closing the NEM program to new participants would create uncertainty in the DER market has no basis in fact. Customers and DER system installers have been or should have been aware of the commission's intentions to comprehensively re-design DER policies, including the NEM program, which the commission made clear in Order No. 32053, issued April 28, 2014 in Docket No. 2011-0206; the commission's *Inclinations*, attached as Exhibit A to Order No. 32052 in Docket No. 2012-0036; the commission's August 21, 2014 order opening this docket; and Order No. 32737,

³³⁰HRS § 269-102(b) (2008).

issued March 31, 2015 in this proceeding. The new customer options established by this Order (customer *self-supply* and customer *grid-supply*) clarify and improve the terms and efficiency of interconnection to the HECO Companies' electric systems.

The Joint Parties further assert that capping the NEM program will increase tax liability for customers who may opt to interconnect under the grid-supply tariff. However, as discussed below, the record does not contain any evidence that customers will be subjected to increased tax liability as a result of a transition to the grid-supply tariff. The commission observes that the relevant tax authorities are the Hawaii Department of Taxation and the US Internal Revenue Service, neither of which has ruled on the taxability of the grid-supply tariff. The commission further observes that neither agency has ruled on the taxability of NEM itself.

The Joint Parties have submitted "opinions" of two law firms specializing in tax matters, which claim to analyze the tax liability of a residential solar feed-in-tariff program. However, such a program is not under consideration here. The grid-supply option allows for an energy exchange, which is the same as what is offered pursuant to the State's NEM statute. In other words, given that the tax "opinions" submitted by the Joint Parties do not analyze the grid-supply option, such opinions do not provide any relevant guidance as to the tax liability

of a participating grid-supply customer.³³¹ Furthermore, the Joint Parties' proposal to reduce the NEM credit via the "tolling mechanism" is not substantially different than the HECO Companies' proposal to do the same in establishing the grid-supply option, other than the resulting credit rate for energy export.

Thus, in the absence of any actual evidence of tax liability, the commission approves the grid-supply tariff, with modifications as discussed above. The commission may consider further modifications to the design of the grid-supply option to enhance its value to participating and non-participating customers during Phase 2, if appropriate.

Next, the Joint Parties assert that the statutory protections offered to NEM program participants are necessary to "assure customers that the value of their systems will not be undercut by electric utilities requiring new controls or imposing new charges after the system is installed."³³² The commission finds this argument unpersuasive. The commission has reviewed the proposed grid-supply tariff language to ensure it does not allow unreasonable fees or charges to be imposed on DER customers.

³³¹In addition, both "opinions" are silent with respect to the tax liability of existing NEM customers.

³³²Joint Parties FSOP at 41.

Furthermore, the HECO Companies are required to abide by approved tariff rules, and are not permitted to change such rules without explicit commission authorization.³³³

Finally, the commission finds and concludes that the NEM program was simply not designed for DER deployment at the scale experienced today. As discussed above, when the current version of the NEM program was established in 2001, the Legislature mandated a cap on customer participation at 0.5% of system peak load (an increase from the original NEM program cap of 0.1% of system peak load). Subject to the discretion granted the commission by the Legislature, the commission has allowed participation to increase substantially over time, far beyond the original cap, in conjunction with advances in understanding and mitigation of technical integration challenges. As shown below in Table 3, NEM program participation in the HECO Companies' service territories has increased by more than 60 times over the cap established by the Legislature. NEM program capacity now represents between 30% and 53% of each of the HECO Companies' system peak load.³³⁴ Participation in the NEM program is now

³³³The commission observes that even statutory protections offer no guarantee that the Legislature will not modify such protections at a later date.

³³⁴The HECO Companies provided updated NEM program capacity data at the request of commission staff. System peak is reported by the HECO Companies in their annual Adequacy of Supply reports.

approaching twenty percent of all customers on the HECO and MECO systems.

Table 3. HECO Companies' Net Energy Metering Program Capacity and Enrollment

Capacity (MW)	HECO	HELCO	MECO
Installed or Approved	327.9	73.3	88.8
In the Queue	17.3	5.1	11.9
Total	345.2	78.4	100.7
Total NEM Customers	51,680	11,549	12,893
System Peak Load (MW)	1,165	188	191
NEM % of All Customers	17%	14%	18%
NEM % of System Peak	30%	42%	53%

The value of DER to participating customers is unquestioned and is clearly demonstrated by the significant private investment it has attracted in Hawaii. The rapid adoption of DER is largely the result of the success of the NEM program. The challenge facing the State today is ensuring that DER continues to scale in such a way that it benefits all customers as each utility transitions to 100% renewable energy.

The commission has determined that DER policies and programs in Hawaii must evolve to meet changing customer and

See <http://puc.hawaii.gov/reports/energy-reports/adequacy-of-supply/>. Customer accounts reported by Hawaiian Electric Industries, Inc. in the 2014 *Statistical Supplement*. See <http://phx.corporate-ir.net/phoenix.zhtml?c=101675&p=irol-financial-information>

utility system needs. This is in sharp contrast to the attempts in other states to alter or limit net metering *before* customer sited renewables have had the opportunity to scale or have resulted in significant technical integration challenges. The NEM program has fulfilled its core objective of providing a simple and effective tool to jumpstart the adoption of distributed renewable energy. As a corollary, this policy also moved the DER industry in Hawaii past the early stages of development. Hawaii's electric utilities and the DER industry are now adapting to technical challenges not yet experienced in other jurisdictions, while developing advanced solutions that, in some cases, have not yet been tested in operating power systems.

The establishment of this docket and the resolution of the Phase 1 issues ordered herein, including the creation of self-supply and grid-supply options, is the first step in this ongoing evolution of the DER market in Hawaii.

After review of the record in this docket, the commission agrees with the HECO Companies, DBEDT, and the Consumer Advocate that the NEM Program capacity should be capped to new participants once the self-supply and grid-supply options are established. The HECO Companies propose that existing NEM applications that have "successfully passed 'Completeness Review' . . . up to the date of the Commission Decision and Order approving the new customer options" be allowed to interconnect under the

NEM program.³³⁵ However, the commission finds and concludes that it is reasonable to allow customers who have *submitted* complete applications as of the date of this order and are awaiting interconnection approval to continue to be eligible for interconnection under the NEM Program.

Thus, the commission finds and concludes that the NEM program for the HECO Companies' service territories is fully subscribed. Therefore, applications submitted after the date of this Order shall not be eligible for the NEM program.

The HECO Companies shall immediately cease offering NEM application forms and shall begin accepting applications subject to the tariffs approved herein. The HECO Companies shall automatically treat any future NEM application as if it is an application for interconnection under the grid-supply tariff.

The Companies shall inform each such applicant of the change in program eligibility and options, and shall allow applicants to retain their queue position under the grid-supply tariff. The Companies shall process such applications consistent with the requirements of Rule 14H and the grid-supply tariff, unless the customer informs the Companies that the customer is not interested in continuing the interconnection process under the grid-supply option.

³³⁵HECO FSOP at 90.

Customers shall be allowed to maintain their queue position and resubmit their applications under the self-supply tariff or other interconnection option (such as the Standard Interconnection Agreement) for a period of up to thirty (30) business days after being approved for interconnection under the grid-supply option. After thirty (30) business days, customers who decline to accept the grid-supply option may reapply under another interconnection option, but such customers shall not retain their original queue position.

With respect to the issue of "grandfathering," the commission finds and concludes that existing NEM customers' agreements shall continue to be honored and the HECO Companies shall continue to adhere to the tariffs it has established for utility service. The HECO Companies shall continue to review "grandfathered" applications consistent with existing interconnection standards and review timelines.

However, no additional individual system capacity shall be added to approved or pending NEM systems. Customers with existing or pending NEM systems may opt to interconnect new capacity under the grid-supply or self-supply options, consistent with the requirements of those tariffs; however, such an election by a customer will result in the entire DER system moving to the grid-supply or self-supply tariff option. Thus, if an existing NEM customer (or customer in the NEM queue) seeks to add

capacity to their system, beyond the capacity originally approved (or requested in the original NEM application), the customer must agree to transfer their entire DER system (i.e., the original NEM system and the new requested capacity) to either the grid-supply or self-supply option.

Furthermore, the commission agrees with the HECO Companies that grandfathered NEM customers are allowed to remain under the existing NEM tariff through an ownership transfer, tenant change or account name change events. The commission may consider additional adjustments to the NEM program as part of Phase 2 of this proceeding.

e.

Non-Participating Customer Impacts

The HECO Companies claim that their proposal will positively impact non-participating customers by (1) instituting a higher minimum bill "that creates an economic incentive for customers to right-size their system and pay a share of the fixed costs" of grid service; and (2) "crediting DER production that is fed into the grid at a fair rate that better reflects the value of the electricity and partially mitigates the cost shift to non-participating customers."³³⁶

³³⁶HECO FSOP at 92.

The Consumer Advocate asserts that its proposal "is transitional and meant to bridge the gap between the current NEM program and a more competitive, market-based DER program" and "will benefit non-participants relative to the [sic] keeping the NEM program in place."³³⁷

DBEDT observes that "it is not necessary to establish the value that distributed solar provides to know that a reduction in the cost resulting from the interim DER rate will result in an increase in the benefit cost ratio of DER to non-participating customers."³³⁸

The other Parties did not directly address non-participating customer impacts in their FSOPs, other than to suggest additional study of any such impacts should be conducted in Phase 2 of this proceeding.

After review of the record, the commission finds and concludes that to the extent there is a negative impact to non-participating customers from current DER policy design, the interim options approved and ordered herein will alleviate that impact. Moreover, the various new options established herein offer compelling value propositions to customers who may choose to interconnect new DER systems. While the commission will consider

³³⁷Consumer Advocate FSOP at 16.

³³⁸DBEDT FSOP at 17.

further revisions, adjustments, or additions to DER policies to enable continued beneficial DER deployment throughout Phase 2, the interim options approved herein provide near-term balance, customer choice, and value to both participating and non-participating customers. This balance affords stakeholders the time to conduct more granular analysis and propose new policy designs during Phase 2.

C.

Phase 2 of this Proceeding

The commission views the continued evaluation of DER policies and programs in this docket to be an urgent matter. Given the complexity and importance of the issues under consideration in this proceeding, the commission anticipates that the first six (6) to twelve (12) months of Phase 2 will be devoted to (1) evaluation of opportunities to integrate and aggregate various forms of DER (e.g., solar PV, energy storage, demand response, etc.) to enhance their value; (2) developing proposals for establishing an appropriate DER market structure; and (3) ongoing assessment of technical integration challenges and ensuring safe and reliable integration of DER into the State's island grids. The commission will then, and at any time during the course of the proceeding, as appropriate, approve further

changes to DER policies and programs with the aim of expanding cost-effective deployment of these resources throughout Hawaii.

As such, Phase 2 of this proceeding will begin with a technical conference facilitated by commission staff. Commission staff shall notify the Parties of the time and date of the first technical conference, which shall take place within thirty (30) days of the date of this Order.

As a preliminary matter, the commission has determined that the following issues will be addressed in Phase 2 of this docket:

1. Hosting Capacity Analysis (circuit-level and system-level);
2. Opportunities to enhance the value of DER to the grid (focused on integration and aggregation of various forms of DER)
3. The HECO Companies' Integrated Interconnection Queue and further revisions to applicable interconnection standards to enable advanced DER capabilities and improve the interconnection process;
4. Establishment of communications protocols between utilities and DER;
5. Activation timeline and implementation process for advanced inverter functions; and
6. DER rate design and program structures.

After the first technical conference, the commission will invite comments from the Parties concerning the issues to be considered in Phase 2. The commission will formally establish the

Statement of Issues and procedural schedule subsequent to receiving comments from the Parties.

VI.

OUTSTANDING MOTIONS

A.

HECO Companies' January 20, 2015 Motion

On January 20, 2015, the HECO Companies filed a "Motion for Approval of NEM Program Modification and Establishment of Transitional Distributed Generation Program Tariff" ("January 20 Motion"), requesting that the commission reinstitute a program capacity cap for the Companies' NEM program, allow customers who are currently waiting for interconnection approval and those who may apply for interconnection until March 20, 2015, to interconnect under the NEM program, approve an interim transitional distributed generation ("TDG") tariff, approve an interconnection agreement for the TDG contract tariff, and "reinstate the Companies' ability to submit proposed modifications to Tariff Rule 14H via a 30-day filing pursuant to Rule 6-61-111, HAR."³³⁹

³³⁹"Hawaiian Electric Companies' Motion for Approval of NEM Program Modification and Establishment of Transitional Distributed Generation Program Tariff; Appendices 1 to 5; and Certificate of Service," filed on January 20, 2015, at 5-6.

The Consumer Advocate filed a protest,³⁴⁰ and several entities submitted comments in opposition³⁴¹ to the January 20 Motion. On February 27, 2015, the Chairman of the commission and the President of the HECO Companies signed a letter agreement stating that the HECO Companies' proposed timeline in the January 20 Motion would not provide enough time for commission and stakeholder review of the issues covered in the January 20 Motion, and that regardless of whether the commission had ruled on the Companies' proposed policy changes, the Companies have an affirmative duty to continue to interconnect customers consistent with existing policy.³⁴²

³⁴⁰"Division of Consumer Advocacy's Protest of Hawaiian Electric Companies' Motion for Approval of NEM Program Modifications and Establishment of Transitional Distributed Generation Program Tariff," filed on January 27, 2015.

³⁴¹See (1) Letter from Blue Planet, filed on January 27, 2015; (2) "Request For Party Status And Opposition Of The Alliance For Solar Choice, Hawaii Solar Energy Association, Hawaii PV Coalition, And Sunpower Corporation To the Motion of The Hawaiian Electric Companies, Exhibit 1, Affidavit of R. Thomas Beach, and Certificate of Service," filed on January 27, 2015 (joined by HREA on January 27, 2015); and (3) "The Department of Business Economic Development, and Tourism's Response to Hawaiian Electric Companies' Motion for Approval of NEM Program Modification and Establishment of Transitional Distributed Generation Program Tariff, and Certificate of Service," filed on January 27, 2015.

³⁴²See Letter Agreement by and between Randy Iwase and Alan Oshima, dated February 27, 2015, available at: <http://puc.hawaii.gov/wp-content/uploads/2015/03/NewRelease.20150227.pdf>.

Given the breadth of the DER issues already being analyzed by the Parties and the commission in this docket, many of which the Parties raised in their Preliminary and Final Statements of Position, and the subject matter overlap between the topics addressed in this Order with the requests made in the HECO Companies' January 20 Motion, the commission denies the January 20 Motion as moot.

B.

TASC's June 29, 2015 Motion To
Initiate Formal Evidentiary Proceedings

On July 2, 2015, TASC filed a motion, requesting that the commission initiate formal evidentiary hearings in this proceeding.³⁴³ Several parties filed responses to TASC's Motion to Initiate Hearings.³⁴⁴ For the reasons that follow, the commission finds and concludes that the Motion to Initiate Hearings is denied.

³⁴³"Motion of the Alliance for Solar Choice to Initiate Formal Evidentiary Hearings" ("Motion to Initiate Hearings" or "TASC's motion").

³⁴⁴KIUC's "Response" to TASC's motion, filed on July 10, 2015; Blue Planet's "Statement of No Position" on TASC's motion, filed on July 10, 2015; HECO's "Opposition" to TASC's motion, filed on July 10, 2015; the Joint Parties' "Statement of No Position" on TASC's motion, filed on July 13, 2015; DBEDT's "Response" to TASC's motion, filed on July 13, 2015; and the Consumer Advocate's "Memorandum in Opposition" to TASC's motion, filed on July 13, 2015.

In its September 10, 2014 motion to intervene, TASC represented, among other things, that it "will not broaden the scope" or "delay the progress of this proceeding."³⁴⁵ Significantly, TASC affirmed its understanding that this docket "will not be one in which 'a formal hearing [will be] held involving the taking of testimony and formulation of a record'":

At this time, TASC's understanding is that this proceeding will not be one in which a "formal hearing [will be] held involving the taking of testimony and formulation of a record."⁶ If such a hearing is initiated, pursuant to HAR Title 6, Chapter 61, Subchapter 12, TASC's counsel will request the Commission's permission to appear before it after associating "with a member in good standing of the bar of the [Hawaii] in the presentation of a specific proceeding."⁷

. . . .

⁶HAR 6-61-12(b)

⁷HAR 6-61-12(b) (2) ³⁴⁶

Based on the representations in the TASC Motion to Intervene, on March 31, 2015, the commission granted intervention to TASC and cautioned all Intervenors that "it is imperative that participation in this docket reflect a high standard of quality, relevance, and timeliness" and that the commission "will preclude

³⁴⁵Motion to Intervene of The Alliance For Solar Choice, Verification, and Certificate of Service, filed September 10, 2014 ("TASC Motion to Intervene"), at 6.

³⁴⁶TASC Motion to Intervene at 7 (emphasis added; brackets in original).

any attempts to broaden the issues or to unduly delay the proceeding”:

The commission cautions the Intervenor permitted herein that their participation will be limited to the issues established by the commission in this docket. Moreover, the commission reminds all Parties that it is imperative that participation in this docket reflect a high standard of quality, relevance, and timeliness. Finally, the commission observes that it will preclude any attempts to broaden the issues or to unduly delay the proceeding, and will reconsider any Intervenor's participation in this docket if, at any time during the course of this proceeding, the commission determines that any Intervenor is attempting to unreasonably broaden the pertinent issues established by the commission in this docket, is unduly delaying the proceeding, or is failing to meaningfully participate and assist the commission in the development of the record in this docket.³⁴⁷

In the same order in which the commission granted intervention to TASC, the commission identified the specific issues to be addressed,³⁴⁸ and adopted a “Procedural Schedule to expeditiously resolve the highest priority (Phase 1) issues in this docket[.]”³⁴⁹

Notably, the Procedural Schedule did not suggest the expectation of a contested case or evidentiary hearing,

³⁴⁷Order No. 32737 “Granting Motions To Intervene, Consolidating And Incorporating Related Dockets, And Establishing Statement Of Issues And Procedural Schedule”, filed on March 31, 2015 (“Order No. 32737”), at 23-24 (footnote omitted).

³⁴⁸Order No. 32737 at 36-38.

³⁴⁹Order No. 32737 at 45.

and identified only the following procedural events and timing:

(1) "Technical Conferences on Phase 1 issues, including the Parties and commission staff" (bi-weekly unless otherwise specified by the commission); (2) "Parties file Initial Comments on Statement of Issues" (within twenty (20) days of the date of this Order); (3) "Parties file Preliminary Statements of Position on Phase 1 Issues" (within sixty (60) days of the date of this Order); (4) "Parties file Stipulated Resolution of Phase 1 Issues (or Final Statements of Position)" (within ninety (90) days of the date of this Order); and (5) "Commission Decision and Order on Phase 1 Issues and Guidance of Phase 2" (subsequent to Parties' Stipulation).³⁵⁰

The commission further ordered that "[i]f the Parties are unable to agree to a stipulated resolution of the issues, the Parties shall file joint or individual final statements of position, including comments describing why they were not able to reach agreement."³⁵¹

TASC did not object to the commission's statement of issues or the procedural schedule.

³⁵⁰Order No. 32737 at 45.

³⁵¹Order No. 32737 at 49.

On April 20, 2015, TASC filed its initial comments on the commission's statement of issues in Order No. 32737.³⁵² After the other parties and Intervenor's submitted their initial comments, the commission issued an order which "confirm[ed] that the issues identified in Order No. 32737 for resolution in Phase 1 of this proceeding remain unchanged" and ordered that "all other provisions set forth in Order No. 32737, remain in effect."³⁵³

On June 1, 2015, TASC filed its preliminary statement of position on Phase 1 issues (totaling 38 pages, excluding the certificate of service), which recommended, among other things, that all Parties: "[a]ct with urgency and purpose to resolve issues, rather than prolonging the process with delays and excuses."³⁵⁴ TASC again made no objection to the commission's

³⁵²See Hawaii PV Coalition's, Hawaii Solar Energy Association's, The Alliance For Solar Choice's, and Sunpower Corporation's Comments on Statement of Issues, filed April 20, 2015 ("April 20, 2015 Initial Comments"). Before TASC was granted intervention, in response to the commission's invitation for public comment in Order No. 32293, TASC also submitted forty-nine pages of written comments on the HECO Companies' Distributed Generation Interconnection Plan and Power Supply Improvement Plans. See Earthjustice's, Hawaii PV Coalition's, Hawaii Solar Energy Association's, and The Alliance For Solar Choice's Comments on the HECO Companies' Distributed Generation Interconnection Plan and Power Supply Improvement Plans, filed on October 6, 2014 ("October 6, 2014 Comments").

³⁵³Order No. 32849 "CONFIRMING STATEMENT OF ISSUES," filed May 15, 2015 at 2-3 (emphasis added).

³⁵⁴See Hawaii Solar Energy Association's, Hawaii PV Coalition's, Hawaii Renewable Energy Alliance's, Ron Hooson's,

procedural schedule and did not deviate from TASC's original representation that "TASC's understanding is that this proceeding will not be one in which 'a formal hearing [will be] held involving the taking of testimony and formulation of a record.'"³⁵⁵

On June 29, 2015, the Parties, including TASC, filed a signed "Stipulation Setting Forth Proposed Revisions to Rule 14H[.]"³⁵⁶

TASC filed its June 29, 2015 final statement of position, which included sixty-six (66) pages of written text, a six-page amended declaration of its chosen expert, and Exhibits A through C consisting of ten pages.³⁵⁷ As before, TASC did not object to this docket's lack of an evidentiary hearing.

In part, TASC contended that the docket record, in its current state, only supported a decision to adopt TASC's recommendations: **"Only Joint Parties' Recommendations Provide an Evidentiary Basis Upon Which the Commission Can Make a Decision."**³⁵⁸

Life of the Land's, Sunpower's and The Alliance For Solar Choice's Statement of Position, Declaration of R. Thomas Beach, and Certificate of Service, filed on June 1, 2015 ("Joint Parties PSOP"), at 5 (emphasis in original).

³⁵⁵TASC Motion to Intervene at 7.

³⁵⁶See Stipulation Setting Forth Proposed Revisions to Rule 14H, filed June 29, 2015.

³⁵⁷See Joint Parties FSOP.

³⁵⁸Joint Parties FSOP at 26 (bolded text in original).

On July 2, 2015, TASC filed the Motion to Initiate Hearings. TASC contended that it "made a good-faith effort to reach agreement with the HECO Companies and other parties through these settlement-like discussions" but that "a stipulation could not be reached on a number of issues vital to the property and financial interests of TASC, its members, and their customers."³⁵⁹

However, contrary to its prior representation that "TASC's understanding is that this proceeding will not be one in which 'a formal hearing [will be] held involving the taking of testimony and formulation of a record[,]'"³⁶⁰ TASC now contends:

As an Intervenor, TASC has a right to a hearing to cross-examine witnesses, put on evidence, and respond to evidence submitted by other parties in order to assist the Commission in establishing a record up on [sic] which it can make a just and reasonable decision. The procedures to date in Phase 1 of this proceeding are insufficient to establish the requisite level of sophistication in the record and to ensure TASC's rights are protected. The initiation of formal evidentiary hearings are [sic] the best way to achieve this end.³⁶¹

TASC asserts that "every party in a contested case has the right to 'conduct such cross-examination as may be required

³⁵⁹Motion to Initiate Hearings at 2.

³⁶⁰TASC Motion to Intervene at 7.

³⁶¹Motion to Initiate Hearings at 2 (footnotes omitted).

for a full and true disclosure of the facts, and shall have the right to submit rebuttal evidence.'"³⁶²

The Consumer Advocate, the HECO Companies, and other Parties submitted their respective oppositions to the Motion to Initiate Hearings.³⁶³ No Party supported the Motion to Initiate Hearings.

In pertinent part, the Consumer Advocate stated: (1) the "attempt to request an evidentiary hearing at this juncture is clearly an attempt to delay the proceeding" because the parties "conducted extensive discussion on the Phase 1 issues and were provided the opportunity to file Initial Comments on the Statement of Issues, Preliminary Statements of Positions, and Final Statements of Position if Stipulated Resolution of the Phase 1 issues was not reached;"³⁶⁴ (2) the "denial of the request for a formal evidentiary hearing would not deny any of TASC's legal rights, duties, and privileges" because TASC "sought and received intervenor status on behalf of solar service providers to assist

³⁶²Motion to Initiate Hearings at 2, n.4.

³⁶³See Division of Consumer Advocacy's Memorandum in Opposition, filed July 13, 2015 ("Consumer Advocate Opposition"); and Hawaiian Electric Companies' Opposition to Motion of The Alliance For Solar Choice to Initiate Formal Evidentiary Hearings, filed on July 10, 2015.

³⁶⁴Consumer Advocate Opposition at 3-4.

the Commission in developing the record;"³⁶⁵ (3) "TASC fails to state how its [94-page] joint Final Statement of Position represents an insufficient opportunity to respond on the record to the positions and evidence offered by the parties;"³⁶⁶ (4) the "instant proceeding is not a contested case hearing as contemplated by HRS Chapter 91, or an agency hearing under HAR Chapter 6-61" but is instead "a generic Commission initiated investigation regarding [distributed energy resources] policies;"³⁶⁷ and (5) "TASC's purpose in this proceeding is to preserve the existing NEM retail rate compensation structure for as long as possible by requesting additional regulatory processes."³⁶⁸

In its Response to the Motion to Initiate Hearings, DBEDT stated that it "is not supportive of TASC's motion requesting evidentiary hearings" because a "sufficient record has been developed by the various Intervenors through their respective Final Statement of Position [sic]" and granting such a hearing "would delay the implementation of longer-term distributed energy

³⁶⁵Consumer Advocate Opposition at 4.

³⁶⁶Consumer Advocate Opposition at 5.

³⁶⁷Consumer Advocate Opposition at 5.

³⁶⁸Consumer Advocate Opposition at 6.

resources (DER) market solutions . . . that will be developed during Phase 2.”³⁶⁹

KIUC’s response stated: (1) “this docket involves an investigatory proceeding, and is not a contested case, and as such, there is no requirement to hold an evidentiary hearing, and the parties should not be allowed to dictate whether and/or at what point in the proceeding an evidentiary hearing should be held;” and (2) “the holding of evidentiary hearings at this point of the proceeding is unnecessary and would be extremely prejudicial and unduly burdensome” and would “unduly delay any decision by the Commission on this matter, and further impede any efforts by the Commission to immediately address or resolve the Phase 1 issues as emphasized by the Commission in Order No. 32737.”³⁷⁰

Upon review of the entire record and the submittals of the Parties, the commission finds and concludes as follows:

1. By its Motion to Initiate Hearings, TASC misconstrues the applicable law, administrative procedure, and the commission’s orders in this docket.

³⁶⁹The Department of Business, Economic Development, and Tourism’s Response to The Alliance For Solar Choice’s Motion to Initiate Formal Evidentiary Hearings, filed on July 13, 2015, at 2.

³⁷⁰Kauai Island Utility Cooperative’s Response to the Motion of The Alliance For Solar Choice to Initiate Formal Evidentiary Hearings, filed on July 10, 2015, at 8-9.

2. In light of TASC's representation to the commission, in seeking intervention, that "TASC's understanding is that this proceeding will not be one in which 'a formal hearing [will be] held involving the taking of testimony and formulation of a record[.]'"³⁷¹ the commission concludes that TASC is precluded from now asserting the inconsistent position of a "right to a hearing to cross-examine witnesses, put on evidence, and respond to evidence submitted by other parties[.]"³⁷²

3. The commission concludes that TASC is bound by its representations in the TASC Motion to Intervene, which served as the bases for the commission to grant intervention to TASC.³⁷³

³⁷¹TASC Motion to Intervene at 7 (emphasis added). In another docket, TASC made the identical representation in support of a motion to intervene. See Docket No. 2014-0130, Motion to Intervene of The Alliance For Solar Choice, Verification of Tim Lindl, filed on June 23, 2014, at 11 ("At this time, TASC's understanding is that this proceeding will not be one in which 'a formal hearing [will be] held involving the taking of testimony and formulation of a record[.]'").

³⁷²Motion to Initiate Hearings at 2.

³⁷³See Han v. Yang, 84 Hawai'i 162, 174 n.18, 931 P.2d 604, 616 n.18 (App. 1997) ("A judicial admission is a formal statement, either by a party or his or her attorney, in the course of a judicial proceeding that removes an admitted fact from the field of controversy. It is a voluntary concession of fact by a party or a party's attorney during judicial proceedings." (formatting adjusted)); Rosa v. CWJ Contractors, Ltd., 4 Haw. App. 210, 218-20, 664 P.2d 745, 751-52 (1983) ("Since the trial court accepted the Rosas' non-party/co-obligors theory of action in denying Contractors' motion to dismiss, the Rosas could not subsequently repudiate such a position in their motion for summary judgment;" Plaintiffs "are estopped from taking a position

4. The Parties' - and indeed the public's interest in the orderly and timely disposition of the significant energy policy issues in this docket - would be prejudiced by allowing TASC to impermissibly assert inconsistent positions and to play "fast and loose" with the commission or "blowing hot and cold" during the course of the proceedings.³⁷⁴

5. Even if TASC is not precluded from asserting the Motion to Initiate Hearings, the requested relief is fundamentally flawed insofar as this commission-initiated investigatory docket is not, as TASC mistakenly contends, a "contested case."³⁷⁵

6. A "contested case" is defined as "a proceeding in which the legal rights, duties, or privileges of specific parties

inconsistent with their former stand" because the doctrine of judicial estoppel partakes of "positive rules of procedure based on manifest justice" and "considerations of the orderliness, regularity, and expedition of litigation" insofar as "[a]t stake is the integrity of the judicial process"); Order No. 32737 at 23 ("Based on these assertions and the commission's review of each of the motions to intervene, the commission grants intervention to . . . TASC[.]").

³⁷⁴See Roxas v. Marcos, 89 Hawai'i 91, 124, 969 P.2d 1209, 1242 (1998) (stating that under the doctrine of judicial estoppel, a "party will not be permitted to maintain inconsistent positions or to take a position in regard to a matter which is directly contrary to, or inconsistent with, one previously assumed by him, at least where he had, or was chargeable with, full knowledge of the facts, and another will be prejudiced by his action" and "prevents parties from playing 'fast and loose' with the court or blowing 'hot and cold' during the course of litigation.").

³⁷⁵Motion to Initiate Hearings at 2, n.4.

are required by law to be determined after an opportunity for an agency hearing.”³⁷⁶ However, “[i]f the statute or rule governing the activity in question does not *mandate* a hearing prior to the administrative agency’s decision-making, *the actions of the administrative agency are not ‘required by law’* and do not amount to ‘a final decision or order in a contested case[.]’”³⁷⁷

7. Originally, on August 21, 2014, the commission issued Order No. 32269 stating that “[p]ursuant to HRS §§ 269-6 and 269-7, this proceeding is instituted to investigate distributed energy resource policies as they relate to HECO, HELCO, MECO, and KIUC.”³⁷⁸

8. The applicable statutes that gave rise to this proceeding - HRS §§ 269-6 and 269-7 - do not “mandate a hearing” prior to the commission’s decision and order. The pertinent administrative rules and the commission orders in this docket likewise omit any requirement of a hearing. Here, Order No. 32737 directed, as the final procedural step before a decision by the commission, that “[i]f the Parties are unable to agree to a stipulated resolution of the issues, the Parties shall file joint

³⁷⁶HRS § 91-1(5) (2012 Repl.).

³⁷⁷Kaleikini v. Thielen, 124 Hawaii 1, 17, 237 P.3d 1067, 1083 (2010).

³⁷⁸Order No. 32269 “INITIATING A PROCEEDING TO INVESTIGATE DISTRIBUTED ENERGY RESOURCE POLICIES,” filed on August 21, 2014.

or individual final statements of position, including comments describing why they were not able to reach agreement.”³⁷⁹ Consequently, this investigatory docket is not a contested case inasmuch as a hearing is not “required by law.”³⁸⁰

9. The commission has previously distinguished contested case proceedings from investigatory dockets.³⁸¹ Consistent with the commission’s treatment of prior energy policy proceedings, the commission affirms that this investigatory

³⁷⁹Order No. 32737 at 49.

³⁸⁰See Bush v. Hawaiian Homes Comm’n, 76 Hawaii 128, 134-35, 870 P.2d 1272, 1278-79 (1994) (concluding that no contested case had occurred because the applicable statutes and administrative rules “contain[] no provision requiring the [Hawaiian Homes] Commission to hold a hearing prior to decision-making” and thus “there is no regulatory mandate” and “there is no statutory mandate entitling Appellants to a hearing”); Lingle v. Hawaii Gov’t Employees Ass’n, AFSCME, Local 152, AFL-CIO, 107 Hawaii 178, 184, 111 P.3d 587, 593 (2005) (“[P]ursuant to HRS § 91-14, in order for proceedings before an agency to constitute a contested case from which an appeal can be maintained, the agency must be required by law to hold a hearing before a decision is rendered. Stated differently, discretionary hearings are not contested cases because they are not required by law.”). Besides a general reference to statutes and administrative rules, TASC asserts no other basis for an alleged entitlement to an evidentiary hearing. See Motion to Initiate Hearings.

³⁸¹See In the Matter of Public Utilities Commission Instituting a Proceeding to Investigate Proposed Amendments to the Framework For Integrated Resource Planning, Docket No. 2009-0108, Decision and Order, filed on March 14, 2011, at 78 (distinguishing that the issuance of a commission order opening a docket for the utility’s integrated resource planning process “will be considered an investigatory proceeding, and not a contested case proceeding”).

docket, rather than an adversarial proceeding, is the most appropriate forum to allow meaningful and collaborative participation by all parties and, given the rapid technological advancements and changes in the market, to serve the public interest by means of a timely resolution of the "highest priority" energy policy issues in Phase 1.³⁸²

10. The commission finds that TASC's conclusory claim of an "insufficient" record, to thereby justify an evidentiary hearing,³⁸³ is factually unsupported. Significantly, TASC fails to specify what additional arguments it would advance in an evidentiary hearing, and fails to explain why such arguments were not made in TASC's joint and individual filings totaling no less

³⁸²See Order No. 32737 at 22-23, 33-35; In the Matter of Public Utilities Commission Opening a Proceeding to Investigate Whether an Oahu-Maui Interisland Transmission System May Be in the Public Interest, Docket No. 2013-0169, Order No 31356, "INITIATING PROCEEDING," filed on July 11, 2013, at 5-7 ("The investigative docket on this issue will provide a forum to better facilitate public input and disseminate information. . . . The commission's intention in opening this investigative docket is to obtain input from knowledgeable stakeholders on the selection process, policy issues, and overall objectives with respect to how, where, and at what cost a cable may be developed. Through these actions, the commission seeks potential solutions to develop an interisland transmission infrastructure that can minimize risk, maximize utilization of existing and new infrastructure, and achieve greater efficiencies and cost effectiveness to augment and complement the Hawaii electric system, and ultimately, serve the public interest.").

³⁸³See Motion to Initiate Hearings at 2.

than 242 pages of commentary, argument, recommendations, expert opinion, exhibits, and rebuttal.³⁸⁴

11. Indeed, it is disingenuous for TASC to contend that the record before the commission is somehow "insufficient" when TASC has argued, in part, that the record as it currently stands only supports a decision to adopt TASC's recommendations:

**C. Only Joint Parties' Recommendations
Provide an Evidentiary Basis Upon Which
the Commission Can Make a Decision.**

Joint Parties' current proposals for DER compensation lie between the existing NEM program's retail credit and HECO's recent proposal to compensate DERs only at the avoided fuel cost. While Joint Parties' proposals are supported by cost-based evidence, other parties that offer somewhat lower rates provide no empirical backing or analysis to support their proposed compensation for exported energy. Instead, they arbitrarily pick a rate around \$0.16/kWh to \$0.18/kWh. As a result, only Joint Parties' recommendations provide a sufficient evidentiary basis upon which the Commission can adjust the existing NEM program to

³⁸⁴See, e.g., October 6, 2014 Comments (forty-nine (49) pages of public comments); January 27, 2015 Request for Party Status and Opposition of The Alliance For Solar Choice, Hawaii Solar Energy Association, Hawaii PV Coalition, and Sunpower Corporation to the Motion of the Hawaiian Electric Companies, Exhibit 1, Affidavit of R. Thomas Beach, and Certificate of Service (seventy-one (71) pages); April 20, 2015 Initial Comments (two pages); June 1, 2015 TASC Joint SOP (thirty-eight (38) pages, excluding the certificate of service); June 29, 2015 TASC Joint Final SOP (sixty-six (66) pages of written text, a six-page amended declaration of its chosen expert, and Exhibits A through C consisting of ten pages).

establish an interim grid supply tariff that will achieve its goals.”³⁸⁵

12. Furthermore, TASC’s request conflicts with the purpose of the procedural schedule established in Order No. 32737, wherein the commission stated in relevant part:

[Order No. 32737] directs the HECO Companies to collaborate with the Parties [(as defined in Order No. 32737)] to this docket to resolve the distributed energy resources issues identified herein through a two phase schedule. The issues established for the first phase of this proceeding are considered by the commission to be of the highest priority, based on the urgent need to clear the existing interconnection queue backlog, assist in providing needed grid-supportive capabilities, enable customer choice, and allow DER to continue to grow cost-effectively in the future without adversely affecting non-participating customers.³⁸⁶

13. In accordance with these directives, the commission adopted an expedited procedural schedule to facilitate the resolution of the important issues identified in Order No. 32737, either through the Parties’ stipulation or position statements.³⁸⁷ TASC failed to seek any modification of the procedural schedule and failed request reconsideration of Order No. 32737.

³⁸⁵June 29, 2015 TASC Joint Final SOP at 26-27 (bolded text in original; footnotes omitted; underscored emphasis added).

³⁸⁶Order No. 32737 at 33-34.

³⁸⁷Order No. 32737 at 45.

14. During this expedited procedural schedule, the Parties expended considerable time and effort to discuss and evaluate both the issues identified in Order No. 32737, and the proposals developed in response to the commission's directives. This resulted in multitudinous filings, including preliminary statements of position, customer options, proposed tariffs, proposed tariff modifications, final statements of position, and supporting documentation.

15. The commission finds that TASC has been provided a full and fair opportunity to develop a record in support of its arguments and recommendations. Insofar as the commission had clearly set forth, at the outset, the procedural schedule and the expectations of all parties and intervenors to meaningfully contribute to a collaborative and timely resolution of the significant issues in this docket, the commission finds that TASC's conduct of asserting inconsistent positions and its dubious claim of an "insufficient" record are impermissible attempts to "broaden the issues" and to "unduly delay the proceeding[.]"³⁸⁸ As such, TASC has failed to respect the commission's mandate that TASC's participation "reflect a high standard of quality, relevance, and timeliness."³⁸⁹

³⁸⁸See Order No. 32737 at 23-24.

³⁸⁹See Order No. 32737 at 23.

16. For these reasons, the commission therefore finds and concludes that TASC's Motion to Initiate Hearings has no basis in fact or law, and is an obvious attempt to delay the prompt resolution of the issues in this proceeding, and should therefore be denied. The commission addresses TASC's behavior further in Section VI.C, below.

17. Because the commission denies the Motion to Initiate Hearings, the commission dismisses as moot the corresponding July 2, 2015 "Motion To Appear On Behalf Of The Alliance For Solar Choice" in which Timothy J. Lindl, who is not licensed to practice law in Hawaii, requests to appear on behalf of TASC and to associate with local counsel, Robert Harris. In the proceedings going forward, there is no indication in the docket record that Mr. Harris, or other local counsel, would not be able to adequately represent TASC before the commission.

C.

HECO Companies' July 10, 2015 Motion

On July 10, 2015, the HECO Companies filed a "Motion for Order Requesting Removal of The Alliance for Solar Choice from Proceeding" ("July 10 Motion"), alleging that TASC has ignored the commission's established ground rules for this docket requiring productive collaboration based on reasonable dialogue and that the Parties refrain from broadening the issues or unduly delaying the

proceeding, and has chosen to litigate issues in the media instead of through the agreed-upon investigative, regulatory process.³⁹⁰ Several Parties to this proceeding have filed a response to the July 10 Motion.³⁹¹

As is "generally true in proceedings before administrative agencies," "[i]ntervention as a party in a proceeding before the PUC is not a matter of right but is a matter resting within the sound discretion of the commission." Application of Hawaiian Elec. Co., Inc., 56 Haw. 260, 262, 535 P.2d 1102, 1104 (Haw. 1975). While the commission "has generally

³⁹⁰"Motion for Order Requesting Removal of The Alliance for Solar Choice from Proceeding; Exhibits 1-2; Declaration of Kaiulani Shinsato; and Certificate of Service," filed on July 10, 2015.

³⁹¹The following responses to the HECO Companies' July 10, 2015 motion were filed with the commission: (1) "Renewable Energy Action Coalition of Hawaii, Inc.'s Opposition to Hawaiian Electric Companies' Motion for Order Requesting Removal of The Alliance For Solar Choice from Proceeding," in opposition, filed on July 15, 2015; (2) "Opposition of The Alliance For Solar Choice to the Motion of the Hawaiian Electric Companies for Order Requesting the Removal of the Alliance for Solar Choice from Proceeding, in opposition, Exhibits A-C, and Certificate of Service," filed on July 16, 2015; (3) "Kauai Island Utility Cooperative's Response to Hawaiian Electric Companies' Motion for Order Requesting Removal of The Alliance for Solar Choice from Proceeding, and Certificate of Service," taking no position, filed on July 17, 2015; and (4) "Hawaii Solar Energy Association's, Blue Planet Foundation's, Ron Hooson's, Hawaii PV Coalition's, Hawaii Renewable Energy Alliance's, and Life of the Land's Opposition to the Hawaiian Electric Companies' Motion for Order Requesting Removal of The Alliance for Solar Choice from Proceeding, and Certificate of Service," in opposition, filed on July 20, 2015.

been permissive in allowing intervention in policy-making investigative dockets,"³⁹² the commission has frequently made clear that it will revoke an intervenor's status in a docket, "if, at any time, during the course of [the] proceeding, the commission determines that they are unreasonably broadening the pertinent issues raised in this docket or are unduly delaying the proceeding by, without limitation, failing to timely act or respond as appropriate in this matter."³⁹³

The commission has removed Intervenor's from a proceeding for failing to meaningfully participate and contribute to the development of a record, or for broadening the issues or unduly delaying a proceeding.³⁹⁴

³⁹²Docket No. 2011-2006, Order Granting Intervention, Approving RSWG Purpose, Scope of Work and Work Plan, and Clarifying Role of Commission's Consultant, filed on October 12, 2011, at 5.

³⁹³In the Matter of the Application of Hawaiian Electric Company, Inc., Docket No. 2007-0084, Order No. 23455, filed on May 23, 2007, at 9-10; see also In the Matter of the Application of Hawaiian Electric Company, Inc., Docket No. 2007-0346, Order No. 23965, filed on January 10, 2008, at 7 ("[T]he commission will reconsider [] intervention if [the intervenor] fails to follow commission rules, contribute to the development of a sound record, or otherwise meaningfully participate in this proceeding." Id. at 8).

³⁹⁴See Docket No. 2011-0206, Order No. 30530, filed on July 16, 2012, at 3-4 (finding that the removed Parties "have demonstrated a noticeable lack of timely and meaningful participation in the RSWG, which the commission has consistently emphasized is expected to be a working group"); Docket No. 2008-0273, Order Granting Extension Request Filed By the Solar Alliance and

On April 15, 2015, the Parties met with the commission staff to discuss the DER docket process and ground rules, at which time the commission staff reiterated that the purpose of taking a collaborative approach to this docket was to facilitate open, frank, cooperative, and productive discussion among the Parties, and that by moving to intervene and participating in this proceeding, the Parties were agreeing to pursue this approach. The commission staff also informed the Parties that if, as the docket progressed, the collaborative approach proved to be unproductive, the commission would transition the docket to a more formal process for resolution of the DER issues. As such, the commission also emphasized that it expected the Parties to work out and discuss any differences informally in good faith and to raise any unresolved issues during bi-weekly meetings with commission staff.

In its July 10 Motion, the HECO Companies allege that TASC has employed a tactic of "litigating issues in the media versus through the collaborative process,"³⁹⁵ and that

HSEA on September 2, 2011, and Removing As Parties From This Proceeding Zero Emissions Leasing LLC and Clean Energy Maui LLC, filed on September 15, 2011, at 7-9 (removing intervenors for "complicat[ing] the filing and review process for the commission, broaden[ing] the issues, and unduly delay[ing] [the] proceeding.")

³⁹⁵July 10 Motion at 2.

"TASC's conduct evidences a deliberate choice by TASC to not 'meaningfully participate and assist the commission in the development of the record in this docket.'"³⁹⁶ The Companies argue that this includes issuing press releases that seek to influence the commission's decision in this docket and making specious claims that the Companies are attempting to discriminate against customers with PV systems in a variety of ways.³⁹⁷

In addition, the July 10 Motion states that TASC deliberately attempted to prevent the other Parties from commenting on TASC's proposed "tolling arrangement" in their FSOPs,³⁹⁸ and further argues that "TASC's recent actions undermine much [of] the legitimate effort and much of the progress that the other parties in the DER docket have achieved."³⁹⁹

The commission finds that on multiple occasions, TASC has chosen to seek resolution of issues in this docket outside of the collaborative process, rather than adhering to the procedure upon which the Parties agreed.⁴⁰⁰ Furthermore, as discussed above,

³⁹⁶July 10 Motion at 14-15 (internal citation omitted).

³⁹⁷July 10 Motion at 2-9.

³⁹⁸July 10 Motion at 5-6.

³⁹⁹July 10 Motion at 16.

⁴⁰⁰In addition, on July 21, 2015, two principal members of TASC, SolarCity and Sunrun, filed "public comments" in this docket responding to the HECO Companies' FSOP. Given that the Procedural Schedule for Phase 1 established in Order No. 32737 did not provide

TASC's Motion to Initiate Hearings is clearly an attempt to delay this proceeding, unsupported by fact, and unfounded in law.

Nevertheless, the commission declines, at this time, to grant the HECO Companies' July 10 Motion requesting that the commission remove TASC from this proceeding. While there is merit in the HECO Companies' position, by issuing this Order, the commission has resolved the Phase 1 Issues, and therefore has prevented TASC from delaying the proceeding.

The commission provides a final caution to TASC, and all other Intervenor, that any further attempts to delay this proceeding will not be tolerated. The commission will closely scrutinize the behavior of TASC and its counsel in Phase 2 of this docket. To the extent that the commission determines that TASC, or any Intervenor, seeks to broaden the scope of issues, is attempting to delay resolution of the issues, further jeopardizes the collaborative process, or fails to meaningfully contribute to the development of the record, that Intervenor will be dismissed from this proceeding.

for any responses of the Parties to the various FSOPs, it appears that TASC's members, posing as representatives of the public, have violated the Procedural Schedule in order to attempt to unfairly influence the commission in this proceeding.

VII.

ORDERS

THE COMMISSION ORDERS:

1. Within five (5) days of the date of this Order, the HECO Companies shall re-file clean and black-lined tariff sheets for Rule 14H, incorporating the approved revisions attached to this Order as Exhibit A, as well as further revisions to Appendix III of Rule 14H, consistent with the discussion of the interconnection review process herein.
2. The revised tariff sheets required under Ordering Paragraph No. 1 shall take effect two (2) days after filing unless otherwise ordered by the commission.
3. The HECO Companies' proposed self-supply tariff, modified as shown in Exhibit B attached to this Order, is approved.
4. The technical specification of a self-supply system, as discussed in Section V.B.2.c of this Order, shall be incorporated into the self-supply tariff, as shown in Exhibit B attached to this Order, and as approved herein.
5. Within five (5) days of the date of this Order, the HECO Companies shall re-file clean and black-lined tariff sheets for the self-supply option, as approved herein. The revised tariff sheets for the self-supply

option shall take effect two (2) days after filing, unless otherwise ordered by the commission.

6. HECO Companies' proposed grid-supply tariff, modified as shown in Exhibit C attached to this Order, is approved.
7. Within five (5) days of the date of this Order, the HECO Companies shall re-file clean and black-lined tariff sheets for the grid-supply option, as approved herein. The revised tariff sheets for the grid-supply option shall take effect two (2) days after filing, unless otherwise ordered by the commission.
8. The HECO Companies shall establish an initial cap on the availability of the grid-supply tariff option, equal to twenty-five (25) MW_{ac} for HECO, and five (5) MW_{ac} each for MECO and HELCO service territories.
9. Within thirty (30) days of the date of this Order, the HECO Companies shall re-file their TOU proposal consistent with the guidance provided in Section V.B.3.c of this Order. Thereafter, the Parties shall have ten (10) days to file any comments on the proposed TOU rate option. The new TOU option shall take effect upon approval by the commission.
10. The NEM program for the HECO Companies' service territories is fully subscribed as of the date of this Order and is closed to new participants. Applications

submitted after the date of this Order shall not be eligible for the NEM program.

11. The NEM program shall remain unchanged and in effect in its current form for existing NEM program participants. Customers who have applied for interconnection under the NEM program up to and including the date of this Order shall continue to be eligible for interconnection under the NEM program.
12. The HECO Companies shall immediately cease offering NEM application forms and shall make available a revised interconnection application to allow customers to apply for interconnection under either the grid-supply or self-supply options approved by this Order.
13. The HECO Companies shall automatically treat any future NEM application as if it is an application for interconnection under the grid-supply tariff, unless otherwise indicated by the customer. The HECO Companies shall notify the customer (and the customer's contractor or agent, as applicable) that the NEM program is fully subscribed and explain the details of the grid-supply tariff option.
14. No additional individual system capacity shall be added to approved or pending NEM systems. Customers with existing or pending NEM systems may opt to interconnect

new capacity under the grid-supply or self-supply options, consistent with the requirements of those tariffs; however, such an election by a customer will result in the entire DER system moving to the grid-supply or self-supply tariff option. Thus, if an existing NEM customer (or customer in the NEM queue) seeks to add capacity to their system, beyond the capacity originally approved (or requested in the original NEM application), the customer must agree to transfer their entire DER system (i.e., the original NEM system and the new requested capacity) to either the grid-supply or self-supply option.

15. Other available interconnection options, such as the Standard Interconnection Agreement, Power Purchase Agreement, Feed-in-Tariff, etc., remain unchanged.
16. The HECO Companies' weekly reports on the interconnection queue for each service territory shall be expanded to cover each island grid separately. The weekly interconnection queue reports shall be supplemented to indicate the maximum number of days an application has remained at each applicable step in the interconnection process (in addition to the average duration of all pending applications at each step). The Companies shall expand the data presented in the

weekly report to include the self-supply and grid-supply options approved by commission in this Order, as well as any other interconnection option available to customers or that may be approved by the commission in the future (e.g., community-based renewable options, Schedule Q, TOU rates, etc.). Furthermore, the weekly report shall be supplemented to include the total rated capacity (MW_{ac}) of the executed systems and those in the queue.

17. The HECO Companies shall continue to submit the weekly report electronically, and shall formally file a quarterly summary in this docket that summarizes the content of the weekly reports. The HECO Companies shall work with commission staff to develop the appropriate format and content of the quarterly summary.
18. Within thirty (30) days of the date of this Order, HECO shall (1) develop and present the technical basis for the need to deviate from IEEE standards in this regard, and (2) propose return-to-service standards consistent with best practices under discussion as part of the California Rule 21 process (such as ramp rate control standards and randomized re-connection standards) to mitigate these potential issues.
19. The HECO Companies shall collaborate with inverter manufacturers and with the Parties to this docket

(and other stakeholders, as appropriate) to develop a reasonable self-certification process for the advanced inverter functions approved for inclusion in Rule 14H. After approval by the commission, the self-certification process shall remain in effect until national standards are established, unless otherwise ordered by the commission.

20. The HECO Companies shall collaborate with inverter manufacturers to develop a test plan for the highest priority advanced inverter functions that do not yet have UL certification. The Companies shall submit the test plan to the commission for approval no later than December 15, 2015. Upon approval, the HECO Companies shall test a variety of inverters to assess their performance with respect to the high priority advanced inverter functions, and submit a report summarizing the test results to the commission no later than six (6) months after the test plan is approved by the commission.

21. The HECO Companies shall develop and maintain a list of inverter models that are deemed to meet the interconnection standards established in Rule 14H and approved herein. The Companies shall prominently post the qualified inverter model list to the Companies'

respective websites to improve the transparency of the interconnection process for customers and DER system providers.

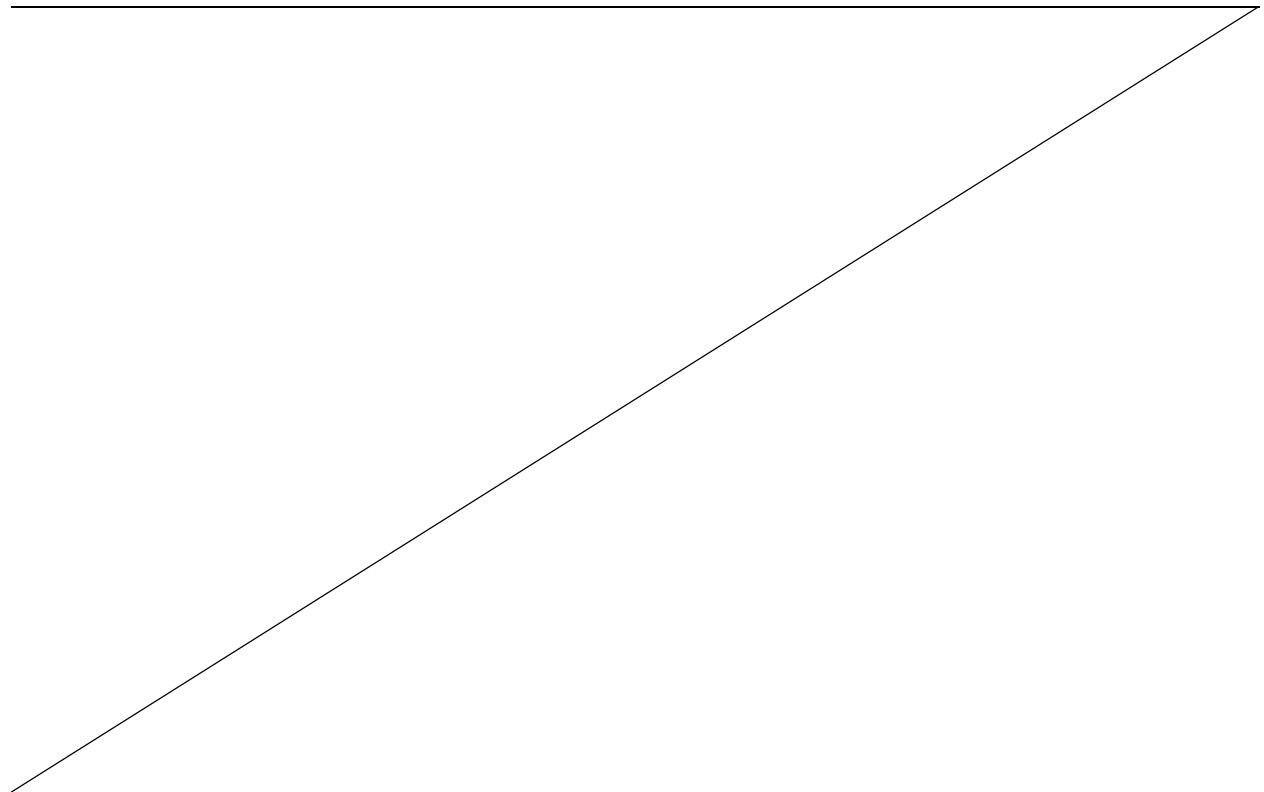
22. Within thirty (30) days of the date of this Order, the HECO Companies shall update the list of qualified inverter models required under Ordering Paragraph 20 to include inverter models for which the Companies have received self-certification from the inverter manufacturer of compliance with the technical specification for self-supply systems approved herein.
23. Within sixty (60) days of the date of this Order, the HECO Companies shall complete the circuit-level hosting capacity analysis for all islands in the Companies' service territories, and submit the results of such analysis for consideration by the Parties and the commission in this docket.
24. Within sixty (60) days of the date of this Order, the HECO Companies shall file in this docket a proposed methodology and resulting system-level hosting capacity for each island grid in the Companies' service territories.
25. Phase 2 of this proceeding will begin with a technical conference facilitated by commission staff. Commission staff shall notify the Parties of the

time and date of the first technical conference, which shall take place within thirty (30) days of the date of this Order.

26. The HECO Companies' January 20, 2015 "Motion for Approval of NEM Program Modification and Establishment of Transitional Distributed Generation Program Tariff" is dismissed as moot.

27. TASC's June 29, 2015 "Motion of the Alliance for Solar Choice to Initiate Formal Evidentiary Hearings" is denied.

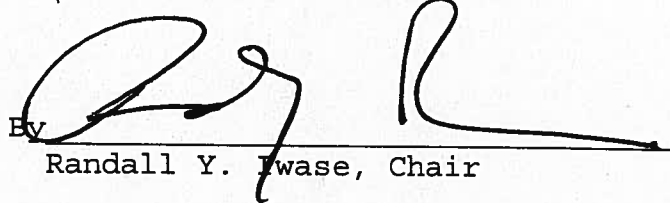
28. TASC's July 2, 2015 "Motion To Appear On Behalf Of The Alliance For Solar Choice" is dismissed as moot.

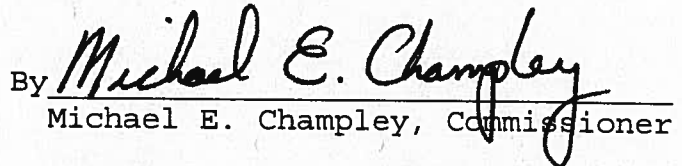


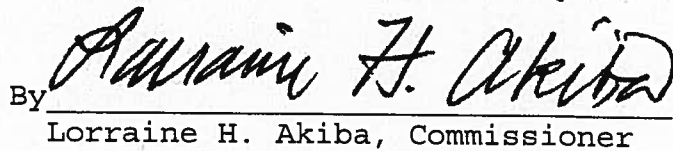
29. The HECO Companies' July 10, 2015 "Motion for Order Requesting Removal of The Alliance for Solar Choice from Proceeding" is denied.

DONE at Honolulu, Hawaii OCT 12 2015.

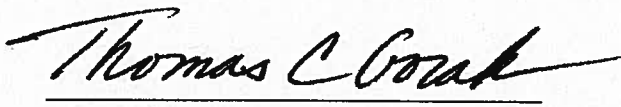
PUBLIC UTILITIES COMMISSION
OF THE STATE OF HAWAII

By 
Randall Y. Iwase, Chair

By 
Michael E. Champley, Commissioner

By 
Lorraine H. Akiba, Commissioner

APPROVED AS TO FORM:


Thomas C. Gorak
Commission Counsel

2014-0192.sr

Exhibit A: Revisions to Rule 14H

RULE No. 14 (Continued)

Service Connections and Facilities on Customer's Premises

H. INTERCONNECTION OF DISTRIBUTED GENERATING FACILITIES
~~OPERATING IN PARALLEL~~ WITH THE COMPANY'S ~~ELECTRIC~~
DISTRIBUTION SYSTEM

1. Interconnection Standards

- a. Distributed generating facilities ~~operating in parallel with~~ interconnected to the Company's electric system shall satisfy the Company's Interconnection Standards.
- b. The Company's Interconnection Standards are included as Appendix I to Rule 14.

2. Definitions

For purposes of this Rule 14H, the following definitions shall apply:

- a. "Distributed Generation Facility": A Generating Facility located on a Customer's premises that is interconnected with the Distribution System.
- b. "Distribution System": All electrical wires, equipment and other facilities at the distribution voltage levels (such as 25kV-HECO only, 12kV, 4kV or 2.4kV) owned or provided by the utility, through which the utility provides electrical service to its customers.
- c. "Generating Facility": Customer or utility-owned electrical power generation that is interconnected to the utility.
- d. "Interconnect" or "interconnected" or "interconnection": The physical connection of any Distributed Generating Facility to the Distribution System, including the facilities required to provide the electric distribution service to a Customer, using electrical wires, switches, and related equipment located on either side of the

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point of common coupling as appropriate to their purpose and design to allow the physical connection of a Distributed Generating Facility to the Distribution System.

e. "Momentary Parallel Operation": Parallel Operation for a duration less than 100 ms.

f. "Parallel operation": The operation of a Distributed Generating Facility, while interconnected, such that customer load can be fed by the Distributed Generating Facility and Distribution System simultaneously.

2.3. Interconnection Agreement

- a. Customers, on whose premises ~~distributed~~ Distributed generating facilities that are interconnected to intended to operate in parallel the Company's ~~electric system~~ Distribution System are located, shall complete and execute Standard Interconnection Agreement with the Company provided in Appendix II or Appendix II-A of this Rule, or an Application for Non-Export Distributed Generation Facilities (Momentary-Parallel Operation) provided in Appendix II-B of this Rule, or other Company-approved application for interconnection of a Generating Facility subject to Rule 14H, and obtain Company approval of such interconnection application prior to interconnecting~~operating~~ the Distributed Generating Facilities~~distributed generating facilities to in parallel with~~ the Company's Distribution System~~electric system~~, or within one hundred fifty (150) days after the effective date of this Rule if the distributed generating facilities are already operating in parallel with the Company's system as of such date, provided that following the expiration of such one hundred fifty (150) days period, Customers shall have thirty (30) days to file a request for an extension of such one hundred fifty (150) days period with the Commission for good cause shown. The Company shall not deem the Customer to be in violation of Rule 14H while the Customer's request for extension of time to

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Superseding REVISED SHEET NO. 34A-3
Effective April 18, 2008

REVISED SHEET NO. 34A-3
Effective May 27, 2010

complete and execute the Standard Interconnection Agreement is under consideration by the Commission. Nothing in this provision shall affect the Company's right to refuse or discontinue service as provided in Rules 7.A.1 and 2.

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Decision and Order dated May 26, 2010, Docket No. 2010-0015.
Transmittal Letter dated June 10, 2010.

- b. Distributed Generating Facilities ~~generating facilities~~ may be interconnected ~~and operated in parallel with~~ to the Company's Distribution System in accordance with the terms and conditions of the Standard Interconnection Agreement or other interconnection agreement approved by the Company.
- c. The Standard Interconnection Agreement does not apply when (1) the Customer enters into a power purchase agreement for the sale to the Company of electric energy generated by the Distributed Generating Facility ~~distributed generating facility~~, ~~or~~ (2) the Customer enters into a standard agreement providing for net energy metering pursuant to Rule No. 18, (3) the customer submits an application for Non-Export Distributed Generation Facilities (Momentary-Parallel Operation) provided in Appendix II-B of this Rule, or (4) the Customer enters into any other standard interconnection agreement for a Generating Facility that is governed by Rule 14H. A customer that has an executed interconnection agreement with the Company as of the effective date of this rule shall not be required to enter into the Standard Interconnection Agreement until such time as the existing interconnection agreement is terminated.
- d. Customers with Distributed Generating Facilities that are eligible for net energy metering pursuant to Chapter 269 of the Hawaii Revised Statutes, shall follow the rules and requirements set forth in Rule No. 18 for Net Energy Metering and this Rule No. 14H, as applicable.
- e. Distributed Generating Facilities that incorporate the use of an energy storage device, e.g. battery storage, shall obtain an interconnection review by the Company pursuant to this Rule 14H and satisfy the Company's Interconnection ~~Connection~~ Standards to the extent that such distributed generating facilities operate in parallel with the Company's Distribution System.

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3.4.Interconnection Process

- a. Customer requests to interconnect ~~and operate distributed-Distributed generating-Generating facilities-Facilities in parallel with~~to the Company's ~~electric-Distribution system-System~~ under the Standard Interconnection Agreement provided in Appendix II or Appendix II-A, or other Company-approved application for interconnection of a Generating Facility subject to this Rule, will be processed in accordance with the procedures in the Interconnection Process Overview, which is included in Appendix III of this Rule.
- b. Distributed Generating Facilities that are interconnected but will not operate in parallel with the Company's Distribution System, are not subject to the interconnection review process under this Rule 14H except that Customer shall register such Distributed Generation Facilities by completing and submitting an Application for Non-Export Distributed Generation Facilities provided in Appendix II-B to this Rule 14H. Such registration shall satisfy the Customer's notice requirements set forth in Tariff Rule 3B (Change In Customer's Equipment Or Operations) and is required for purposes of determining potential load that the Company may be required to serve.
- c. Generators that are not interconnected with the Company's Distribution System are not subject to the interconnection review process under this Rule 14H and are not required to be registered with the Company.
- d. b.—The Interconnection Process Overview addresses the steps in the interconnection process, the technical review process, the need for additional study, and the resolution of disputes.

HAWAIIAN ELECTRIC COMPANY, INC.

APPENDIX I

Distributed Generating Facility Interconnection Standards Technical Requirements

The following interconnection standards are intended to provide general technical guidelines and procedures to facilitate the interconnection and parallel operation of distributed generating facilities with Hawaiian Electric Company, Inc.'s (HECO, Company or utility) electrical distribution system. If there is a conflict between the technical specifications set forth in this Appendix I with any technical specifications set forth elsewhere in HECO's Distributed Generating Facility Interconnection tariff, the specifications of this Appendix I shall prevail. The specific characteristics or needs of each distributed generating facility may reduce or increase its interconnection requirements. The degree of technical review required for a request for interconnection, and the extent to which an Interconnection Requirements Study (IRS) will be needed, will depend on factors such as the size of the generating facility, the type of technology and the point on the utility's system at which the generating facility will be interconnected. (See Interconnection Process Overview, Appendix III.) These technical interconnection requirements have been established to maintain safety, reliability, and power quality standards for all utility customers and personnel under the objectives described below:

Objectives of Good Interconnection Practice

- **Safety** – To protect the safety of utility personnel, utility customers, and the public.
- **Reliability** – To maintain the reliability of the utility system for all utility customers.
- **Power Quality** – To provide for acceptable power quality¹ and voltage regulation on the utility system and for all utility customers.
- **Restoration** – To facilitate restoration of power on the utility system.
- **Protect Utility and Customer Equipment** – To protect utility and customer equipment during steady state and faulted system operating conditions.
- **Protect Generating Facilities** – To protect generating facilities from operation of utility protective and voltage regulation equipment.
- **Utility System Overcurrent Devices** – To maintain proper operation of the utility system's overcurrent protection equipment.
- **Utility System Operating Efficiency** – To ensure operation at appropriate power factors and minimize system losses.

¹ "Acceptable" power quality is power delivered to customers that does not impair operation of the customers' equipment or cause visible light flickering due to voltage fluctuations under normal operating conditions. One element of power quality is voltage flicker, which is a function of the magnitude of voltage fluctuation and the frequency at which the fluctuation occurs. Voltage flicker is described in Section 4.n. of this Appendix I.

HAWAIIAN ELECTRIC COMPANY, INC.

Superseding SHEET NO. 34B-2
Effective March 21, 2003

REVISED SHEET NO. 34B-2
Effective April 18, 2008

Consistency with IEEE Standards

These technical interconnection standards are based on the requirements of IEEE² 1547-2003 *Standard for Interconnecting Distributed Resources with Electric Power Systems*. HECO intends to maintain consistency between its requirements for interconnection of distributed generating facilities and IEEE interconnection standards to the extent feasible, considering the specific design and operating requirements of HECO's electric power system.³ Except as otherwise provided herein, HECO will evaluate all future revisions to IEEE standards directly related to interconnection of distributed generating facilities, if any, and update its Distributed Generating Facility Interconnection Standards Technical Requirements accordingly. If, as a result of reviewing such revised or new IEEE standards HECO determines that an update to its Rule 14H is required, HECO shall file a request with the Commission to modify its interconnection tariff. If, as a result of reviewing such revised or new IEEE standards HECO determines that an update to its Rule 14H is not required, HECO will provide a written explanation of its determination in its Rule 14H annual report to the Commission. HECO will also provide a written explanation of its determinations concerning IEEE distributed generation interconnection standards to interested parties upon request, or will make such information available on a publicly accessible website.

Customers are encouraged to review and discuss these technical interconnection standards with the utility before proceeding with their design and procurement of distributed generating facility equipment.

² IEEE – Institute of Electrical and Electronic Engineers.

³ IEEE 1547-2003 does not address planning, designing, operating, or maintaining the area electric power system (IEEE 1547-2003, Section 1.3).

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Decision and Order Dated November 29, 2011, Docket No. 2010-0015
Transmittal Letter Dated December 2, 2011.

1. Definitions

- a. Active Anti-Islanding Scheme: A control scheme installed with the generating facility that prevents the formation of an unintended island by accelerating the drift in voltage and/or frequency to the respective trip points when the utility is not connected.
- b. Advanced Inverter: A Generating Facility's inverter that performs functions that, when activated, can autonomously contribute to grid support during excursions from normal operating voltage and frequency system conditions by providing: dynamic reactive/real power support, voltage and frequency ride-through, ramp rate controls, communication systems with ability to accept external commands and other functions.
- c. Clearing Time: The time between the abnormal voltage being applied and the generating facility ceasing to energize the utility distribution system.
- ~~b-d.~~ Continuous Operation: The Generating Facility operates indefinitely without tripping. Any functions that protect the Advanced Inverter from damage may operate as needed.
- ~~e-e.~~ Customer insurance coverage: Consistent with Appendix III, Section 5, the Customer shall maintain insurance coverage or be self insured against risks arising under the interconnection agreement. Proof of Customer Insurance Coverage will be included as Exhibit D to an interconnection agreement entered between the Company and the Customer.
- d. Dedicated Transformer: A transformer that provides electrical service to a single customer.
- e. Distribution System: All electrical wires, equipment, and other facilities at the distribution voltage levels (such as 25kV-HECO only, 12kV, or 4kV) owned or provided by the utility, through which the utility provides electrical service to its customers.

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- f. Direct Transfer Trip: Automatic remote trip of a generating facility's circuit breaker or interrupting device by means of a communication channel that is acceptable to the utility.⁴
- g. Facility Equipment List: Identifies equipment, space, and/or data at the Generating Facility location to be provided by the Customer for use in conjunction with the Company's Interconnection Facilities. The Facility Equipment List will be included as Exhibit B to any interconnection agreement entered between the Company and the Customer.
- h. Generating Facility: Customer or utility-owned electrical power generation that is interconnected to the utility.
- i. Induction Generator: A rotating machine generator that converts mechanical power to electrical power, in which the rotor current creating the magnetic field is supplied by an external AC source, usually the electric utility system.
- j. Initial Technical Review: Pursuant to Appendix III, Section 2, the review by the Company following receipt of an Interconnection Application to determine the following: a) if the Generating Facility qualifies for Simplified Interconnection; or b) if the Generating Facility can be made to qualify for interconnection with a Supplemental Review determining additional requirements, if any.
- k. Interconnection Application: Completion of one of the two applicable Commission-approved forms in Exhibit A of Appendix II or II-A hereto, or other Company-approved application for interconnection of a Generating Facility governed by Rule 14H submitted to the Company for interconnection of a Generating Facility.
- l. Interconnection Facilities: The electrical wires, switches and related equipment that are required in addition to the facilities required to provide electric distribution service to a Customer to allow interconnection. Interconnection Facilities may be located on either side of the Point of Interconnection as appropriate to their purpose and design. Interconnection Facilities may be integral to a Generating Facility or provided separately.

⁴ Acceptance of the communications channel depends upon the speed of the operation, availability (up time), reliability, security, and type of electrical interface equipment used. The criteria for selecting the type of acceptable communications are the levels of guaranteed priority for restoration response, maintenance, and system upgrades in order to maximize availability, reliability, and security. Other technical communications channel requirements are determined by the manufacturers of the electrical interface equipment used.

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- m. Interconnection Requirements Study (or "IRS"): Pursuant to Appendix III, Section 4, a study to establish the requirements for interconnection of a Generating Facility with the Company's Distribution System.
- n. Inverter System: A machine, device, or system that changes direct-current power to alternating-current power.
- o. Line Section: The portion of the Company's Distribution System connected to a Customer bounded by automatic sectionalizing devices, or the end of a distribution line. Where a radial distribution circuit does not have automatic sectionalizing devices, the whole circuit is considered one line section. A fuse must be manually replaced and is therefore not considered an automatic sectionalizing device.
- p. Mandatory Operation: The Generating Facility operates at maximum available current without tripping during the utility's Transmission or Distribution System excursions outside the region of continuous operation. Any functions that protect the Advanced Inverter from damage may operate as needed.
- q. 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. The network system is designed to provide higher reliability for customers connected to it.
- r. Parallel Operation: The operation of a Distributed Generating Facility, while interconnected, such that customer load can be fed by the Distributed Generating Facility and Distribution System simultaneously.
- s. Permissive Operation: The Generating Facility is allowed, but not required, to operate at any current level.
- t. Point of Interconnection: The point at which the utility and the customer interface occurs.
- u. Short Circuit Contribution Ratio (SCCR): The SCCR evaluates the short circuit current contribution of the Generating Facility in two ways. First the SCCR looks at the ratio of the Generating Facility short circuit contribution to the short circuit contribution of the utility system for a three-phase fault at the high voltage side of the customer or utility transformer connecting the generating facility to the utility (aggregate SCCR must be less than or equal to 10%). Second, it compares the Generating Facility short circuit current to the interrupt rating of the customer's service panel to ensure that the customer's equipment will not be overloaded.

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sv. Simplified Interconnection: Interconnection conforming to the Initial Technical Review requirements of Appendix III, Section 2 and 3.

tw. Subtransmission System: All electrical wires, equipment, and other facilities at the subtransmission voltage levels (such as 46kV, 35kV, or 23kV) owned or provided by the utility, through which the utility provides electrical service to its customers.

ux. Supervisory Control: Remote monitoring and/or control of a generating facility's power output and interrupting device status by means of a communication channel (see footnote number 2) that is acceptable to the utility.

vy. Supplemental Review: Pursuant to Appendix III, Section 3, a process wherein the Company further reviews an Interconnection Application that fails one or more of the Initial Technical Review screens. The intent of the Supplemental Review is to provide a slightly more detailed review of only the conditions that cause the Generating Facility generator to fail the Initial Technical Review. The Supplemental Review may result in one of the following: a) approval of interconnection; b) approval of interconnection with additional requirements; or c) cost and schedule for an Interconnection Requirements Study.

wz. Synchronous Generator: A rotating machine generator that converts mechanical power into electrical power, in which the rotor current creating the magnetic field comes from a separate DC source or the generator itself.

xza. Transmission System: All electrical wires, equipment, and other facilities at the transmission voltage levels (such as 138kV or 69kV) owned or provided by the utility, through which the utility provides electrical service to its customers.

yzb. Unintended Islanding: Islanding is a condition in which one or more generating facilities deliver power to a utility customer or customers using a portion of the utility's distribution system that is electrically isolated from the remainder of the utility's distribution system. Unintended islanding may occur following an unanticipated loss of a portion of the utility distribution system.

zc. Utility-grade Protective Equipment: Protective equipment that meet requirements defined by:

- ANSI/IEEE C37.90-1989 IEEE Standards for Relays and Relay Systems Associated with Electric Power Apparatus
- IEEE C37.90.1 IEEE Standard Surge Withstand Capability (SWC) Tests for Protective Relays and Relay Systems
- IEEE C37.90.2 IEEE Trial-Use Standard Withstand Capability of Relay Systems to Radiated Electromagnetic Interference from Transceivers

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2. General Interconnection Guidelines

- a. **Compliance with Laws and Codes:** The generating facility, protection, interconnection equipment, design, and design drawings shall meet all applicable national, state, and local laws, including construction and safety codes. The following construction and safety codes shall be followed for the design and construction of all distributed generating facility installations to ensure the safety of the public, customer, and utility personnel. These codes include, but are not limited to, the following:
- National Electric Code (NEC)
 - National Electrical Safety Code (NESC)
 - National Fire Protection Association (NFPA) Building Code
 - City & County of Honolulu Building Code
 - Uniform Building Code (UBC)
 - American Concrete Institute (ACI)
 - American Institute of Steel Construction (AISC)
 - American Association of State Highways & Transportation Officials (AASHTO)
- b. **Notification for Supplemental Review:** With regard to the potential need for Supplemental Review referenced in various sections of this Appendix I, as described in section 1 of Appendix III (Interconnection Process Overview) to Rule 14H, upon Company's determination that Supplemental Review will be required based on the results of the Initial Technical Review, the Company shall notify the customer in writing within fifteen (15) business days, or such other period as is mutually agreed upon in writing between the Company and the customer, following the Initial Technical Review or any Supplemental Review required and the reasons for such review.
- c. **Export of Power:** Generating facilities intending to export power to the utility that will cause a reversal of power flow at any voltage regulation device that is not bi-directional may require Supplemental Review or an IRS that will be completed by the Company to evaluate the impacts on equipment ratings and protective relay settings. If an IRS is required, analyses such as a Feeder Load Flow, Dynamic Stability Analysis, Transient Overvoltage, Short Circuit and Relay Coordination may need to be performed in order to evaluate the impacts of the export of power on equipment ratings and protective relay settings. Generating facilities that export power to the utility system may change the direction of power flow on the utility system. The magnitude of the change in power flow will be a function of the aggregate amount of export power on a feeder, the location of the generating facilities exporting power on a feeder, the feeder load, and the location of loads on a feeder. The need for an IRS will depend on these factors.

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- d. Utility Feeder Penetration: As the penetration of generating capacity increases on the utility distribution feeder, there is increased risk of voltage regulation problems, adverse interactions with the utility's protection system, and unintended islanding. Therefore, Supplemental Review to examine the risk of voltage regulation problems, protection malfunction from reverse power flow, and unintended islanding may be required when the aggregate generating capacity per distribution line section exceeds 15% of the annual peak KVA load of the line section. If an IRS is required, analyses such as a Feeder Load Flow, Dynamic Stability Analysis, Transient Overvoltage, Short Circuit and Relay Coordination may need to be performed in order to evaluate the risk of voltage regulation problems, protection malfunction from reverse power flow and unintended islanding. The need for an IRS will be identified by the Company during Supplemental Review.

To avoid excessive unbalanced loading on the utility distribution feeder, interconnection of 1-phase generating facilities with a capacity greater than 10kW shall be reviewed by the Company in its Initial Technical Review. Based upon the results of the Initial Technical Review, the Company may determine that Supplemental Review is necessary.

- e. Short Circuit Contribution Ratio (SCCR): A generating facility's short circuit current contribution to the utility distribution feeder can affect operation of existing utility protective devices. A good indicator of the potential impact of a generating facility's short circuit contribution is the Short Circuit Contribution Ratio. To ensure the operation of existing utility protective devices are not compromised, Supplemental Review will be required if the sum of the SCCR of all Generating Facilities on the Distribution System circuit exceeds 10% when measured at the primary side of a dedicated distribution transformer, or the short circuit contribution of the proposed generating facility is greater than 2.5% of the interrupting rating of the ~~Customer-Generator's~~~~Producer's~~ Service Equipment when measured at secondary side of a shared distribution transformer. Analyses such as Short Circuit and Relay Coordination may need to be performed. The need for such analysis will be identified by the Company during Supplemental Review.
- f. Network Interconnection: Connection of generating facilities on utility distribution network systems shall be reviewed by the Company in its Initial Technical Review of the impact of the distributed generating facility on the Company's system. Based upon the results of the Initial Technical Review, the Company may determine that Supplemental Review of the network interconnection is necessary.
- g. Interconnection of Generating Facility: Once any generating facility has been interconnected to the Company's system, the Company reserves the right to

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require the installation of, or modifications to, equipment determined by the utility to be necessary to facilitate the delivery of reliable electric service to its customers, 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.

3. Design Requirements

- a. Integration with Utility Grounding and Ground System Protection: The grounding scheme and the ground fault protection of the generating facility shall be coordinated with the utility system to ensure a ground fault is properly cleared on the utility system. Any ground faults detected by the utility protection scheme (for faults on the utility feeder between the utility substation and the generating facility) must also be detected by the protection scheme of the generating facility. For a single line to ground fault on the connecting utility feeder, the generating facility's ground fault protection must be sufficient to prevent damage to the utility system and other customer equipment due to overvoltage caused by ferroresonance, displaced neutral, or self-excitation. The generating facility must disconnect before the utility breaker recloses automatically.
- b. Transformer Winding Configuration: The transformer winding configuration of the customer or utility distribution transformer serving the generating facility shall be reviewed by the Company in its Initial Technical Review to determine the potential impact to the utility system and generating facility, and subsequent interconnection requirements. Refer to typical single-line diagrams in Figures 1-3. Based upon the results of the Line Configuration Screen of the Initial Technical Review, the Company may determine that Supplemental Review of the transformer winding configuration is necessary.
- c. Isolation Device: The customer shall furnish and install a manual isolation device that has a visible break to isolate their generating facility from the utility distribution system. The isolation device shall either be a disconnect switch or a breaker with rack-out capability. The device must be accessible to utility personnel and be capable of being locked by utility personnel in the open position. For generating facilities that do not have a circuit breaker or interrupting device, the isolation device must be capable of interrupting load. An existing service disconnect device may be used if it meets these requirements. Attach a label indicating "Customer Generating Facility" to the generator isolation device.
- d. Interrupting Device: Applicable circuit breakers or interrupting devices at the generating facility must be capable of interrupting the maximum available fault current at the site, including any contribution from the generating facility. For generating facilities that are greater than 10kW, the interrupting device must be accessible to utility personnel at all times.

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- e. Dedicated Transformer: The utility may require the generating facility to install a dedicated transformer, where the generating facility is served from the same transformer secondary as another utility customer and if inverter-based

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Transmittal Letter Dated December 22, 2011.

technology is used that does not meet IEEE 519-1992 (or latest versions) specifications. A dedicated transformer or other current-limiting device is needed for any type of generating facility where the increase in available short circuit current could adversely impact other utility customers on the same secondary circuit (i.e., the short circuit contribution of the generating facility must not increase the available short circuit current to the other utility customers on the same secondary circuit such that the ratings of their equipment and protective devices are exceeded). Based upon the results of the Initial Technical Review or Supplemental Review, the Company shall determine whether an adverse impact may occur and whether a dedicated transformer is necessary. In accordance with Section 1.c of Appendix III, the Company shall provide the customer with final results of all technical screenings and Supplemental Review in writing, and shall notify the customer of such determination and the reasons for such determination as part of the written results.

- f. Supervisory Control: For generating facilities with an aggregate capacity greater than 1MW, computerized supervisory control shall be required to ensure the safety of working personnel and prompt response to system abnormalities in case of islanding of the generating facility. Supervisory control may be required for generating facilities with an aggregate capacity greater than 250 kW and up to 1 MW, but shall not be required for generating facilities with an aggregate capacity of 250 kW or less.

Supervisory control shall include monitoring of: (a) gross generation by the generating facility; (b) feedback of Watts, Vars, WattHours, current and voltage; (c) Vars furnished by the utility; and (d) status of the interrupting device. In addition, the supervisory control will allow the utility to trip the interrupting device during emergency conditions.⁵ Monitoring will be performed by system dispatchers or operators at the Company's control center.

⁵ 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 generating facility is interfering with the Company's equipment or equipment belonging to other customers (including non-utility generating equipment);
The generating facility's protective devices have been tampered with by the customer and/or owner and/or operator of the generating facility; 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.

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- g. Surge Capability: The generating facility interconnection equipment and relays shall have the capability to withstand voltage and current surges in accordance with IEEE/ANSI Standard C62.41 or IEEE Standard C37.90.1 as appropriate.
- h. Equipment Testing: The generating facility shall provide to the utility the manufacturer's brochures/instruction manuals and technical specifications of their proposed generating facility equipment, and test reports for evaluation by the utility.

In addition, verification tests of customer-owned equipment shall be performed on-site by customer to verify protective settings and functionality to ensure that the equipment will not adversely affect the utility distribution system and that it will cease providing power to the system under abnormal conditions. A verification test shall be performed upon initial parallel operation of the generating facility, or whenever interface hardware or software is changed that can affect the protective functions. These tests shall be done by a qualified individual (hired or employed by the customer) in accordance with the manufacturer's recommended test procedure and in concurrence with the utility. Qualified individuals include professional engineers, factory trained and certified technicians, and licensed electricians with experience in testing protective equipment.⁶ To ensure that verification tests of customer-owned equipment are performed correctly, the utility may request to witness the tests and receive written certification of the results from the qualified individual. The customer must inform the Company in writing of proposed changes in the customer's interconnection hardware or software that are related to the performance, operation, or timing of the protective functions not later than fifteen (15) business days prior to implementation of such changes. Upon receiving notice of such proposed changes from the customer, the Company must notify the customer in writing of any concerns regarding the proposed changes within fifteen (15) business days, in which case the changes shall not be implemented until the customer and Company resolve the concerns to their mutual satisfaction and document the resolution in writing.

All interconnection-related protective functions and transfer trip schemes, if applicable, shall be periodically tested at intervals specified by the manufacturer, or in accordance with industry practice. (When the interval is not specified by the manufacturer or by the Company, protective functions should be tested every four years.) The customer shall submit or make available for inspection by the utility, test reports of such testing. Periodic testing conforming to the utility test intervals for the particular line section can be specified by the utility under special circumstances (e.g., where the generating facility is connected to a utility feeder that has experienced high frequency of outages due to natural or unnatural

⁶ Also see the Standard Interconnection Agreement, Exhibit B, paragraph 2.a. (Sheet No. 34C-19).
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causes such as in coastal areas where there are high winds). The Company will determine whether special circumstances exist, and must inform the customer in writing of any such determination and the reasons for that determination. A system that depends upon a battery for trip power shall be checked and logged once per month for proper voltage, or monitored continuously.

4. Operating Requirements

This Section 4 shall continue to be used for interconnection applications received with inverter based technologies until December 31, 2015, with the exception of interconnection requirements for frequency and voltage ride through (Section 4.g. and 4.h.). Beginning October 1, 2015, interconnection applications must comply with the frequency and voltage ride through requirements specified in Section 4A.g. and 4A.h., below.

Interconnection applications received with inverter based technologies after December 31, 2015 shall comply with section 4A in its entirety. Until such date, Section 4A, may be used in its entirety, or in part, for inverter based technologies by mutual agreement of the utility and the Applicant.

- a. **Disconnection of Generating Facility for Utility Reasons:** Upon providing reasonable notice (generally not to be less than ten (10) business days for scheduled work), the utility may require the generating facility to temporarily disconnect from the utility's system when necessary for the utility to construct, install, maintain, repair, replace, remove, investigate, test, or inspect any of its equipment or other utility customer's equipment, or any part of its system. The generating facility shall not energize a de-energized utility line under any circumstances, but may operate isolated from the utility system with an open tie point in accordance with Section 4.i.

If the utility determines that such disconnection is necessary because of unexpected system emergencies, forced outages, operating conditions on the utility's system, or compliance with good engineering practices as determined by the Company's engineers and/or operations personnel, the Company will immediately attempt to notify, in person, by telephone, by electronic mail, or by facsimile, the customer's designated representatives of the need to disconnect the customer's generating facility. Unless the emergency condition requires immediate disconnection as determined by the utility, the Company shall allow sufficient time for the generating facility operator to manually disconnect the generator. (As stated in Section 4.b below, there are circumstances where the utility may disconnect the generating facility without prior notice to the Customer.)

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Following the completion of work and/or rectification of the emergency conditions by the utility, the utility shall reset the Customer's isolation device, if open, as soon as practicable and shall provide, within fifteen (15) business days or such other period as is mutually agreed upon in writing by the utility and the customer, written documentation of the occurrence and nature of the utility's work and/or emergency condition, and the disconnection of the customer's generating facility.

The utility shall take reasonable steps to minimize the number and duration of such disconnections. The utility may disconnect the customer from the utility's system for failure by the customer to disconnect their generating facility under this Section 4.a, until such time that the utility work or emergency condition has been corrected and the normal system condition has been restored.

The generating facility may be disconnected by the utility at the facility location or remotely by supervisory control, if available.

- b. Personnel and System Safety: The utility may disconnect the generating facility from the utility's system, without prior notice to the customer: (a) to eliminate conditions that constitute a potential hazard to the utility's personnel or the general public; (b) if pre-emergency⁷ or emergency conditions⁵ exist on the utility system; (c) if a hazardous condition relating to the generating facility is observed by the utility's inspection; (d) if the generating facility interferes with the utility's equipment or equipment belonging to other utility customers (including non-utility generating equipment); or (e) if the customer or a party with whom the customer has contracted for ownership and/or operation of the generating facility has tampered with any protective device. The generating facility shall remain disconnected until such time as the utility is satisfied that the endangering condition(s) has been corrected, and the utility shall not be obligated to allow parallel operation of the generating facility during such period. If the utility disconnects the generating facility under this Section 4.b, it shall as soon as practicable notify the customer in person, by telephone, by electronic mail, or by facsimile and provide the reason(s) why the generating facility was disconnected from the Company's system. Following the rectification of the endangering conditions, the utility shall provide, within fifteen (15) business days or such other period as is mutually agreed upon in writing by the utility and the customer, written documentation of the occurrence and nature of the endangering conditions, and the disconnection of the customer's generating facility.

The generating facility may be disconnected by the utility at the facility location or remotely by supervisory control, if available.

- c. Synchronization: Upon connection, the generating facility shall synchronize with the utility distribution system. Synchronization means that at the Point of

⁷ Pre-emergency conditions refer to the need for immediate action in response to a situation that has the potential to cause injury, loss of life, or property damage.

Interconnection, the frequency difference shall be less than 0.2 Hz from rated frequency, the voltage difference shall be less than 5% of nominal voltage, and the phase angle difference shall be less than 10 degrees.

- d. Voltage Regulation: Unless specifically requested by the utility, the generating facility shall not attempt to control or regulate the utility system voltage while operating in parallel with the utility distribution system.

The generating facility shall not degrade the normal voltage provided by the utility outside the limits stated in the utility tariff ($\pm 5\%$ of nominal voltage).

- e. Unintended Islanding: For public and utility personnel safety and to prevent possible damage to customer equipment, the generating facility shall be equipped with protective equipment designed to prevent the generating facility from being connected in parallel with a de-energized utility line. The generating facility must automatically disconnect from the utility distribution system upon loss of utility source, and remain disconnected until the voltage and frequency have stabilized (see Section 4.j). Protective device requirements, such as direct transfer trip, grounding bank, or active anti-islanding scheme, shall be determined by the Company based upon the results of the Initial Technical Review and/or Supplemental Review.
- f. Disconnect for Faults: The generating facility shall be equipped with protective equipment designed to automatically disconnect the generating facility from the utility distribution system for faults on the utility distribution circuit to which it is connected, and remain disconnected until the voltage and frequency have stabilized (see Section 4.j).
- g. Voltage Disturbances: The generating facility shall be equipped with protective equipment designed to automatically disconnect the generating facility from the utility distribution system for voltages outside the normal operating range within the clearing time as indicated in the table below, and remain disconnected until the voltage and frequency have stabilized (see Section 4.j). The protective equipment shall measure the RMS (root-mean-square) voltage at the Point of Interconnection.

<u>Voltage (% of base voltage)</u>	<u>Voltage (120V base)</u>	<u>Clearing Time</u>
$V < 50\%$	$V < 60$ volts	10 cycles
$50\% \leq V < 88\%$	$60 \text{ volts} \leq V < 106 \text{ volts}$	120 cycles
$88\% \leq V \leq 110\%$	$106 \text{ volts} \leq V \leq 132 \text{ volts}$	Normal Range
$110\% < V < 120\%$	$132 \text{ volts} < V < 144 \text{ volts}$	60 cycles
$120\% \leq V$	$144 \text{ volts} \leq V$	10 cycles

For generating facilities $\geq 30\text{kW}$, the voltage set points and clearing times shall be adjustable to accommodate utility system requirements.

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Effective December 3, 2011 Effective December 23, 2011

- h. Frequency Disturbances: The generating facility shall be equipped with protective equipment designed to automatically disconnect the generating facility from the utility distribution system when the frequency at the Point of Interconnection deviates outside the utility specified operating range set forth below, and remain disconnected until the voltage and frequency have stabilized (see Section 4.j).

All generating facilities, including those with an aggregate capacity less than 30 kW, shall have frequency setpoints and clearing times selected by the utility and provided below, to coordinate with the utility's system relay settings.

The generating facilities shall set protective equipment to (1) disconnect the generating facility within 10 cycles if the frequency exceeds 60.5 Hz, (2) be capable of time delayed disconnection of 300 seconds with the adjustable

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underfrequency setting set to 57.0 Hz, and (3) disconnect the generating facility within 10 cycles if the frequency is less than 57.0 Hz.

- i. Inadvertent Energization, Operation During Utility System Outage: The generating facility shall not energize a de-energized utility circuit for any reason. The generating facility may be operated isolated from the utility system during a utility outage or system emergency only with an open tie breaker or disconnect device which isolates the generating facility from the utility system. This shall generally be done through manual opening and lockout of the Customer's service breaker or isolation device (required under Section 3.c) by utility personnel prior to starting the generating facility.

Where customers desire the ability to manually or automatically isolate their generating facility from the utility system by themselves, the utility will consider alternative designs proposed by the Customer that will prevent inadvertent energization of a de-energized utility circuit. Such alternative design proposals shall be reviewed and approved in writing by the Company prior to implementation. The utility shall not unreasonably withhold such approval. Upon implementation of an alternative design approved by the Company, the Customer may isolate itself from the utility system during a utility outage and operate its generating facility. Customers' alternative designs may, subject to review and approval by the Company, enable customers to manually or automatically reconnect back to the utility system upon restoration of utility system power, provided that the utility has not locked out the customers' service as described below and subject to the delay requirements specified in Section 4.j.

In certain situations, including any time that utility personnel will be performing work on the distribution system serving the point of interconnection between the utility and Customer, the utility may determine the need to actively verify the open tie point, and to install a Company lock to ensure the safety of utility personnel. The Customer shall provide access to the isolation device required under Section 3.c for utility personnel to visually confirm the open tie point and install a Company lock if necessary. Following restoration of grid power or rectification of the emergency condition, the utility personnel shall, as soon as practicable, remove the Company lock to allow reconnection of the generating facility with the utility system.

Generators that do not operate in parallel to the utility's distribution system at any time and which are therefore not covered under an interconnection agreement may be operated by Customer at their discretion.

- j. Required Delay on Reconnection: The generating facility shall be equipped with automatic means to prevent reconnection of the generating facility with the utility distribution system until the utility service voltage and frequency are within the

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utility tariff normal operating ranges and stable for at least 5 minutes, unless earlier directed by the utility.

- k. Loss of Protection: Failure of the generating facility interconnection protection equipment, including loss of control power, shall result in the automatic disconnection of the generating facility from the utility distribution system until such time that the interconnection protection equipment has been restored. Such failure shall initiate a signal to trip a generating facility circuit breaker or shutdown an inverter. In the case of failure of Company-owned protection equipment, following the rectification of the loss of protection, the utility shall provide, within fifteen (15) business days or such other period as is mutually agreed upon in writing by the utility and the customer, written documentation of the occurrence, and the disconnection of the customer's generating facility.
- l. Reclosing Coordination: The generating facility shall be coordinated with the utility system reclosing devices, by disconnecting from the utility distribution system within the first reclose interval and remaining disconnected until the voltage and frequency have stabilized (see Section 4.j).
- m. Power Factor: The generating facility shall not adversely impact the power factor at the Point of Interconnection. Generating facilities shall operate at a power factor ≥ 0.85 (lagging or leading).

Operation outside this range is acceptable provided the reactive power of the generating facility is used to meet the reactive power needs of the customer's internal loads or that reactive power is otherwise provided under utility tariff, and it does not adversely impact the utility system voltage as specified in Section 4.d. above.

- n. Voltage Flicker: Any voltage flicker at the Point of Interconnection caused by the generating facility shall not exceed the limits defined by the "Borderline of Visibility Curve" identified in IEEE Standard 519-1992 "Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems" (or latest version). This requirement is necessary to minimize the adverse voltage effects upon other utility customers on the utility distribution system.
- o. Harmonics: Harmonic distortion at the Point of Interconnection caused by the generating facility shall not exceed the limits stated in IEEE Standard 519-1992 "Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems" (or latest version). The customer is responsible for the installation of any necessary controls or hardware to limit the voltage and current harmonics generated from their generating facility to levels defined in IEEE Standard 519-1992.

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- p. Direct Current Injection: The generating facility shall not inject DC current greater than 0.5% of the full rated output current into the utility distribution system at the Point of Interconnection under either normal or abnormal operating conditions. This applies primarily to generating facilities that use an inverter to interconnect with the utility system.
- q. Protection from Electromagnetic Interference (Immunity Protection): The influence of electromagnetic interference (EMI) shall not result in a change in state or misoperation of the generating facility interconnection system.
- r. Disconnection of Customer Generating Facilities: Except as otherwise provided herein, the disconnection of a customer's generating facility shall not be subject to standby charges provided that the disconnection was caused by the utility or by the failure of the utility's equipment, or the disconnection was requested or required by the utility due to reasons other than problems caused by the customer's generating facility. The procedure for determining the applicability of standby charges to a disconnection event shall be specified in the Company's Schedule SS Standby Service tariff.

4A. Advanced Inverter Generating Facility Design And Operating Requirements

Section 4 (Operating Requirements) above shall continue to be used for interconnection applications received with inverter based technologies until December 31, 2015, with the exception of requirements for frequency and voltage ride through (Sections 4A.g. and 4A.h.), which are required as of October 1, 2015.

Interconnection applications received with inverter based technologies after December 31, 2015 shall (1) comply with section 4A and be certified to UL-1741 Supplement SA, or (2) upon interconnection approval, comply with fixed power factor (Section 4A, part m), voltage ride-through (Section 4A, Part g)⁸, and frequency ride-through (Section 4A, part h)⁸, with the capability to be updated, at the expense of the Generating Facility Owner, with the remaining Advanced Inverter requirements (Volt/Var Operations – Section 4A, Part s, Ramp Rate Requirements – Section 4A, Part t, Remote Reconnect/Disconnect – Section 4A, Part u, Remote Configurability – Section 4A, Part v, Default Activation States for Phase 1 Functions – Section 4A, Part w) set forth in section 4A no later than twelve (12) months after the date the Supplement SA of UL-1741 is approved by the full UL-1741 Standards Technical Panel (STP). Following such date, Section 4A shall apply for interconnection of all inverter based technologies. Until

⁸ If not immediately available upon interconnection approval, compliance of volt-watt and frequency-watt functionality may be implemented twelve months after the date the Supplement SA of UL-1741 is approved by the full UL-1741 Standards Technical Panel (STP).

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such date, Section 4A, may be used in all or in part, for inverter based technologies by mutual agreement of the utility and the Applicant.

The inverter requirements are intended to be consistent with ANSI/IEEE 1547-2003 and 1547a Standard for Interconnecting Distributed Resources with Electric Power Systems (IEEE 1547 including amendment 1547a). In the event of conflict between this Rule and IEEE 1547-2003, this Rule shall take precedence. Exceptions are taken to IEEE 1547 Clauses 4.1.4.2 Distribution Secondary Spot Networks and Clauses 4.1.8.1 or 5.1.3.1, which address Protection from Electromagnetic Interference.

PREVENTION OF INTERFERENCE

Customer-Generator shall not operate Advanced Inverters that superimpose a voltage or current upon the utility's Distribution or Transmission System that interferes with utility operations, service to utility Customers, or communication facilities. If such interference occurs, Customer-Generator must diligently pursue and take corrective action at its own expense after being given notice and reasonable time to do so by utility. If Customer-Generator does not take corrective action in a timely manner, or continues to operate the facilities causing interference without restriction or limit, utility may, without liability, disconnect Customer-Generator's facilities from the utility's Distribution or Transmission System, in accordance with Section 4.b of this Rule. To eliminate undesirable interference caused by its operation, each Advanced Inverter shall meet the following criteria:

- a. Disconnection of Generating Facility for Utility Reasons: See Section 4.a.
- b. Personnel and System Safety: See Section 4.b.
- c. Synchronization: See Section 4.c.
- d. Voltage Regulation: If approved by the utility, the Advanced Inverter may actively regulate the voltage at the Point of Interconnection while in parallel with the utility's Distribution System. The Advanced Inverter shall not cause the service voltage at other customers to go outside the requirements of ANSI C84.1-1995, Range A (IEEE 1547-4.1.1).
- e. Unintended Islanding: See Section 4.e.
- f. Disconnection for Faults: See Section 4.f.
- g. Voltage Trip and Ride-Through Settings: The voltage ranges in Table 4a.g define protective trip limits for the Protective Function and are not intended to define or imply a voltage regulation function. Generating Facilities shall cease to energize

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utility Distribution System within the prescribed trip time whenever the voltage at the Point of Interconnection deviates from the allowable voltage operating range. The protection function shall detect and respond to voltage on all phases to which the Generating Facility is connected.

(i) Advanced Inverters: Advanced Inverters shall be capable of operating within the voltage range normally experienced on the utility Distribution System from plus 5% to minus 5% of the nominal voltage (e.g. 126 volts to 114 volts, on a 120 volt base), at the service panel or Point of Interconnection. The trip settings at the generator terminals may be selected in a manner that minimizes nuisance tripping in accordance with Table 4a.g to compensate for voltage drop between the generator terminals and the Point of Interconnection. Voltage may be detected at either the generator terminals or the Point of Interconnection. However, the voltage range at the Point of Interconnection, with the generator on-line, shall stay within +/-5% of nominal.

(ii) Voltage Disturbances: Whenever the utility Distribution System voltage at the Point of Interconnection varies from and remains outside the normal operating high and normal operating low region voltage for the predetermined parameters set forth in Table 4a.g, the Advanced Inverter's protective functions shall cause the Advanced Inverter(s) to cease to energize the utility Distribution System. Unless provided alternate settings by the Company, all inverter-based Generating Facilities must comply with the standard voltage ride-through and trip settings specified in Table 4a.g:

1. The Advanced Inverter shall stay connected to the utility Transmission or Distribution System while the grid remains within the "Ride-Through Until" voltage-time range and must operate in accordance with the "Operating Mode" specified for each "Operating Region".
2. In the NORH region, the Advanced Inverter shall continue to operate at full available power or may reduce power output as a function of voltage, in accordance with section (iii) Volt-Watt.
3. Different settings than that specified in Table 4a.g, and section (iii) Volt-Watt may be specified by the utility.

Table 4a.g: Voltage Ride-Through Table

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Operating Region	Voltage at Point of Interconnection (% Nominal Voltage)	Ride-Through Until	Operating Mode	Maximum Trip Time	Return To Service - Trip Criteria (V) Time Delay (s)	
Over-Voltage 2 (OVR2)	$V > 120$	No Ride Through		0.16** seconds	$110 \geq V \geq 88$	300 - 600*
Over-Voltage 1 (OVR1)	$120 \geq V > 110$	0.92 seconds	Mandatory Operation	1 second	$110 \geq V \geq 88$	300 - 600*
Normal Operation High (NORH)	$110 \geq V > 100$	Indefinite	Continuous Operation	Indefinite	Not Applicable	Not Applicable
Normal Operation Low (NORL)	$100 > V \geq 88$	Indefinite	Continuous Operation	Indefinite	Not Applicable	Not Applicable
Under-Voltage 1 (UVR1)	$88 > V \geq 70$	20 seconds	Mandatory Operation	21 seconds	$110 \geq V \geq 88$	300 - 600*
Under-Voltage 2 (UVR2)	$70 > V \geq 50$	10-20* seconds	Mandatory Operation	11-21* seconds	$110 \geq V \geq 88$	300 - 600*
Under-Voltage 3 (UVR3)	$50 > V$	No Ride Through	Permissive Operation	0.5 seconds	$110 \geq V \geq 88$	300 - 600*

* May be adjusted within these ranges at manufacturer's discretion.

** Must trip time under steady state condition. Inverters will also be required to meet the Companies transient overvoltage criterion (TrOV-2).

(iii) Volt-Watt: The Advanced Inverter shall be capable of modulating active power output (on a percentage basis of nominal rated watt output) when the voltage at the Point of Interconnection is above the Volt/Watt start voltage in accordance with the parameters set forth in the table below.

Parameter	Default Setting	Minimum Range of Adjustability
Start Voltage (% of nominal)	106	105 to 120
Reduction Gradient (% P_{nom} /%V)	0	0 to -100
Time Constant (s) ⁹	60	3 to 90

h. Frequency Disturbances: The utility controls system frequency, and the Generating Facility shall operate in synchronism with the utility Distribution or Transmission System. Whenever the utility Distribution or Transmission System frequency at the Point of Interconnection varies from and remains outside normal (nominally 60 Hz) by the predetermined amounts set forth in Table 4a.h, the Generating Facility's protective functions shall cease to energize the utility Distribution or Transmission System within the stated maximum trip time. Unless provided alternate settings by the Company, all inverter-based

⁹ The time constant is for a simple first order low-pass filter

Generating Facilities must comply with the standard frequency ride-through and trip settings specified in Table 4a.h

(i) Frequency Ride-Through Requirements: Advanced Inverter based systems shall remain connected to the utility Distribution or Transmission System while the grid is within the frequency-time range indicated in Table 4a.h, and shall disconnect from the electric grid during a high or low frequency event that is outside that frequency-time range. The frequency values are shown in Table 4a.h. These values provide default interconnection system response to abnormal frequencies. The inverter shall disconnect by the default clearing times. The Advanced Inverter is permitted to reduce real power output as a function of frequency in accordance with section (iii) Frequency-Watt. Islands and microgrids may need different default frequency settings.

Table 4a.h: Frequency Ride-Through Table (Oahu, Maui, Hawai'i Island)

Operating Region	System Frequency Default Settings (Hz)	Minimum Range of Adjustability	Ride-Through Until	Operating Mode	Maximum Trip Time	Return To Service - Trip Criteria (f, Hz) Time Delay (s)	
Over-Frequency 2 (OFR2)	$f > 64.0$	60.1 - 65.0	No Ride Through	Permissive Operation	0.16 seconds	$60.1 \geq f \geq 59.9$	300 - 600*
Over-Frequency 1 (OFR1)	$64.0 \geq f > 63.0$	60.1 - 65.0	20 seconds	Mandatory Operation	21 seconds	$60.1 \geq f \geq 59.9$	300 - 600*
Normal Operation High (NORH)	$63.0 \geq f > 60.0$	Not Applicable	Indefinite	Continuous Operation	Not Applicable	Not Applicable	Not Applicable
Normal Operation Low (NORL)	$60.0 \geq f \geq 57.0$	Not Applicable	Indefinite	Continuous Operation	Not Applicable	Not Applicable	Not Applicable
Under-Frequency 1 (UFR1)	$57.0 > f \geq 56.0$	57.0 - 59.9	20 seconds	Mandatory Operation	21 seconds	$60.1 \geq f \geq 59.9$	300 - 600*
Under-Frequency 2 (UFR2)	$56.0 > f$	53.0 - 57.0	No Ride Through	Permissive Operation	0.16 seconds	$60.1 \geq f \geq 59.9$	300 - 600*

Commented [PDC1]: Return to service criteria not approved.

* May be adjusted within these ranges at manufacturer's discretion.

Note: Return to service may be adjusted to $60.3 \geq f \geq 59.7$ Hz upon mutual agreement between the Customer-Generator and the utility

Table 4a.h: Frequency Ride-Through Table (Molokai, Lanai)

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Operating Region	System Frequency Default Settings (Hz)	Minimum Range of Adjustability	Ride-Through Until	Operating Mode	Maximum Trip Time	Return To Service - Trip Criteria (f, Hz) Time Delay (s)	
Over-Frequency 2 (OFR2)	$f > 65.0$	60.1 - 65.0	No Ride Through	Permissive Operation	0.16 seconds	$60.1 \geq f \geq 59.9$	300 - 600*
Over-Frequency 1 (OFR1)	$65.0 \geq f > 63.0$	60.1 - 65.0	20 seconds	Mandatory Operation	21 seconds	$60.1 \geq f \geq 59.9$	300 - 600*
Normal Operation High (NORH)	$63.0 \geq f > 60.0$	Not Applicable	Indefinite	Continuous Operation	Not Applicable	Not Applicable	Not Applicable
Normal Operation Low (NORL)	$60.0 \geq f \geq 57.0$	Not Applicable	Indefinite	Continuous Operation	Not Applicable	Not Applicable	Not Applicable
Under-Frequency 1 (UFR1)	$57.0 > f \geq 50.0$	57.0 - 59.9	20 seconds	Mandatory Operation	21 seconds	$60.1 \geq f \geq 59.9$	300 - 600*
Under-Frequency 2 (UFR2)	$50.0 > f$	50.0 - 57.0	No Ride Through	Permissive Operation	0.16 seconds	$60.1 \geq f \geq 59.9$	300 - 600*

Commented [PDC2]: Return to service criteria not approved.

* May be adjusted within these ranges at manufacturer's discretion.

Note: Return to service may be adjusted to $60.3 \geq f \geq 59.7$ Hz upon mutual agreement between the Producer and the utility

(ii) Frequency-Watt: The Advanced Inverter shall modulate real power when the frequency at the Point of Interconnection is above the frequency/watt start frequency in accordance with the parameters set forth in the table below. The power reduction shall be on a percentage basis of the momentary real power (P_M) existing at the time the start frequency is exceeded. If frequency returns to below the start frequency value and more power is available than the previous momentary power (P_M), the increase in real power shall be limited to the normal ramp rate

Parameter	Default Setting	Minimum Range of Adjustability
Start Frequency (Hz)	60.5	60.1 to 65.0
Reduction Gradient (% P_M /Hz)	0	0 to -100

i. Inadvertent Energization, Operation During Utility System Outage: See Section 4.i.

j. Required Delay on Reconnection: See Section 4.j.

k. Loss of Protection: See over existing provision from Section 4.k.

l. Reclosing Coordination: See Section 4.l.

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m. Fixed Power Factor: Customer-Generator shall provide adequate reactive power compensation on site to maintain the Advanced Inverter power factor at the default setting at rated output or a utility specified power factor in accordance with the following requirements:

- (i) Default Power Factor setting: -0.95 lagging (absorbing) +/- 0.01 (-0.94 lagging to -0.96 lagging).
- (ii) Aggregate generating facility is greater than 15 kW: Adjustable range 1.0 +/- 0.15 (0.85 Lagging to 0.85 Leading) down to 20% rated power.
- (iii) Aggregate generating facility is less than or equal to 15 kW: Adjustable range 1.0 +/- 0.10 (0.90 Lagging to 0.90 Leading) down to 20% rated power.

n. Voltage Flicker: See Section 4.n.

o. Harmonics: See Section 4.o.

p. Direct Current Injection: See Section 4.p.

q. Protection from Electromagnetic Interference (Immunity Protection): See Section 4.q.

r. Disconnection of Customer Generating Facilities: See Section 4.r.

s. Volt/VAR Operations: The Advanced Inverter shall be capable of operating within a power factor range of +/- 0.85 PF for larger (>15 kW) systems, down to 20% of rated power, and +/- 0.9 PF for smaller systems (≤15 kW), down to 20% of rated power. This Volt/VAR capability shall be able to be activated or deactivated in accordance with utility requirements. By mutual agreement between the Customer-Generator and the utility, the Advanced Inverter system may operate in larger power factor ranges, including in 4-quadrant operations for storage systems, with the implementation of additional anti-islanding protection as determined by the utility.

The Advanced Inverter shall be capable of providing dynamic reactive power compensation (Volt/VAR operation) within the following constraints:

- The Advanced Inverter shall not cause the line voltage at the point of interconnection to go outside the requirements of the latest version of ANSI C84.1, Range A.

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- The Advanced Inverter shall be able to consume reactive power in response to an increase in line voltage, and produce reactive power in response to a decrease in line voltage.
- The maximum reactive power provided to the system shall be as directed by the utility.
- t. Ramp Rate Requirements: The Advanced Inverter is required to have the following ramp controls for at least the following two conditions. These functions may be established by multiple control functions or by one general ramp rate control function. Ramp rates are contingent upon sufficient energy available from the Advanced Inverter.
 - Normal ramp-up rate: For transitions between energy output levels over the normal course of operation. The default value is 100% of maximum current output per second with a range of adjustment between 1% to 100%, with specific settings as mutually agreed by the utility and the Customer-Generator.
 - Connect/Reconnect Ramp-up rate: Upon starting to inject power into the grid, following a period of inactivity or a disconnection, the inverter shall be able to control its rate of increase of power from 0.1% to 100% maximum current per second, with specific settings as mutually agreed upon by the utility and the Customer-Generator. The default value is 0.33% maximum current per second.
- u. Remote Reconnect/Disconnect: The Advanced Inverter shall be capable of receiving a remote command directly from the utility, or its agent(s), to reconnect or disconnect the Advanced Inverter from parallel operation pursuant to Section 4.a and 4.b.
- v. Remote Configurability: The Advanced Inverter shall be capable of receiving and implementing remote updates, including but not limited to: Advanced Inverter setting or parameter modifications, activation and deactivation of various Advanced Inverter functions, as required by the utility or its agent(s). The Advanced Inverter shall be capable of reporting current settings.
- w. Default Activation States for Phase 1 Functions: Unless otherwise provided by the utility, the default settings will be as follows:
 - Anti-islanding – activated
 - Low/High Voltage Ride-Through – activated
 - Low/High Frequency Ride-Through – activated
 - Frequency/Watt - deactivated

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- Volt/Watt - activated
- Volt/VAR operations – deactivated
- Ramp rates – activated
- Fixed power factor – activated
- Reconnect by “soft-start” methods – activated

These default activation states may be modified by mutual agreement between the utility and Customer-Generator.

5. Technology Specific Requirements

- a. Three-Phase Synchronous Generators: The generating facility circuit breakers shall be 3-phase devices with electronic or electromechanical control. The customer shall be responsible for properly synchronizing its generating facility with the utility distribution system by means of either a manual or automatic synchronizing function. Automatic synchronizing is required for all synchronous generators which have an SCCR greater than 5%. For a generating facility whose SCCR exceeds 5%, the customer shall provide protective equipment suitable for detecting loss of synchronism and automatically disconnecting the generating facility from the utility distribution system. Unless otherwise agreed to in writing between the utility and customer, synchronous generators shall automatically regulate power factor, not voltage, while operating in parallel with the utility system.
- b. Induction Generators: Induction generators may be connected and brought up to synchronous speed (as an induction motor) if it can be demonstrated that the initial voltage drop measured at the Point of Interconnection is within the visible flicker limits as defined by IEEE 519-1992 (or latest version). The same requirements also apply to induction generation connected at or near synchronous speed because a similar voltage dip is present due to an inrush magnetizing current. The customer shall submit number of starts per specific time period and maximum starting kVA draw data for the utility to verify that the

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voltage dip due to starting is within the visible flicker limits and does not degrade the normal voltage provided by the utility.

Induction generators do not require separate synchronizing equipment. Starting or rapid load fluctuations on induction generators can adversely impact the utility's system voltage. Corrective step-switched capacitors or other techniques may be necessary if the voltage fluctuations measured at the Point of Interconnection are not within the visible flicker limits as defined by IEEE 519-1992 (or latest version). These measures can, in turn, cause ferroresonance. If these measures (additional capacitors) are installed on the customer's side of the Point of Interconnection, the utility will review these measures and may require the customer to install additional protective relaying equipment, provided that the utility provides the customer with written notice of the additional equipment required and the reasons for such determination. The Company will determine whether additional equipment is required to protect the Company's system.

- c. Inverter Systems: Inverter interfaced distributed generators that are to be installed in parallel with the utility distribution system must employ a non-islanding synchronous inverter. The inverter design shall comply with the requirements of IEEE Std 1547 and UL 1741 standards (or latest versions) and be certified to have anti-islanding protection such that the synchronous inverter will automatically disconnect upon a utility system interruption.

Self-commutated inverters of the utility-interactive type shall synchronize to the utility. Inverters capable of stand-alone operation shall not attempt to control the voltage while operating in parallel with the utility distribution system. Line-commutated, thyristor-based inverters are not recommended and will require Supplemental Review or IRS to determine harmonic and reactive power requirements. All interconnected inverter systems shall comply with the harmonic current limits of IEEE Std 519-1992 (or latest version).

6. Protection, Synchronizing, and Control Requirements

- a. Protection Requirements: The generating facility shall, at a minimum, provide adequate protective devices which include over/under voltage trip, over/under frequency trip, reverse power relay (for non-export generating facilities), and a means for automatically disconnecting the generating facility from the utility distribution system whenever a protective device initiates a trip. Based upon the results of the Initial Technical Review and/or Supplemental Review by the Company, additional protective devices may be required. Photovoltaic generating systems are to follow the guidelines set by UL 1741 standard (or latest version). Typical equipment and protective device requirements for large

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synchronous, induction, and inverter generators are illustrated in Figures 1, 2, and 3 respectively in Exhibit A.

- b. Suitable Equipment: All protective devices (described in this document) for generating facilities $\geq 30\text{kW}$ shall be utility-grade (see Definition for "Utility-Grade Protective Equipment") except for inverter-based generating facilities which shall comply with UL 1741 standard (or latest version) and IEEE 1547 (or latest version). The generating facility shall be responsible for identifying the specific models of their protective devices. All protective devices shall be used in accordance with their intended application.
- c. Review of Design Drawings: The following engineering drawings/documents are required for review and approval by the utility prior to construction of the generating facility interconnection. Prior to being submitted to the utility, all drawings/documents shall be approved by a Professional Electrical Engineer registered in the State of Hawaii for generating facilities $\geq 30\text{kW}$. That approval shall be indicated by the presence of the Engineer's Professional seal on all drawings and documents.
- A single-line diagram, relay list, trip scheme and settings of the generating facility, which identifies the Point of Interconnection, circuit breakers, relays, switches, synchronizing equipment, monitoring equipment, and control and protective devices and schemes.
 - A three-line diagram which shows the Point of Interconnection, potential transformer (PT) and current transformer (CT) ratios, and details of the generating facility configuration, including relays, meters and test switches. (Not required for generating facilities $< 30\text{kW}$).

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Superseding SHEET NO. 34B-32
Effective April 18, 2008

REVISED SHEET NO. 34B-32
Effective December 3, 2011

EXHIBIT A

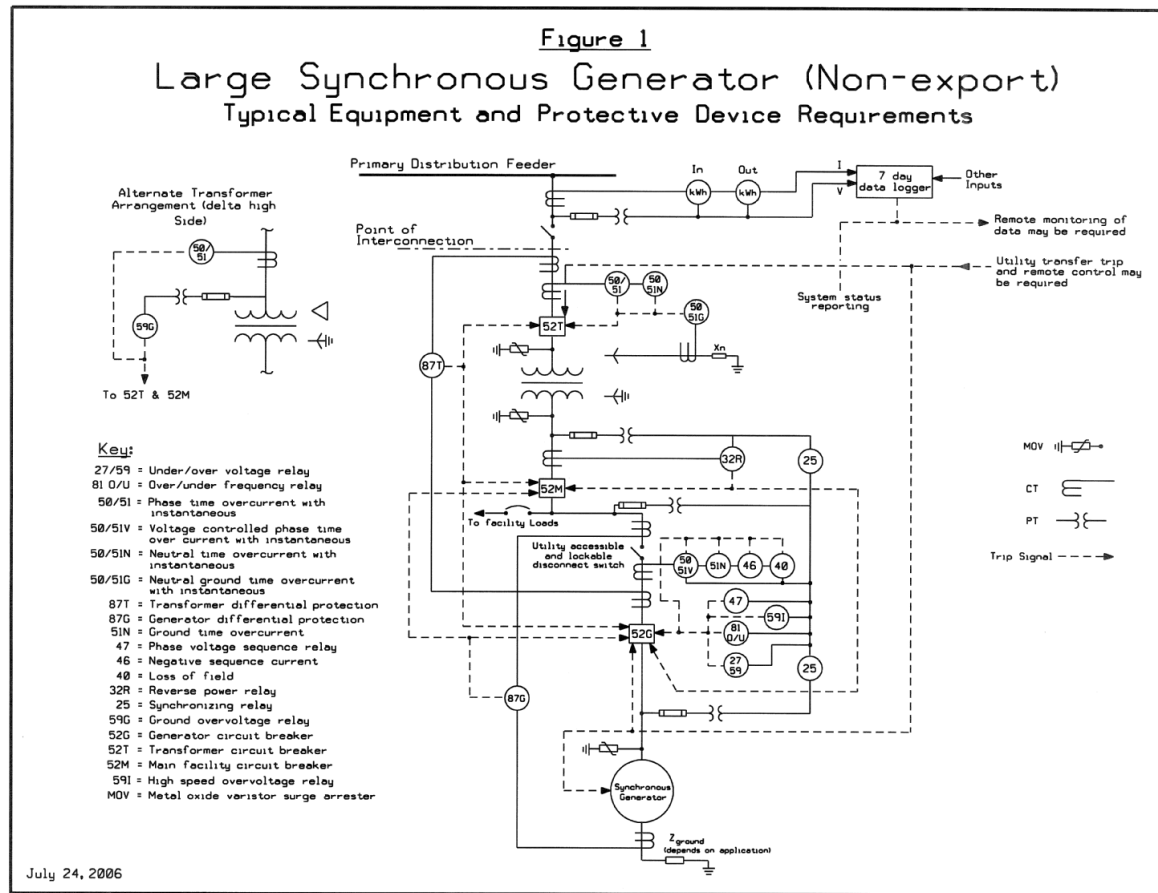
Typical Equipment and Protective Device Requirements for
Large Synchronous, Induction, and Inverter Generators

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Decision and Order Dated November 29, 2011, Docket No. 2010-0015
Transmittal Letter Dated December 2, 2011.

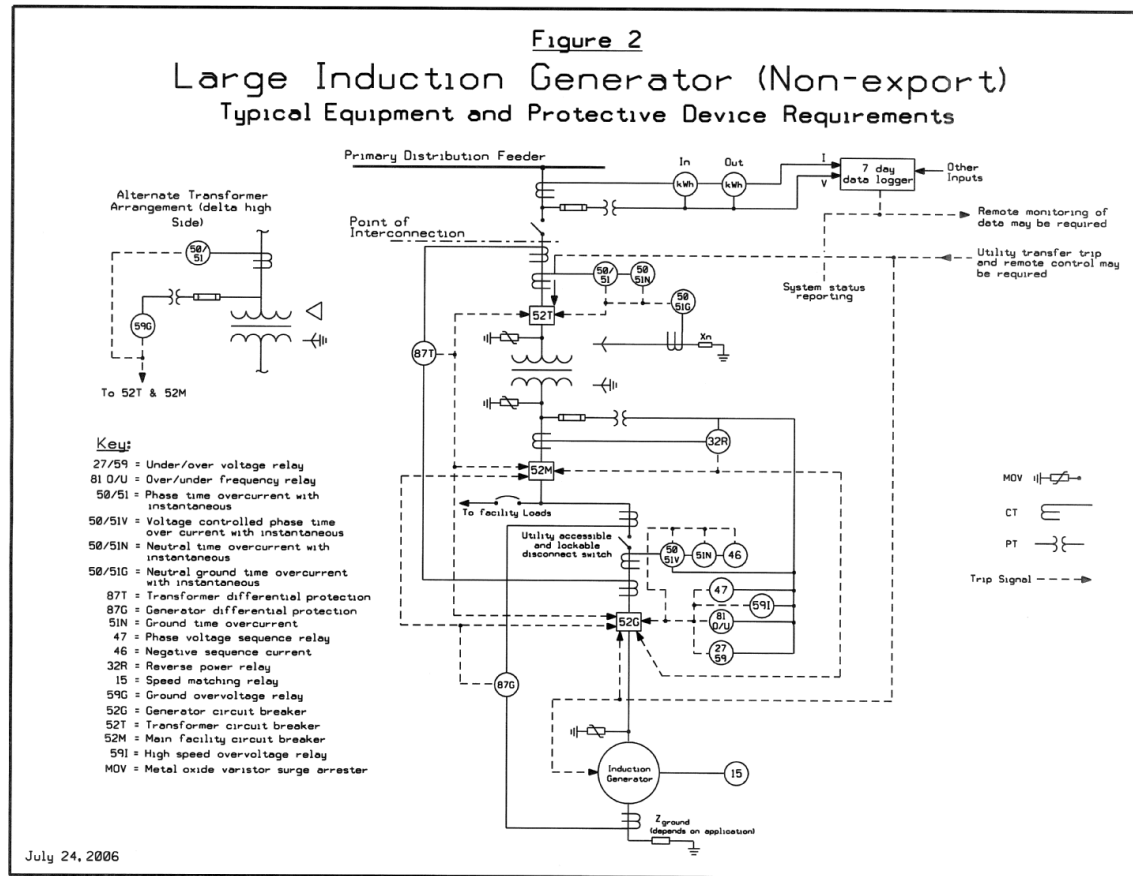
Superseding SHEET NO. 34B-33
Effective April 18, 2008

SHEET NO. 34B-33
Effective December 3, 2011

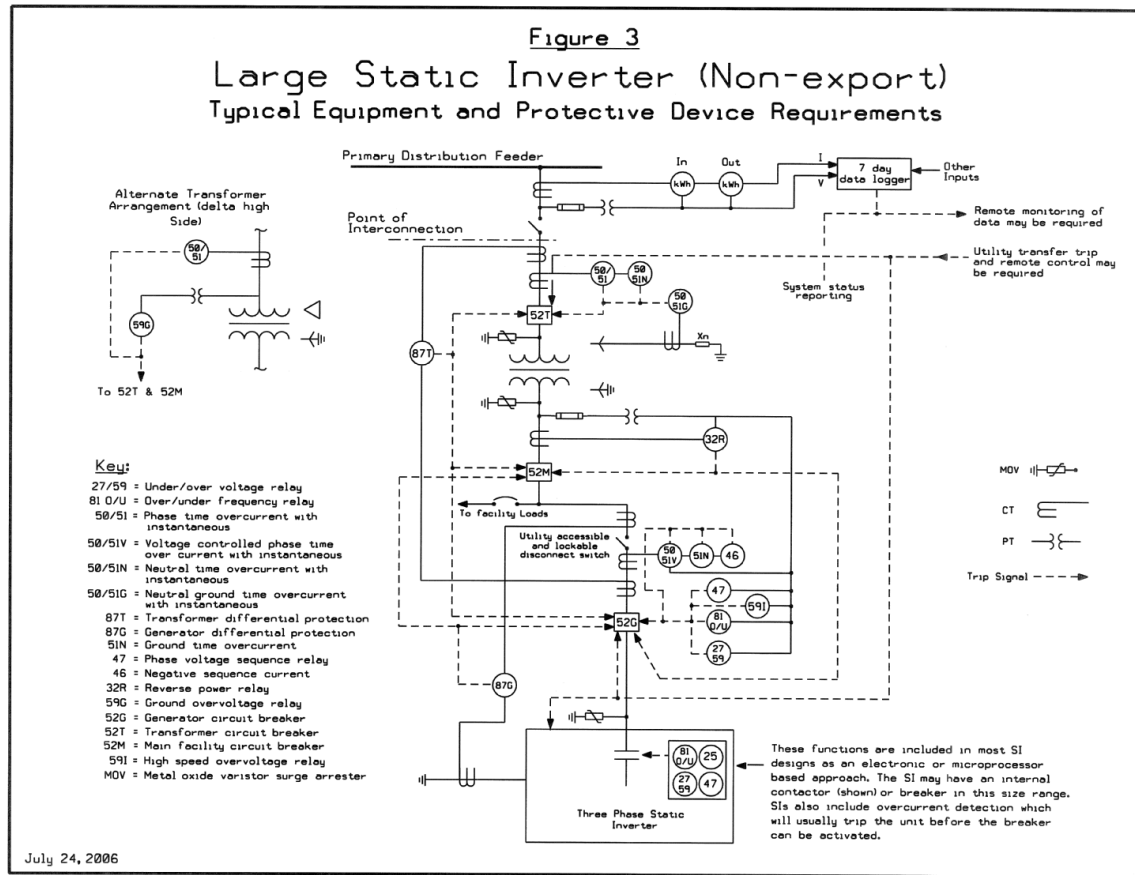


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Exhibit B: Self-Supply Tariff

Rule No. [XX]

CUSTOMER SELF-SUPPLY

A. ELIGIBLE CUSTOMER-GENERATOR

Customer Self-Supply service is available to permanent customers (“Eligible Customer-Generator”) who own (or lease from a third party) and operate (or contract to operate with a third party) a solar generating facility (“Generating Facility” or “Self-Supply System”), with a capacity of not more than one hundred kilowatts (100 kW), and where:

1. The Generating Facility, which may include an energy storage system, is located on the Eligible Customer-Generator’s premises,
2. The Generating Facility is sized and designed such that all of the Generating Facility’s output is intended to offset all or part of the Eligible Customer-Generator’s own electrical requirements (“Host Load”),
3. The Eligible Customer-Generator does not intend to export electrical energy to the utility system, and
4. The Generating Facility is in conformance with the Company’s interconnection requirements provided in Rule No. 14, Paragraph H.
5. The Generating Facility shall be designed and configured to meet the Technical Specifications set forth in Appendix II attached hereto.

B. INTERCONNECTION AGREEMENT AND REQUIREMENTS

1. Eligible Customer-Generator shall complete ~~and complete~~ and sign an application for service and a Standard Interconnection Agreement For Self-Supply ~~Generators—Inadvertent Export Systems~~ (100 kW or less) provided as Appendix I of this Rule (“Interconnection Agreement”), to receive Customer Self-Supply service, which shall not be effective until approved and executed by the Company. Where the Eligible Customer-Generator is not the person or entity in whose name electric service is rendered for the Eligible Customer-Generator’s premises where the Generating Facility is located, i.e. where a landlord-tenant relationship exists, only the Eligible Customer-Generator shall be required to complete and sign the application for service and the Interconnection Agreement.
2. The Eligible Customer-Generator’s Generating Facility and interconnection systems must be in compliance with all applicable safety and performance standards of the National

Electric Code (NEC), the Institute of Electrical and Electronic Engineers (IEEE), accredited testing laboratories such as Underwriters Laboratories (UL), the Company's interconnection requirements provided in Rule No. 14, Section H, Appendix I, and is subject to any other requirements provided in the Interconnection Agreement.

C. METERING AND BILLING

1. The Company, at its expense, may install meter(s) to record the flow of electric power in each direction. The Eligible Customer-Generator shall, at its expense, provide, install and maintain all conductors, service switches, fuses, meter sockets, meter instrument transformer housing and mountings, switchboard meter test buses, meter panels and similar devices required for service connection and meter installations on the customer's premises in accordance with the Company's Rule No. 14, Section A.2.
2. Eligible Customer-Generators served under this tariff who also receive energy from the Company shall be billed monthly for the energy supplied by the Company, in accordance with the Company's Rule No. 8, the applicable rate schedule, and the Company's rules filed with the Commission.
3. All rates, terms, and conditions from the applicable rate schedule will apply except for the minimum charge. The minimum charge shall be as follows:

Applicable Rate Schedule:

Schedule R, TOU-R, TOU EV	\$25.00 per month
Schedule G, TOU-G,	\$50.00 per month
Schedule J, TOU-J, U, SS	Per Rate Schedule
Schedule DS	Per Rate Schedule
Schedule P	Per Rate Schedule
Schedule F	Per Rate Schedule
Schedule EV-R, EV-C, EV-F	Per Rate Schedule

4. Company's agreement to accept inadvertently exported electric power from the Generating Facility under this tariff is solely an accommodation. Neither this tariff nor the Interconnection Agreement provide for, require or otherwise obligate Company to measure, purchase, transmit, distribute, or store any electric power that may be delivered to Company's distribution system by Eligible Customer-Generator.

D. INTERCONNECTION PROCESS

1. Eligible Customer-Generator requests to interconnect and operate a Generating Facility in parallel with the Company's electric system will be processed in accordance with the procedures in the Interconnection Process Overview provided in Appendix III of Rule 14, Paragraph H. Generating Facilities that meet the Technical Specifications stated in Appendix II to this Rule shall qualify for expedited interconnection subject to the terms and conditions set forth in Company Rule 14, Section H, Appendix III.

2. Under no circumstances shall a Customer-Generator interconnect and operate a Generating Facility in parallel with the Company's electric system without prior written approval by the Company in the form of a fully executed Interconnection Agreement.

APPENDIX I

STANDARD INTERCONNECTION AGREEMENT FOR SELF-SUPPLY ~~GENERATORS-~~ SYSTEMS-INADVERTENT EXPORT

(100 kW or less)

This Standard Interconnection Agreement For Self-Supply Systems Generators—Inadvertent-
~~Export~~ (100 kW or less) (“Agreement”) is made by and between:

____ (“Company”),
____ (“Customer-Generator”) and, if applicable,
____ (“Owner/Operator”),

and is made, effective and binding as of _____ (“Effective Date”). Company and Customer-Generator may be referred to individually as a “Party” and collectively as the “Parties”.

WHEREAS, Company is an operating electric public utility subject to the Hawaii Public Utilities Law, Hawaii Revised Statutes, Chapter 269, and the rules and regulations of the Hawaii Public Utilities Commission (“Commission”);

WHEREAS, the Customer-Generator receives permanent service from the Company;

WHEREAS, the Customer-Generator qualifies as “Eligible Customer-Generator,” as defined in the Company’s Rule No. [XX] (Customer Self-Supply);

WHEREAS, the Customer-Generator intends to construct a generating facility, as further described herein (“Generating Facility”) and desires to interconnect the Generating Facility ~~in-parallel-~~ with the Company’s electric system;

WHEREAS, the Company agrees to allow interconnection to the Company’s electric system under the terms and conditions set forth herein;

WHEREAS, the Owner/Operator, may be a person or entity other than the Customer-Generator, who owns and operates the Generating Facility.

NOW, THEREFORE, in consideration of the premises and the respective promises herein, the Company and the Customer-Generator, and if applicable, the Owner/Operator, hereby agree as follows:

1. **Scope and Purpose.** The Parties understand and agree that this Agreement applies only to the operation of Customer-Generator’s Generating Facility described in Exhibit B attached hereto. This Agreement provides for interconnection and operation of the Generating Facility in parallel with the Company’s electric system to serve only the electrical loads at the location identified in Exhibit B (“Customer Loads”). To facilitate the operation of the Generating Facility and the

Company's system, this Agreement also allows for the occasional and inadvertent export of power to the Company's electric system, as specifically agreed to herein, and may require export of power to provide grid support, as specified under Rule 14H or other applicable interconnection standards.

1.2. Notice 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. Customer-Generator acknowledges that such modifications may positively or negatively impact any potential savings or the value of Customer-Generator's Agreement and Generating Facility.

CUSTOMER-GENERATOR SHALL ACKNOWLEDGE AND SIGN THE "NOTICE AND DISCLAIMER – POSSIBLE FUTURE RULES AND/OR RATE CHANGES AFFECTING YOUR GENERATING FACILITY" ATTACHED HERETO AS EXHIBIT A.

2.3. Effectiveness of Agreement. This Agreement shall not be effective until approved and executed by each Party, i.e. upon the Effective Date. Customer-Generator shall not interconnect and operate the Generating Facility in parallel with the Company's system prior to approval and execution of this Agreement by the Company, except to the extent necessary to obtain governmental or utility approvals. Until this Agreement is effective, no Party shall have any legal obligations arising hereunder, express or implied, and any actions taken by a Party in reliance on the terms of this Agreement prior to the Effective Date shall be at that Party's own risk.

3.4. Term and Termination. This Agreement shall continue on a month-to-month basis from the Effective Date. Customer-Generator may terminate this Agreement at any time with thirty (30) days' written notice. Company may terminate this Agreement at any time if Customer-Generator fails to comply with any term of this Agreement or if Customer-Generator fails to be an Eligible Customer-Generator.

4.5. Generating Facility Description. For the purposes of this Agreement, the "Generating Facility" is defined as the equipment and devices, and associated appurtenances, owned by the Customer-Generator, which produce electric energy for use by the Customer-Generator and are to be interconnected and operated in parallel with the Company's system. The Generating Facility is identified in Exhibit B (Description of Generating Facility) attached hereto.

5.6. Operation of Generating Facility.

- (a) Company shall allow Customer-Generator to interconnect and operate the Generating Facility in parallel with the Company's distribution system in accordance with the terms and conditions of this Agreement and Company Rule 14, Paragraph H (Interconnection of Distributed Generating Facilities Operating in Parallel With The Company's Electric System) ("Rule 14H").

- (b) The electric power produced by the Generating Facility shall be used to serve electric loads for the electric service account that the Company uses to interconnect the Customer-Generator's Generating Facility. Customer-Generator shall not ~~use the Generating Facility to serve any other electric load or otherwise~~ cause the Customer-Generator to be considered a "public utility" as such term is defined in Chapter 269 of the Hawaii Revised Statutes.
- (c) If, notwithstanding Customer-Generators efforts to regulate the electrical output of the Generating Facility, electric power flows from the Generating Facility to the Company's distribution system, Company shall attempt to receive such power. Unless acceptance of such energy from the Seller by the Company would require the Company to operate the Company system outside of good engineering and operating practices. In no event shall the delivery of electric power to Company's electric system exceed the amounts, duration, frequency of occurrence, or other limitations specified in Appendix I to Company Rule [XX]. If Customer-Generator does not regulate its Generating Facility in compliance with the limitations set forth in Appendix I to Company Rule [XX], Company may require Customer-Generator to disconnect the Generating Facility from Company's electric system until Customer-Generator demonstrates to Company's sole satisfaction that Customer-Generator has taken adequate measures to regulate the output of the Generating Facility and control its export of power. Further, even if the Generating Facility is operating within the limitations set for in Appendix I to Company Rule [XX], if at any time the Company determines that the continued operation of the Generating Facility may endanger any person or property, the Company's electric system, or have an adverse effect on the safety or power quality of other customers, the Company shall have the right to disconnect the Generating Facility from the Company's electric system in accordance with Paragraph 15 (Personnel and System Safety) herein.

~~6.7.~~ **No Purchase of Electric Power.** Company's agreement to accept electric power from the Generating Facility is solely an accommodation. This Agreement does not provide for, or otherwise obligate Company to measure, purchase, transmit, distribute, or store any electric power that may be delivered to Company's distribution system by Customer-Generator.

~~7.8.~~ **No Delivery of Reactive Power.** Customer-Generator shall not deliver reactive power to Company's distribution system, ~~except as provided under Rule 14H or~~ unless the Parties have agreed otherwise in writing.

~~8.9.~~ **Sale of Electric Power by the Company to the Customer-Generator.** This Agreement does not constitute an agreement by the Company to provide retail electric service to Customer-Generator. Such arrangement must be made separately between the Company and Customer-Generator and sales of energy delivered by the Company to the Customer-Generator shall be governed by the applicable rate schedule and the Company's rules filed with the Commission.

~~9.10.~~ **Permits and Licenses.** Customer-Generator shall be responsible for the design, installation, operation, and maintenance of the Generating Facility and shall obtain at its expense, and maintain any required governmental authorizations and/or permits for the construction and operation of the Generating Facility. Customer-Generator shall not commence parallel operation

of the Generating Facility until Company has provided written approval. Company shall provide such written approval within ~~thirty-five~~ (1530) business days from Company's receipt of a copy of the final inspection or approval of the Generating Facility, which has been issued by the governmental authority having jurisdiction to inspect and approve the installation. Company's written approval shall not be unreasonably withheld. Company shall have the right to have its representatives present at the final inspection made by the governmental authority having jurisdiction to inspect and approve the installation of the Generating Facility. Customer-Generator shall be required to notify Company in accordance with the terms of Section 18 (Notices), herein, at least five (5) business days prior to such inspection.

10.11. Installation.

- (a) Design, installation, operation and maintenance of the Generating Facility shall include appropriate control and protection equipment as specified by the Company, including but not limited to an automatic load-break device such as a circuit breaker or inverter and a manual disconnect that has a visible break or breaker with rack-out capability to isolate the Generating Facility from the Company's system. The manual disconnect device must be accessible by the Company and be capable of being locked by the Company in the open position, to establish working clearance for maintenance and repair work in accordance with the Company's safety rules and practices. The disconnect devices shall be furnished and installed by the Customer-Generator and are to be connected between the Generating Facility and the Company's electric system. The disconnect devices shall be located in the immediate vicinity of the electric meter serving the Customer-Generator. The manual disconnect device shall be, at a minimum, clearly labeled "Customer-Generator System Disconnect". With permission of the Company, the disconnect devices may be located at an alternate location which is readily and safely accessible to the Company on a 24-hour basis. Such alternate location shall be clearly identified with signage placed in the immediate vicinity of the electric meter serving the Customer-Generator.
- (b) The Customer-Generator grants access to the Company to utilize the disconnect device, if needed. The Customer-Generator shall obtain the authorization from the owner and/or occupants of the premises where the Generating Facility is located that allows the Company to access the Generating Facility for the purpose specified in this Agreement. Company may enter premises where the Generating Facility is located, as permitted by law or tariff, for the following purposes: (a) to inspect Generating Facility's protective devices and read or test meter(s); and (b) to disconnect the Generating Facility and/or service to Customer-Generator, 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 Generating Facility, or the absence or failure of properly operating protective device.
- (c) Under no circumstances shall a Customer-Generator interconnect and operate a generating facility in parallel with the Company's electric system without prior written approval by the Company in the form of a fully executed Agreement.

- (d) Generating facilities that incorporate the use of an energy storage device, e.g. battery storage, ~~which is interconnected to regardless of whether such energy storage device is intended to operate in parallel with~~ the Company's transmission and/or distribution facilities, shall obtain an interconnection review by the Company pursuant to this Agreement. Energy storage systems that are intended to be installed by an Eligible Customer-Generator after Company's execution of an Agreement shall constitute a material change and addition to a generating facility and shall require interconnection review pursuant to this Rule prior to installation.
- (e) Once a Generating Facility is interconnected to the Company's system, the Company reserves the right to require the installation of, or modifications to, equipment determined by the utility 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. Such installation or modification shall be made by mutual agreement of the Company and the Customer-Generator. Any disputes related to this provision shall be resolved according to the dispute resolution process described in Rule 14H.

11.12. Metering. The Company, at its expense, may install meter(s) to record the flow of electric power in each direction. The Customer-Generator shall, at its expense, provide, install and maintain all conductors, service switches, fuses, meter sockets, meter instrument transformer housing and mountings, switchboard meter test buses, meter panels and similar devices required for service connection and meter installations on the customer's premises in accordance with the Company's Rule No. 14, Section A.2.

12.13. Interconnection Facilities.

(a) **Customer-Generator-Owned Interconnection Facilities.**

- (1) The Customer-Generator shall furnish, install, operate and maintain, at its cost, the interconnection facilities (such as circuit breakers, relays, switches, synchronizing equipment, monitoring equipment, and control and protective devices and schemes) identified in Exhibit C (Customer-Generator-Owned Generating Facility and Interconnection Facilities).
- (2) The point of interconnection is shown on the single-line diagram and three-line diagram (provided by the Customer-Generator and reviewed by the Company) which are attached to Exhibit C (Customer-Generator-Owned Generating Facility and Interconnection Facilities) (provided that the three-line diagram is not required if the Generating Facility's capacity is less than 30 kW). Pursuant to Company Rule 14H, Appendix I (Distributed Generating Facility Interconnection Standards Technical Requirements), Section 6.c (Review of Design Drawings), the Company must review and approve Customer-Generator's single-line and three-line diagrams prior to Customer-Generator constructing of the Generating Facility interconnection.

- (3) The Customer-Generator agrees to test the Generating Facility, to maintain operating records, and to follow such operating procedures, as may be specified by the Company to protect the Company's system from damages resulting from the parallel operation of the Generating Facility, including such testing, records and operating procedures as more fully described in Exhibit C attached hereto.
- (4) The Company may inspect the Generating Facility and Customer-Generator's interconnection facilities.

(b) **Company-Owned Interconnection Facilities.**

- (1) The Company agrees to furnish, install, operate and maintain such interconnection facilities on its side of the point of interconnection with the Generating Facility as required for the parallel operation with the Generating Facility and more fully described in Exhibit D (Company-Owned Interconnection Facilities) attached hereto and made apart hereof ("Company Interconnection Facilities"). All Company Interconnection Facilities shall be the property of the Company. Where portions of the Company Interconnection Facilities are located on the Customer-Generator's premises, the Customer-Generator 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 Customer shall provide these at no expense to the Company.
- (2) The Customer-Generator agrees to pay to the Company: (1) a non-refundable contribution for the Company's investment in the Company Interconnection Facilities described in Exhibit D (Company-Owned Interconnection Facilities), subject to the terms and conditions included in Exhibit D 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 Generating Facility on the Company's system, but will include the actual cost (or such lesser amount as the Company may specify to facilitate the processing of interconnection requests for similarly situated facilities) of additional technical study for the Generating Facility.

13.14. Indemnification:

- (a) The Customer-Generator shall indemnify, defend and hold harmless the Company and its officers, directors, agents and employees, from and against all liabilities, damages, losses, fines, penalties, claims, demands, suits, costs and expenses (including reasonable attorney's fees and expenses) to or by third persons, including the Company's employees or subcontractors, for injury or death, or for injury to property, arising out of the actions or inactions of the Customer-Generator (or those of anyone under its control or on its behalf) with respect to its obligations under this Agreement, and/or arising out of the installation, operation and maintenance of the Generating Facility and/or the Customer-Generator Interconnection Facilities, except to the extent that such injury, death or

damage is attributable to the gross negligence or intentional act or omission of the Company or its officers, directors, agents or employees.

- (b) The Owner/Operator shall indemnify, defend and hold harmless the Company and its officers, directors, agents and employees, from and against all liabilities, damages, losses, fines, penalties, claims, demands, suits, costs and expenses (including reasonable attorney's fees and expenses) to or by third persons, including the Company's employees or subcontractors, for injury or death, or for injury to property, arising out of the actions or inactions of the Owner/Operator (or those of anyone under its control or on its behalf) with respect to its obligations under this Agreement, and/or arising out of the installation, operation and maintenance of the Generating Facility and/or the Interconnection Facilities, except to the extent that such injury, death or damage is attributable to the gross negligence or intentional act or omission of the Company or its officers, directors, agents or employees.
- (c) The Company shall indemnify, defend and hold harmless the Customer-Generator, and its officers, directors, agents and employees, from and against all liabilities, damages, losses, fines, penalties, claims, demands, suits, costs and expenses (including reasonable attorney's fees and expenses) to or by third persons, including the Customer-Generator's employees or subcontractors, for injury or death, or for injury to property, arising out of the actions or inactions of the Company (or those of anyone under its control or on its behalf) with respect to its obligations under this Agreement, and/or arising out of the installation, operation and maintenance of the Company Interconnection Facilities, except to the extent that such injury, death or damage is attributable to the gross negligence or intentional act or omission of the Customer-Generator or its officers, directors, agents or employees.

Provided, however, where the Customer-Generator is an agency of the United States, the following Section shall be applicable in place of Paragraphs 14(a) and (b):

“The United States understands that it may be held liable for loss, damages expense and liability to third persons and injury to or death of persons or injury to property caused by the United States in its engineering design, construction ownership or operations of, or the making of replacements, additions betterment to, or by failure of, any of such party's works or facilities used in connection with this Agreement to the extent allowed by the Federal Tort Claims Act 28 U.S.C. § 2671 et seq. and the Agreement Disputes Act of 1978, 41 U.S.C. §§ 601-613.

Company shall be responsible for damages or injury caused by Company, Company's agents, officers, and employees in the course of their employment to the extent permitted by law.”

Provided, however, where the Customer-Generator is an agency of the State of Hawaii (the “State”), the following Section shall be applicable in place of Paragraphs 14(a) and (b):

“The State shall be responsible for damages or injury caused by the State’s agents, officers, and employees in the course of their employment to the extent that the State’s liability for such damage or injury has been determined by a court or otherwise agreed to by the State. The State shall pay for such damage and injury to the extent permitted by law. The State shall use reasonable good faith efforts to pursue any approvals from the Legislature and the Governor that may be required to obtain the funding necessary to enable the State to perform its obligations or cover its liabilities hereunder. The State shall not request Company to indemnify the State for, or hold the State harmless from, any claims for such damages or injury.

Company shall be responsible for damages or injury caused by Company, Company’s agents, officers, and employees in the course of their employment to the extent that Company’s liability for such damage or injury has been determined by a court or otherwise agreed to by Company, and Company shall pay for such damage and injury to the extent permitted by law. Company shall not request the State to indemnify Company for, or hold Company harmless from, any claims for such damages or injury.”

- (d) Nothing in this Agreement shall create any duty to, any standard of care with reference to, or any liability to any person not a party to it.

14.15. Personnel and System Safety. If at any time the Company determines that the continued operation of the Generating Facility may endanger any person or property, the Company’s electric system, or have an adverse effect on the safety or power quality of other customers, the Company shall have the right to disconnect the Generating Facility from the Company’s electric system remotely or otherwise. The Generating Facility shall remain disconnected until such time as the Company is satisfied that the endangering or power quality condition(s) has been corrected, and the Company shall not be obligated to accept any energy from the Generating Facility during such period. The Company shall not be liable, directly or indirectly, for permitting or continuing to allow an attachment of the Generating Facility for the acts or omissions of the Customer-Generator that cause loss or injury, including death, to any third party.

15.16. Prevention of Interference. The Customer-Generator shall not operate equipment that superimposes a voltage or current upon the Company’s 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 Customer-Generator 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 Customer-Generator does not take timely corrective action, or continues to operate the equipment causing interference without restriction or limit, the Company may, without liability, disconnect the Customer-Generator’s equipment from the Company’s system.

16.17. Limitation of Liability. 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 Customer-Generator or leased by the Customer-Generator from third parties,

including without limitation the Generating Facility and any structures, equipment, wires, appliances or devices appurtenant thereto.

17.18. Customer-Generator and Generating Facility Information. By signing this Agreement, the Customer-Generator expressly agrees and authorizes the Company to: (1) request and obtain from Customer-Generator and its contractors, vendors, subcontractors, installers, suppliers or agents (collectively “Customer-Generator Agents”), at no cost to Company, ~~any~~ information related to the Generating Facility, including but not limited to Watts, Vars, Watt Hours, current and voltage, status of the generating facility, inverter settings, any and all recorded event or alarm logs recorded, (collectively “~~Customer-Generating Facility~~ Data”) that Company reasonably determines, ~~in its reasonable discretion~~, are needed to ensure the safe and reliable operation of the Generating Facility or the Company’s system; or (2) make such modifications to the Customer-Generator’s system, at no cost to the Company, that Company determines, in its reasonable discretion, are needed to ensure the safe and reliable operation of the Generating Facility or the Company’s system. Customer-Generator expressly agrees and irrevocably authorizes Customer-Generator Agents to disclose such Customer-Generator Data to Company and to make such modifications to the Customer-Generator’s Generating Facility upon request by Company.

18.19. Additional Information. The Company reserves the right to request ~~estire~~ additional information from Customer-Generator relating to the Generating Facility, where reasonably necessary, to serve the Customer-Generator under this Agreement or to ensure reliability, ~~and~~ safety of operation, and power quality of the Company’s system and Customer-Generator agrees to provide such information to Company upon request.

19.20. No Material Changes to Generating Facility. The Customer-Generator agrees that no material changes or additions to the Generating Facility shall be made without having obtained prior written consent from the Company, which consent shall not be unreasonably withheld. In no event may the Total Rated Capacity of the Generating Facility exceed 100 kW. If a Generating Facility changes ownership, the Company may require the new Customer-Generator and/or Owner/Operator to complete and execute an amended Agreement or new Agreement, as may be applicable.

20.21. 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 below. Changes in such designation may be made by notice similarly given. All written notices shall be directed as follows:

To Customer-Generator and Owner/Operator (if applicable): The Mailing Address listed in Exhibit B (Description of Generating Facility) attached hereto.

To Company:

Name: _____
Address: _____
Facsimile: _____

Email: _____

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.

~~21.~~22. **Certification by Licensed Electrical Contractor.** Generating and interconnection systems must comply with all applicable safety and performance standards of the National Electrical Code (NEC), Institute of Electrical and Electronic Engineers (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, in effect at the time of signing this agreement. This requirement shall include, but not be limited to, the interconnection provisions of the Company's Rule 14H, as authorized by the Commission. Licensed Electrical Contractor, as agent for Customer-Generator, certifies in Exhibit B (Description of Generating Facility) that once approved by the Company, the proposed Generating Facility will be installed to meet all preceding requirement(s).

~~22.~~23. **Force Majeure.** For purposes of this Agreement, "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: (a) acts of war, public disorder, insurrection or rebellion; floods, hurricanes, earthquakes, lightning, storms, and other natural calamities; explosions or fires; strikes, work stoppages, or labor disputes; embargoes ; and sabotage. 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 part 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.

~~23.~~24. **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.
- (a) 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.

24.25. Insurance. The following insurance provisions are only applicable to Generating Facilities with a Total Rated Capacity greater than 10 kW but not exceeding 100 kW:

The Customer-Generator shall, at its own expense and during the term of the Agreement and any other time that the Generating Facility is interconnected with the Company's system, maintain in effect with a responsible insurance company authorized to do insurance business in Hawaii, the following insurance or its equivalent at Company's discretion that will protect the Customer-Generator and the Company with respect to the Generating Facility, the Generating Facility's operations, and the Generating Facility's interconnection with the Company's system:

A commercial general liability policy, covering bodily injury and property damage combined single limit of at least the following amounts based on the Total Rated Capacity of the generator (for solar systems—Total Rated Capacity of the generator or inverter, whichever is lower, can be used with appropriate technical documentation on inverter, if not higher Total Rated Capacity will be used), for any occurrence.

Commercial General Liability Coverage Amount	Total Rated Capacity of the Generating Facility
\$1,000,000	Greater than 30 kW and less than or equal to 100 kW
\$500,000	Greater than 10 kW and less than or equal to 30 kW

The Customer-Generator has responsibility to determine if higher limits are desired and purchased. Said insurance shall name the Company, its directors, officers, agents, and employees as additional insureds, shall include contractual liability coverage for written Agreements and agreements including this Agreement, and shall include provisions stating that the insurance will respond to claims or suits by additional insureds against the Customer-Generator or any other insured thereunder. Customer-Generator shall immediately provide written notice 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 Customer-Generator 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 Customer-Generator shall make such increase to that extent and any increased costs shall be borne by the Customer-Generator. The insurance required hereunder shall provide that it is primary with respect to the Customer-Generator and the Company. The Customer-Generator shall provide evidence of such insurance, including insurer's acknowledgement that coverage applies with respect to this Agreement, by providing certificates of insurance to the Company within 30 days of any change. Initially, certificates of insurance must be provided to the Company prior to executing the Agreement and any parallel interconnection. The Customer-Generator's indemnity and other obligations shall not be limited by the foregoing insurance requirements. Any deductible shall be the responsibility of the Customer-Generator.

Alternatively, where the Customer-Generator is a governmental entity, Customer Generator 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.

25.26. Miscellaneous.

- (b) **Disconnection and Survival of Obligations.** Upon termination of this Agreement, the Generating Facility shall be disconnected from the Company's system. The termination of this Agreement shall not relieve the Parties of their respective liabilities and obligations, owed or continuing at the time of termination.
- (c) **Governing Law and Regulatory Authority.** 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. 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.
- (d) **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.
- (e) **Termination of Existing Agreement.** This Agreement shall supersede any existing agreement, if any, under which Customer-Generator is currently operating the Generating Facility and any such agreement shall be deemed terminated as of the date this Agreement becomes effective.
- (f) **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.
- (g) **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.
- (h) **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.

- (i) **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 Hawaii, which currently are included in the Commission's General Order Number 7, as either may be amended from time to time.
- (j) **Multiple Counterparts.** This Agreement may be executed in two or more counterparts, each of which is deemed an original but all constitute one and the same instrument.

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.

CUSTOMER-GENERATOR

By: _____
Signature

Title: _____

Name: _____
Print Date

OWNER/OPERATOR OF GENERATING FACILITY
(IF OTHER THAN CUSTOMER-GENERATOR)

By: _____
Signature

Title: _____

Name: _____
Print Date

HAWAIIAN ELECTRIC COMPANY, INC.

By: _____
Signature

Title: _____

Name: _____
Print Date

EXHIBIT A

NOTICE AND DISCLAIMER

POSSIBLE FUTURE RULES AND/OR RATE CHANGES AFFECTING YOUR GENERATING SYSTEM

- The ~~foregoing Standard Interconnection Agreement For Self-Supply Generators—Inadvertent Export (100 kW or less) and Rule 14H (Company Rule 14, Paragraph H (Interconnection of Distributed Generating Facilities Operating in Parallel With The Company’s Electric System), Company Rule 14 and Company Rule [XX] (Customer Self-Supply Tariff), including but not limited to rules related to required system controls, electricity rates, charges and fees (collectively “Interconnection Rules”)~~ are is subject to modification by the Hawaii Public Utilities Commission (“Commission”).
- Your Agreement and Generating Facility ~~(e.g. PV system)~~ shall be subject to any future modifications ~~of the Interconnection Rules~~ by the Commission. Such modifications ~~to the Interconnection Rules~~ may positively or negatively impact any potential savings or the value of your Agreement and Generating Facility. You agree to pay for any costs related to such Commission-ordered modifications ~~to the Interconnection Rules~~.

By signing below, you acknowledge that you have read, understand and agree to the above Notice and Disclaimer. Further, by signing this disclaimer, you confirm your understanding that any potential savings in your electricity bill that were calculated by you or presented to you to support your decision to buy or lease a Generating Facility may change.

Customer-Generator (signature)

Date

Owner/Operator (if applicable) (signature)

Date

EXHIBIT B

DESCRIPTION OF GENERATING FACILITY

(To Be Filled Out By Customer-Generator)

1. **Customer-Generator Information**

Name (print): _____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____

Service Address: _____
(If different from Mailing Address)

City: _____ State: _____ Zip Code: _____

Phone: (____) _____ Cell: (____) _____ Email: _____

Electric Service Account or Meter #: _____

2. **Owner/Operator (if different from Customer-Generator)**

Name: _____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____

Phone: (____) _____ Cell: (____) _____ Email: _____

3. **Generator Qualifications** (Check all that apply)

- ☐ Solar
- ☐ Wind Turbine
- ☐ Biomass
- ☐ Hydroelectric
- ☐ Hybrid (describe): _____

Generating Facility Location and Tax Map Key: _____

Maximum Site Load without Generation: _____ kW

Minimum Site Load without Generation: _____ kW

Maximum Generating Capability: _____ kW

Maximum Export: _____ kW

4. **Generator Technical Information**

Type of Generator:

- ☐ Synchronous
- ☐ Induction
- ☐ DC Generator or Photovoltaic with Inverter

Photovoltaic System Information:

Module Manufacturer	Model	Quantity	STC Rating (kW)

Total Module Capacity: _____ kW

Inverter Manufacturer	Model	Quantity	A/C Output Rating (kW)

Total Inverter Capacity: _____ kW

Total System Capacity (lower of Total Module Capacity and Total Inverter Capacity): _____ kW

DC Generator (e.g. Wind) System Information:

DC Generator Manufacturer: _____ Model Name: _____ Model #: _____

*** A copy of Generator Nameplate and Manufacturer's Specifications Sheet may be substituted.**

Total Capacity Rating: _____ kW (For solar kW_{DC})

Fault Current Contribution of Generator: _____ Amps

Inverter Manufacturer: _____ Model Name: _____ Model #: _____

*** A copy of Generator Nameplate and Manufacturer's Specifications Sheet may be substituted.**

Total Capacity Rating: _____ kW

Energy Storage System Information:

Energy Storage System Information: (Customer to provide data sheets)

Manufacturer: _____ Model: _____

Size kW: _____ Max Capacity kWh: _____

Rated kW discharge: _____ Rated kW Charge: _____

Description of Storage System Operations:

(Describe mode(s) of operation) - Example: How much export or non-export, load shifting, smoothing, peak shaving, etc.)

Will the distribution grid be used to charge the storage device?

- ☐ Yes If yes, charging periods: _____
- ☐ No

Will power be exported to the grid??

- ☐ Yes If yes, maximum export to the grid: _____
- ☐ No

5. **Technical Information for Synchronous and Induction Generators** [Not applicable for DC Generators or Solar with Inverter]

Number of starts per day: _____ Maximum Starting kVA: _____ Generator Operating Power Factor: _____

Generator Grounding Method:

- ☐ Effectively Grounded
- ☐ Resonant Grounded
- ☐ Low-Inductance Grounded
- ☐ Low-Resistance Grounded
- ☐ High Resistance Grounded
- ☐ Ungrounded

Generator Characteristic Data:

* Not needed if Generator Nameplate and Manufacturer's Specification Sheet are provided.

Direct Axis Synchronous Reactance, X_d : _____ P.U.

Direct Axis Transient Reactance, X'_d : _____ P.U.

Direct Axis Subtransient Reactance, X''_d : _____ P.U.

Inertia Constant, H: _____ P.U.

Excitation Response Ratio: _____

Direct Axis Open-Circuit Transient Time Constant, X_d : _____ Seconds

Direct Axis Open-Circuit Subtransient Time Constant, T''_{do} : _____ Seconds

6. **Interconnecting Equipment Technical Data**

Will an interposing transformer be used between the generator and the point of interconnection?

- ☐ Yes
- ☐ No

Transformer Data (if applicable):

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

Size: _____ KVA

Transformer Primary: _____ Volts

- ☐ Delta
- ☐ Wye
- ☐ Wye Grounded

Transformer Secondary: _____ Volts

- ☐ Delta
☐ Wye
☐ Wye Grounded

Transformer Impedance: _____ % on _____ KVA Base

Transformer Fuse Data (if applicable):

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

- ☐ At Primary Voltage; or
☐ At Secondary Voltage

Manufacturer: _____ Type: _____ Size: _____ Speed: _____

Transformer Protection (if not fuse):

Please describe: _____

Generator Circuit Breaker (if 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

Circuit Breaker Protective Relays (if applicable):

* Enclose copy of any proposed Time-Overcurrent Coordination Curves.

Manufacturer	Type	Style/Catalog No.	Proposed Setting

Current Transformer Data (if applicable):

* Enclose copy of Manufacturer's Excitation & Ratio Correction Curves)

Manufacturer	Type	Accuracy Class	Proposed Ratio Connection
			/5
			/5
			/5
			/5

Generator Disconnect Switch:

A generator disconnect device (isolation device) must be installed with features as described in the "Distributed Generating Facility Interconnection Standards, Technical Requirements" as set forth in Rule 14 (Paragraph H.1) of the Company's tariff, and which is readily and safely accessible to Company.

Manufacturer: _____ Type: _____ Catalog No.: _____

Rated Volts: _____ Rated Amps: _____

Phase:

- ☐ Single Phase
- ☐ Three Phase

Mounting Location: _____

7. **General Technical Information**

Enclose copy of the following documents:

- ☐ **Single Line Diagram:** Showing configuration and interconnection of all equipment, current and potential circuits and protection and control schemes.
- ☐ **Relay list and trip scheme:** Showing all protection, synchronizing and auxiliary relays that are required to operate the Generating Facility in a safe and reliable manner.
- ☐ **Three-line diagram** (if the Generating Facility's capacity is greater than or equal to 30 kW): Showing potential transformer and current transformer ratios, and details of the Generating Facility's configuration, including relays, meters, and test switches.

8. **Installation Details**

Installing Electrical Contractor: _____

License Holder: _____

Hawaii License #: _____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____

Phone: (____) _____ Cell: (____) _____ Email: _____

Interconnection Date*: _____ (to be filled out by the Company upon the Company's approval and execution of the Agreement).

Supply certification that the generating system will be installed and inspected in compliance with the local Building/Electrical code of the County of _____.

* Under no circumstances shall a Customer-Generator interconnect and operate a generating facility in parallel with the Company's electric system without prior written approval by the Company in the form of a fully executed Agreement. Generating facilities that incorporate the use of an energy storage device, e.g. battery storage, regardless of whether such energy storage device is intended to operate in parallel with the Company's transmission and/or distribution facilities, shall obtain an interconnection review by the Company pursuant to this Agreement. Energy storage systems that are intended to be installed by an Eligible Customer-Generator after Company's execution of an Agreement shall constitute a material change and addition to a generating facility and shall require interconnection review pursuant to this Rule prior to installation.

Generating System Building Permit # (Certificate of Completion or Notice of Electrical Inspection?): (to be filled out by the Company upon the Company's approval and execution of Agreement): _____.

9. **Generator/Equipment Certification**

Generating systems that utilize inverter technology must be compliant with *Institute of Electrical and Electronics Engineers IEEE Std 1547* and *Underwriters Laboratories UL 1703* and *UL 1741* in effect at the time this Agreement is executed.

Generating systems that use a rotating machine must be compliant with applicable National Electrical Code, Underwriters Laboratories, and Institute of Electrical and Electronics Engineers standards and rules and orders of the Public Utilities Commission of the State of Hawaii in effect at the time this Agreement is executed. **By signing below, the Applicant certifies that the installed generating equipment will meet the appropriate preceding requirement(s) and can supply documentation that confirms compliance.**

Customer-Generator: _____
Signature Date

Electrical Contractor: _____
Signature Date

10. **Insurance (if applicable)**

Insurance Carrier: _____

EXHIBIT C

CUSTOMER-GENERATOR-OWNED GENERATING FACILITY AND INTERCONNECTION FACILITIES

[To be filled out by Customer-Generator if Generating Facility greater than 10 kW]

1. **Generating Facility**

- a. Compliance with laws and standards. The Generating Facility, Generating Facility design, and Generating Facility drawings shall meet all applicable national, state, and local laws, rules, regulations, orders, construction and safety codes, and shall satisfy the Company's Distributed Generating Facility Interconnection Standards, Technical Requirements ("Interconnection Standards"), as set forth in Rule 14, Paragraph H.1 of the Company's tariff.
- b. Avoidance of adverse system conditions. The Generating Facility shall be designed, installed, operated and maintained so as to prevent or protect against adverse conditions on the Company's system that can cause electric service degradation, equipment damage, or harm to persons, such as:
 - Unintended islanding.
 - Inadvertent and unwanted re-energization of a Company dead line or bus.
 - Interconnection while out of synchronization.
 - Overcurrent.
 - Voltage imbalance.
 - Ground faults.
 - Generated alternating current frequency outside of permitted safe limits.
 - Voltage outside permitted limits.
 - Poor power factor or reactive power outside permitted limits.
 - Abnormal waveforms.
- c. Specification of protection, synchronizing and control requirements. The Customer-Generator 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 Generating Facility 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's system with which the Generating Facility is interconnected ("Facility Protection Devices/Schemes").
- d. Generating Facility protection. The Customer-Generator is solely responsible for providing adequate protection for the Generating Facility.
- e. Customer-Generator Interconnection Facilities.

- (i) The Customer-Generator shall furnish, install, operate and maintain interconnection facilities (such as circuit breakers, relays, switches, synchronizing equipment, monitoring equipment, and control and protective devices and schemes) designated by or acceptable to the Company as suitable for parallel operation of the Generating Facility with the Company's system ("Customer-Generator Interconnection Facilities"). Such facilities shall be accessible at all times to authorized Company personnel.
 - (ii) The Customer-Generator shall comply with the Company's Interconnection Standards. If a conflict exists between the Interconnection Standards and this Agreement, this Agreement shall control.
 - (iii) 1) Single-line diagram of the Generating Facility, 2) relay list, trip scheme and settings of the Generating Facility, 3) Generating Facility Equipment List, and 4) three-line diagram (if the Generating Facility's capacity is greater than or equal to 30 kW), 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 B 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 point of interconnection of the Generating Facility to the Company's system. The relay list, trip scheme and settings shall include all protection, synchronizing and auxiliary relays that are required to operate the Generating Facility in a safe and reliable manner. The three-line diagram shall show potential transformer and current transformer ratios, and details of the Generating Facility's configuration, including relays, meters, and test switches.
- f. Approval of Design Drawings. If the Generating Facility's capacity is greater than or equal to 30 kW, the single-line diagram, relay list, trip scheme and settings of the Generating Facility, 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.

2. Verification Testing.

- a. Upon initial parallel operation of the Generating Facility, or any time interface hardware or software is changed, a verification test shall be performed. A licensed professional engineer or otherwise qualified individual shall perform verification testing in accordance with the manufacturer's published test procedure. Qualified individuals include professional engineers, factory trained and certified technicians, and licensed electricians with experience in testing protective equipment. The Company reserves the right to witness verification testing or require written certification that the testing was performed.

- b. Verification testing shall also be performed every four years. The Company reserves the right to perform, at its expense, additional verification testing. All verification tests prescribed by the manufacturer shall be performed. If wires must be removed to perform certain tests, each wire and each terminal shall be clearly and permanently marked. The Customer-Generator shall maintain verification test reports for inspection by the Company.
- c. Inverters shall be verified once per year as follows: once per year the Customer-Generator shall operate the customer generator system disconnect switch and verify the Generating Facility automatically shuts down and does not reconnect with the Company's system until the Company's system continuous normal voltage and frequency have been maintained for a minimum of 5 minutes. The Customer-Generator shall maintain a log of these operations for inspection by the Company.
- d. Any system that depends upon a battery for trip power shall be checked once per month for proper voltage. Once every four (4) years the battery shall either be replaced or have a discharge test performed. The Customer-Generator shall maintain a log of these operations for inspection by the Company.
- e. Tests and battery replacements as specified in this section 2 of Exhibit B shall be at the Customer-Generator's expense.

3. Inspection of the Generating Facility.

- 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 Customer-Generator), observe the construction of the Generating Facility (including but not limited to relay settings and trip schemes) and the equipment to be installed therein.
- b. Within fourteen days after receiving a written request from the Customer-Generator to begin producing electric energy in parallel with the Company's system, the Company may inspect the Generating Facility (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 begin producing electric energy based upon the inspection or verification test results.
- c. If the Company does not perform an inspection of the Generating Facility (including but not limited to relay settings and trip schemes) and observe the performance of verification testing within the fourteen-day period, the Customer-Generator may begin to produce energy after certifying to the Company that the Generating Facility 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 Generating Facility (including but not limited to relay settings and trip schemes) and make reasonable inquiries of the Customer-Generator, but only for purposes of determining whether the verification tests were properly performed. The Customer-

Generator 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.

- d. 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 Generating Facility (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 Generating Facility commences operations.

4. Operating Records and Procedures.

- a. The Company may require periodic reviews of the maintenance records, and available operating procedures and policies of the Generating Facility.
- b. The Customer-Generator must separate the Generating Facility from the Company's system whenever requested to do so by the Company's System Operator pursuant to this Agreement. It is understood and agreed that at times it may not be possible for the Company to accept electric energy due to temporary operating conditions on the Company's system, and these periods shall be specified by the Company's System Operator. Notice shall be given in advance when these are scheduled operating conditions.
- c. Logs shall be kept by the Customer-Generator 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.

5. Changes to the Generating Facility, Operating Records, and Operating Procedures.

- a. The Customer-Generator agrees that no material changes or additions to the Generating Facility as reflected in the single-line diagram, relay list, trip scheme and settings of the Generating Facility, Generating Facility Equipment List, and three-line diagram (if the Generating Facility's capacity is greater than or equal to 30 kW), 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 Generating Facility (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 Generating Facility, operating records, and operating procedures and policies are required by the Company, the Company shall specify such changes or additions to the Customer-Generator in writing, and the Customer-Generator shall, as soon as practicable, but in no event later than thirty (30) 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 Customer-Generator

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.

[Additional terms and provisions to be added as necessary. Note: This parenthetical phrase should be deleted when the agreement is finalized.]

6. Generating Facility Equipment List.

The Generating Facility shall include the following equipment:

[Specific items to be added as necessary. The Generating Facility Equipment List, together with the single-line diagram, relay list and trip scheme, and three-line diagram (if the Generating Facility's capacity is greater than or equal to 30 kW), should be attached to this Exhibit C. Note: This parenthetical phrase should be deleted when the agreement is finalized.]

EXHIBIT D

COMPANY-OWNED INTERCONNECTION FACILITIES

(To be filled out by Company if Generating Facility is greater than 10 kW)

1. Description of Company Interconnection Facilities

The Company will purchase, construct, own, operate and maintain all interconnection facilities required to interconnect the Company's system with the Generating Facility at _____ volts, up to the point of interconnection.

The Company Interconnection Facilities, for which the Customer-Generator agrees to pay, include:

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

2. Customer-Generator Payment to Company for Company Interconnection Facilities, Review of Generating Facility, and Review of Verification Testing

The Customer-Generator shall pay to the Company the total estimated interconnection cost to be incurred by the Company (Total Estimated Interconnection Cost), which is comprised 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 Generating Facility which allow interconnected operation, and iii) witnessing and reviewing the verification testing. The following summarizes the Total Estimated Interconnection Cost:

	Estimated
Description	Cost (\$)

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

Total Estimated Interconnection Cost \$

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

Within thirty (30) days of receipt of an invoice, which shall be provided within fourteen (14) days of the final accounting, which shall take place within sixty (60) days of completion of

construction of the Company Interconnection Facilities, the Customer-Generator shall remit to the Company the difference between the Total Estimated Interconnection Cost paid to date and the total actual interconnection cost (Total Actual Interconnection Cost). The latter is comprised of (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 Generating Facility which allow interconnected operations as such are described in Exhibit B, and iii) reviewing the verification testing. 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 Customer-Generator within thirty (30) days of the final accounting.

If the Agreement is terminated prior to the Customer-Generator'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 overcollected amount of the Total Estimated Interconnection Cost (or the portion of this cost which has been paid), such payments shall be made by the Customer-Generator or Company, as appropriate. If payment is due to the Company, the Customer-Generator shall pay within thirty (30) days of receipt of an invoice, which shall be provided within fourteen (14) days of the final accounting, which shall take place within sixty (60) days of the date the Agreement is terminated. If payment is due to the Customer-Generator, the Company shall pay within thirty (30) 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 Customer-Generator monthly and the Customer-Generator will, within 30 days after the billing date, reimburse the Company for any costs incurred in operating, maintaining 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.

APPENDIX II

TECHNICAL SPECIFICATIONS FOR CUSTOMER SELF-SUPPLY SYSTEMS

The following technical specifications are intended to provide guidelines to facilitate the interconnection and parallel operation of Self-Supply Systems with the utility's Distribution System. These technical specifications have been established to maintain safety, reliability, and power quality standards for all utility customers and personnel. Unless otherwise defined herein, capitalized terms shall have the definitions set forth in Rule 14, Paragraph H.

Accounting Towards Circuit Hosting Capacity

~~As stated in Rule 14, Section H, Appendix III, expedited review of Self-Supply Systems is subject to the Self-Supply System passing the Circuit Level Hosting Capacity Test, i.e. Technical Review Screen No. 2. This Appendix II includes technical specifications for two(2) types of Self-Supply Systems: (1) Reduced Impact Systems; and (2) Minimal Impact Systems. For the sole purpose of counting a Self-Supply System's capacity towards the Circuit Hosting Capacity limit, the effective capacity of the Self-Supply System will generally be calculated as follows:~~

- ~~• **Reduced Impact Systems:** The effective capacity of the Reduced Impact System will be calculated as the maximum amount of real power the facility may produce at any one instance, with considerations given to the operational design of the facility and its equipment.~~
- ~~• **Minimal Impact Systems:** The effective capacity of the Minimal Impact System will be zero (0), i.e. a Minimal Impact System will pass Screen No. 2 (Circuit Hosting Capacity Test).~~

Technical Specifications—Reduced Impact Systems

~~Self-Supply Systems that meet the requirements stated in this Section A shall qualify as Reduced Impact Systems.~~

- **Maximum System Size.** The Generating Facility shall have a capacity of not more than one hundred kilowatts (100 kW).
- **Host Load Only.** The Generating Facility shall be sized and designed such that all of the Generating Facility's output is consumed by the Eligible Customer-Generator's load ("Host Load").
- **Non-Export Requirements.** The Generating Facility shall be designed to minimize the transfer of electrical energy from the Generating Facility to the utility. Under no circumstances, except during emergency conditions where advanced inverter functions, including functions that result in energy export, may be provided pursuant to Rule 14H and this Agreement, shall the Generating Facility export electrical energy across the Point of Interconnection for a duration exceeding 10-60 seconds with reverse power flow ~~of no more than 2% of the inverter rating,~~ i.e. Inadvertent Export. In order to qualify as a Self-Supply System under the Company's Customer Self-Supply tariff, the Generating Facility must utilize one or more of the following options:

HAWAIIAN ELECTRIC COMPANY, INC.

Option 1 (“Reverse Power Protection”): To ensure power is never exported across the Point of Interconnection, a reverse power relay may be provided. The default setting for this protective function shall be 0.1% (export) of the service transformer’s rating, with a maximum 2.0 second time delay.

Option 2 (“Minimum Power Protection”): To ensure at least a minimum amount of power is imported across the Point of Interconnection at all times (and, therefore, that power is not exported, other than for the short time periods noted), an under-power protective function may be provided. The default setting for this Minimum Power Protection shall be 5% (import) of Generating Facility’s total gross rating, with a maximum 2.0 second time delay.

Option 3 (Certified Non-Islanding Protection): To ensure the incidental export of power is limited to acceptable levels, this option requires that all of the following conditions be met: a) the total gross capacity of the Generating Facility must be no more than 25% of the nominal ampere rating of producer’s dedicated service equipment; b) the total gross capacity of the Generating Facility must be no more than 50% of producer’s dedicated service transformer capacity rating (this capacity requirement does not apply to Eligible Customer-Generator taking primary service without an intervening transformer); and c) the Generating Facility must be Certified as Non-Islanding.

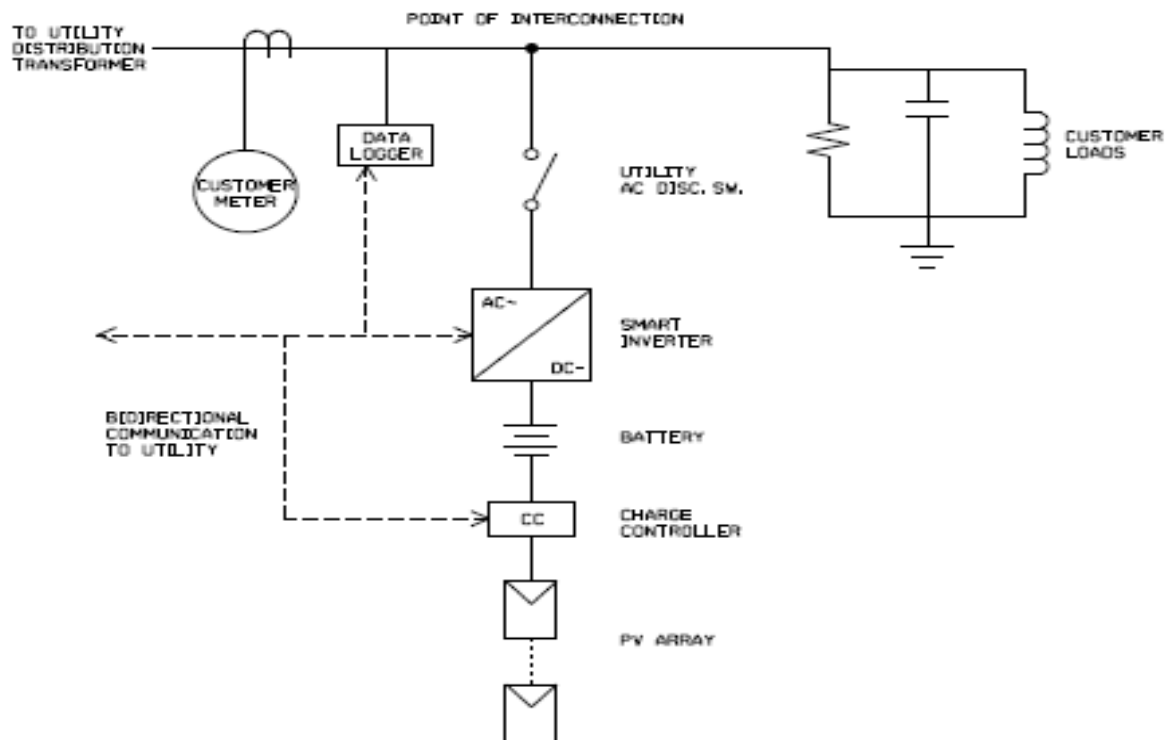
The ampere rating of the Eligible Customer-Generator’s service equipment to be used in this evaluation will be that rating for which the Eligible Customer-Generator’s utility service was originally sized or for which an upgrade has been approved. It is not the intent of this provision to allow increased export simply by increasing the size of the Eligible Customer-Generator’s service panel, without separate approval for the resize.

Option 4 (Relative Generating Facility Rating): This option, when used, requires the net rating of the Generating Facility to be small enough in comparison to its host facility’s minimum load such that the use of additional protective functions is not required to ensure that power will not be exported to the Company’s Distribution System. This option requires the Generating Facility capacity to be no greater than 50% of the Eligible Customer-Generator’s verifiable minimum Host Load over the past 12 months. This option only applies to Eligible Customer-Generators with load profile metering with at least 12 months of historical data.

Option 5 (Advanced Inverter Functionality): Inadvertent export is the unscheduled and uncompensated export of real power from a Generating Facility for a duration exceeding 0.1 seconds but less than ~~10-60~~ seconds. This option, which is only available to Generating Facilities smaller than 100 kW, utilizes an inverter to prevent export lasting longer than ~~10-60~~ seconds, i.e., export lasting longer than inadvertent export. This option requires the use of an internal transfer relay or energy management software within an inverter device that will prevent reverse power flow lasting longer than ~~10-60~~ seconds. ~~Additionally, any communication failure (if applicable) will limit the maximum Generating Facility output to 2% of the inverter rating.~~ To ensure limited impact to the Distribution and Transmission System, the expected frequency of inadvertent export occurrences should be less than two occurrences per 24-hour period. ~~Additionally, a separate reverse power or underpower~~

~~protective function will be required (in addition to the advance inverter functionality described above) to trip the connected Generating Facility if the duration of reverse power or underpower (i.e., ANY export) exceeds 10 seconds. If the advanced inverter is certified by an accredited Nationally Recognized Testing Laboratory to meet nationally recognized test standard or industry developed test standard approved by the Company, in accordance with the inadvertent export requirements stated in this option (inclusive of the ability for the Generating Facility to trip for exports exceeding 10 seconds), a separate reverse power or underpower protective function is not be required.~~

- **Advanced Inverter Requirements to Provide Grid Support.** The Generating Facility shall comply with the advanced inverter requirements set forth in Rule 14, Paragraph H, Appendix III (Advanced Inverter Generating Facility Design And Operating Requirements).
- ~~**Energy Storage.** If a Self Supply System is designed to incorporate the use of energy storage, the Generating Facility shall be designed, sized, and operated in a manner such that energy storage capacity is available on a daily basis to store the expected excess energy produced by the Generating Facility, where the Generating Facility is sized larger than the Customer's Host Load.~~
- **Sample Single Line Diagram**



~~A. Technical Specifications~~ Minimal Impact Systems

~~Self Supply Systems that meet the requirements stated in Section A above and this Section B shall qualify as Minimal Impact Systems. If there is a conflict between the technical specifications set forth in Section A with any technical specifications set forth in this Section B, the specifications set forth in this Section B shall prevail.~~

- ~~• **Control Algorithms.** The Generating Facility shall include control algorithms that enable the Generating Facility to filter fluctuations (or real power smoothing) caused by the intermittency of the Generating Facility.~~
- ~~• **Output Shifting Control.** The Generating Facility shall include output shifting controls to prevent Customer's Host Load from being served by the Generating Facility during critical periods of low load and/or high solar irradiance (i.e. 10 a.m. to 3 p.m.). For example, the energy output of the Generating Facility must be stored in its entirety by an energy storage device between 10 a.m. and 3 p.m. The Generating Facility's energy storage device may supply power to serve the Customer's Host Load before 10am and after 3pm. The Generating Facility shall have a means to provide time synchronization via NTP or GPS clock to coordinate the output shifting control period (i.e. 10am to 3pm).~~

~~**B. Required Customer Documentation.** Eligible Customer Generator shall submit all documentation to verify compliance with the requirements stated herein. Documentation includes but not limited to: system performance data, engineering drawings, equipment datasheet or specifications, control descriptions, and/or operational descriptions. Based on the Eligible Customer Generator submittals, the Company at its sole discretion, will determine whether the proposed Generating Facility complies with the requirements of the foregoing tariff, including this Appendix II.~~

Exhibit C: Grid-Supply Tariff

Rule No. [XX]

CUSTOMER GRID SUPPLY

A. AVAILABILITY FOR CUSTOMER-GENERATORS

Customer Grid-Supply service is available to permanent customers (“Eligible Customer-Generator”) who own (or lease from a third party) and operate (or contract to operate with a third party) a solar, wind turbine, biomass, or hydroelectric energy generating facility, or a hybrid system consisting of two or more of these facilities (“Generating Facility” or “Grid-Supply System”), with a capacity of not more than one hundred kilowatts (100 kW) and where:

1. The Generating Facility which may include an energy storage system, is located on the Eligible Customer-Generator’s premises,
2. The Generating Facility will be operated in parallel with the Company’s transmission and distribution facilities,
3. The Generating Facility is in conformance with the Company’s interconnection requirements provided in Rule No. 14, Paragraph H.
4. The Generating Facility is sized and designed such that all of the Generating Facility’s output is intended to offset all or part of the Eligible Customer-Generator’s own electrical requirements (“Host Load”)

B. GRID SUPPLY ~~STANDARD POWER PURCHASE AND~~ INTERCONNECTION AGREEMENT

1. Eligible Customer-Generator shall complete and sign an application for service and a standard Grid-Supply ~~Standard Power Purchase and~~ Interconnection Agreement (100 kW or less) provided as Appendix I of this Rule (“Interconnection Agreement”), to receive Grid-Supply service. Where the Eligible Customer-Generator is not the person or entity in whose name electric service is rendered for the Eligible Customer-Generator’s premises where the Generating Facility is located, i.e. where a landlord-tenant relationship exists, only the Eligible Customer-Generator shall be required to complete and sign the application for service and the Interconnection Agreement.
2. The Eligible Customer-Generator’s Generating Facility and interconnection systems must be in compliance with all applicable safety and performance standards of the National

Electric Code (NEC), the Institute of Electrical and Electronic Engineers (IEEE), accredited testing laboratories such as Underwriters Laboratories (UL), the Company's interconnection requirements provided in Rule No. 14, Section H, and is subject to any other requirements provided in the Interconnection Agreement.

C. METERING AND BILLING

1. The Company, at its expense, may install meter(s) to record the flow of electric power in each direction. The Eligible Customer-Generator shall, at its expense, provide, install and maintain all conductors, service switches, fuses, meter sockets, meter instrument transformer housing and mountings, switchboard meter test buses, meter panels and similar devices required for service connection and meter installations on the customer's premises in accordance with the Company's Rule No. 14, Section A.2.
2. Eligible Customer-Generators served under this tariff who also receive energy from the Company shall be billed monthly for the energy supplied by the Company, in accordance with the Company's Rule No. 8, the applicable rate schedule, and the Company's rules filed with the Commission.
3. All rates, terms, and conditions from the applicable rate schedule will apply except for the minimum charge. The minimum charge shall be as follows:

Applicable Rate Schedule:

Schedule R, TOU-R, TOU EV	\$25.00 per month
Schedule G, TOU-G,	\$50.00 per month
Schedule J, TOU-J, U, SS	Per Rate Schedule
Schedule DS	Per Rate Schedule
Schedule P	Per Rate Schedule
Schedule F	Per Rate Schedule
Schedule EV-R, EV-C, EV-F	Per Rate Schedule

4. The measurement of the kWh supplied by the Company to the Customer-Generator and the kWh received by the Company from the Customer ~~for the first bill of the initial 12-month reconciliation period~~ shall begin on the date of installation of the required meter(s) or Company's approval to interconnect the Generating Facility, whichever comes later. Each subsequent ~~12~~-billing months shall represent the Customer-Generator's reconciliation period.
5. All kWh received by the Company from the Eligible Customer-Generator shall be assigned ~~a dollar value as~~ Energy Credits. The Energy Credits ~~earned~~ for the billing period shall be calculated as the applicable Energy Credit Rate multiplied by the energy received by the Company from the Customer-Generator during the billing period, or the energy delivered by the Company to the Customer-Generator, whichever is less. The applicable Energy Credit Rates for each rate schedule shall be as follows:

Energy Credit Rates for Each Applicable Rate Schedule:

Schedule R, TOU-R, TOU EV, EV-R	15.07 <u>18.0</u> cents per kWh
Schedule G, TOU-G, EV-C non-demand	15.07 <u>17.7</u> cents per kWh
Schedule J, TOU-J, U, SS, EV-C demand, EV-F	15.07 <u>16.9</u> cents per kWh
Schedule DS	15.07 <u>16.2</u> cents per kWh
Schedule P	15.07 <u>16.4</u> cents per kWh
Schedule F	15.07 <u>17.7</u> cents per kWh

Energy Credit Rates shall be effective for a period of ~~five~~two (~~5~~2) years from ~~Eligible Customer-Generators Company's approval of the Interconnection Agreement~~the effective date of this Grid-Supply Tariff. Thereafter, the ~~terms of the Interconnection Agreement, including~~ applicable Energy Credit Rates, shall be subject to any future modification by the Commission.

- ~~6. In each billing period, the Eligible Customer-Generator's available Energy Credits, including those earned for the billing period plus any Unused Energy Credits from the current 12-month reconciliation period shall be applied against the total of the electric bill calculated under the applicable rate schedule for the energy delivered by the Company to the Customer-Generator in the billing period. Such Energy Credits applied shall appear as a separate line item on the customer bill. Application of Energy Credits may only reduce the electric bill to an amount equal to the minimum charge for the applicable rate schedule, plus any other applicable fixed charges for the billing period. Any Unused Energy Credits shall be carried forward to subsequent billing periods within the current 12-month reconciliation period.~~
- ~~7.~~
- ~~8.6. At the end of each 12-month reconciliation period, a final reconciliation will be made for any remaining Unused Energy Credits. Unused Energy Credits will be applied to the excess of the total of the electric bill above the minimum charge plus any other applicable fixed charges for the 12-month reconciliation period. Any Energy Credits applied in this reconciliation shall be included with any applicable Energy Credits for the current billing month on the customer bill line item credit. Application of Energy Credits may only reduce the electric bill to an amount equal to the minimum charge plus any other applicable fixed charges in any billing period. Any Unused Energy Credits that are not applied in this final reconciliation each billing period shall be forfeited.~~

D. INTERCONNECTION PROCESS

1. Eligible Customer-Generator requests to interconnect and operate a Generating Facility in parallel with the Company's electric system will be processed in accordance with the procedures in the Interconnection Process Overview provided in Appendix III of Rule 14, Paragraph H.

2. Under no circumstances shall a Customer-Generator interconnect and operate a Generating Facility in parallel with the Company's electric system without prior written approval by the Company in the form of a fully executed Interconnection Agreement.

APPENDIX 1

GRID-SUPPLY ~~STANDARD POWER PURCHASE AND~~ INTERCONNECTION AGREEMENT

(100 kW or less)

This ~~Transitional Renewable Energy Tariff~~ Grid-Supply Interconnection Agreement (100 kW or less) (“Agreement”) is made by and between:

____ (“Company”),
____ (“Customer-Generator”) and, if applicable,
____ (“Owner/Operator”),

and is made, effective and binding as of _____ (“Effective Date”). Company and Customer-Generator may be referred to individually as a “Party” and collectively as the “Parties”.

WHEREAS, Company is an operating electric public utility subject to the Hawaii Public Utilities Law, Hawaii Revised Statutes, Chapter 269, and the rules and regulations of the Hawaii Public Utilities Commission (“Commission”);

WHEREAS, the Customer-Generator receives permanent service from the Company;

WHEREAS, the Customer-Generator qualifies as an “Eligible Customer-Generator,” as defined in the Company’s ~~Transitional Renewable Energy~~ Customer Grid-Supply Tariff;

WHEREAS, the Customer-Generator intends to construct a generating facility, as further described herein (“Generating Facility”) and desires to interconnect and operate the Generating Facility in parallel with the Company’s electric system ~~and to sell to the Company electric energy generated by the Customer-Generator’s Generating Facility under Company’s Transitional Renewable Energy Tariff;~~

~~**WHEREAS**, the Company wishes to purchase such energy from the Customer-Generator upon the terms and conditions set forth herein;~~

WHEREAS, the Owner/Operator, may be a person or entity other than the Customer-Generator, who owns and operates the Generating Facility.

NOW, THEREFORE, in consideration of the premises and the respective promises herein, the Company and the Customer-Generator, and if applicable, the Owner/Operator, hereby agree as follows:

1. **Notice 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. Customer-Generator acknowledges that such modifications

may positively or negatively impact any potential savings or the value of Customer-Generator's Agreement and Generating Facility.

CUSTOMER-GENERATOR SHALL ACKNOWLEDGE AND SIGN THE “NOTICE AND DISCLAIMER – POSSIBLE FUTURE RULES AND/OR RATE CHANGES AFFECTING YOUR GENERATING FACILITY” ATTACHED HERETO AS EXHIBIT A.

Without limiting the foregoing, Energy Credit Rates shall be effective for a period of ~~five~~two (~~5~~2) years from ~~Eligible Customer-Generators Company's approval of the Interconnection Agreement~~the effective date of the Grid-Supply Tariff. Thereafter, the ~~terms of the Interconnection Agreement, including~~ applicable Energy Credit Rates, shall be subject to any future modification by the Commission.

2. **Effectiveness of Agreement.** This Agreement shall not be effective until approved and executed by each Party, i.e. upon the Effective Date. Customer-Generator shall not interconnect and operate the Generating Facility in parallel with the Company's system prior to approval and execution of this Agreement by the Company, except to extent necessary to obtain governmental or utility approvals. Until this Agreement is effective, no Party shall have any legal obligations arising hereunder, express or implied, and any actions taken by a Party in reliance on the terms of this Agreement prior to the Effective Date shall be at that Party's own risk.
3. **Term and Termination.** This Agreement shall continue on a month-to-month basis from the Effective Date. Customer-Generator may terminate this Agreement at any time with thirty (30) days' written notice. Company may terminate this Agreement at any time if Customer-Generator fails to comply with any term of this Agreement or if Customer-Generator fails to be an Eligible Customer-Generator.
4. **Generating Facility Description.** For the purposes of this Agreement, the “Generating Facility” is defined as the equipment and devices, and associated appurtenances, owned by the Customer-Generator, which produce electric energy for use by the Customer-Generator and are to be interconnected and operated in parallel with the Company's system. The Generating Facility is identified in Exhibit B (Description of Generating Facility) attached hereto.
5. **Scope of Agreement.** The Parties understand and agree that this Agreement applies only to the operation of Customer-Generator's Generating Facility described in Exhibit B attached hereto.
6. **Parallel Operation.** Company shall allow Customer-Generator to interconnect and operate the Generating Facility in parallel with the Company's distribution system in accordance with the terms and conditions of this Agreement and Company Rule 14, Paragraph H (Interconnection of Distributed Generating Facilities Operating in Parallel With The Company's Electric System) (“Rule 14H”).
7. **Permits and Licenses.** Customer-Generator shall be responsible for the design, installation, operation, and maintenance of the Generating Facility and shall obtain at its expense, and

maintain any required governmental authorizations and/or permits for the construction and operation of the Generating Facility. Customer-Generator shall not commence parallel operation of the Generating Facility until Company has provided written approval. Company shall provide such written approval within ~~thirty-five~~ (30) business days from Company's receipt of a copy of the final inspection or approval of the Generating Facility, which has been issued by the governmental authority having jurisdiction to inspect and approve the installation. Company's written approval shall not be unreasonably withheld. Company shall have the right to have its representatives present at the final inspection made by the governmental authority having jurisdiction to inspect and approve the installation of the Generating Facility. Customer-Generator shall be required to notify Company in accordance with the terms of Section 18 (Notices), herein, at least five (5) business days prior to such inspection.

8. **Installation.**

- (a) Design, installation, operation and maintenance of the Generating Facility shall include appropriate control and protection equipment as specified by the Company, including but not limited to an automatic load-break device such as a circuit breaker or inverter and a manual disconnect that has a visible break or breaker with rack-out capability to isolate the Generating Facility from the Company's system. The manual disconnect device must be accessible by the Company and be capable of being locked by the Company in the open position, to establish working clearance for maintenance and repair work in accordance with the Company's safety rules and practices. The disconnect devices shall be furnished and installed by the Customer-Generator and are to be connected between the Generating Facility and the Company's electric system. The disconnect devices shall be located in the immediate vicinity of the electric meter serving the Customer-Generator. The manual disconnect device shall be, at a minimum, clearly labeled "Customer-Generator System Disconnect". With permission of the Company, the disconnect devices may be located at an alternate location which is readily and safely accessible to the Company on a 24-hour basis. Such alternate location shall be clearly identified with signage placed in the immediate vicinity of the electric meter serving the Customer-Generator.
- (b) The Customer-Generator grants access to the Company to utilize the disconnect device, if needed. The Customer-Generator shall obtain the authorization from the owner and/or occupants of the premises where the Generating Facility is located that allows the Company to access the Generating Facility for the purpose specified in this Agreement. Company may enter premises where the Generating Facility is located, as permitted by law or tariff, for the following purposes: (a) to inspect Generating Facility's protective devices and read or test meter(s); and (b) to disconnect the Generating Facility and/or service to Customer-Generator, 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 Generating Facility, or the absence or failure of properly operating protective device.

- (c) Under no circumstances shall a Customer-Generator interconnect and operate a generating facility in parallel with the Company's electric system without prior written approval by the Company in the form of a fully executed Agreement.

~~(d) — Generating facilities that incorporate the use of an energy storage device, e.g. battery storage, regardless of whether such energy storage device is intended to operate in parallel with the Company's transmission and/or distribution facilities, shall obtain an interconnection review by the Company pursuant to this Agreement. Energy storage systems that are intended to be installed by an Eligible Customer-Generator after Company's execution of an Agreement shall constitute a material change and addition to a generating facility and shall require interconnection review pursuant to this Rule prior to installation. —~~

~~(e)~~(d) Once a Generating Facility is interconnected to the Company's system, the Company reserves the right to require the installation of, or modifications to, equipment determined by the utility 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. Such installation or modification shall be made by mutual agreement of the Company and the Customer-Generator. Any disputes related to this provision shall be resolved according to the dispute resolution process described in Rule 14H.

9. **Metering.** Within fifteen (15) days of execution of this Agreement, the Company will supply, own, and maintain all necessary meters and associated equipment utilized for billing and energy purchase. The meters will be tested and read in accordance with the rules of the Commission and the Company. The Customer-Generator, at its expense, shall provide, install and maintain all conductors, service switches, fuses, meter sockets, meter instrument transformer housing and mountings, switchboard meter test buses, meter panels and similar devices required for service connection and meter installations on the Customer-Generator's premises in accordance with the Company's Rule 14H.

10. **Interconnection Facilities.**

- (a) **Customer-Generator-Owned Interconnection Facilities (for Generating Facilities Larger than 10 kW).**

- (1) The Customer-Generator shall furnish, install, operate and maintain, at its cost, the interconnection facilities (such as circuit breakers, relays, switches, synchronizing equipment, monitoring equipment, and control and protective devices and schemes) identified in Exhibit C (Customer-Generator-Owned Generating Facility and Interconnection Facilities).
- (2) The point of interconnection is shown on the single-line diagram and three-line diagram (provided by the Customer-Generator and reviewed by the Company) which are attached to Exhibit C (Customer-Generator-Owned Generating Facility

and Interconnection Facilities) (provided that the three-line diagram is not required if the Generating Facility's capacity is less than 30 kW). Pursuant to Company Rule 14H, Appendix I (Distributed Generating Facility Interconnection Standards Technical Requirements), Section 6.c (Review of Design Drawings), the Company must review and approve Customer-Generator's single-line and three-line diagrams prior to Customer-Generator constructing of the Generating Facility interconnection.

- (3) The Customer-Generator agrees to test the Generating Facility, to maintain operating records, and to follow such operating procedures, as may be specified by the Company to protect the Company's system from damages resulting from the parallel operation of the Generating Facility, including such testing, records and operating procedures as more fully described in Exhibit C attached hereto.
- (4) The Company may inspect the Generating Facility and Customer-Generator's interconnection facilities.

(b) **Company-Owned Interconnection Facilities (for Generating Facilities Larger than 10 kw).**

- (1) The Company agrees to furnish, install, operate and maintain such interconnection facilities on its side of the point of interconnection with the Generating Facility as required for the parallel operation with the Generating Facility and more fully described in Exhibit D (Company-Owned Interconnection Facilities) attached hereto and made apart hereof ("Company Interconnection Facilities"). All Company Interconnection Facilities shall be the property of the Company. Where portions of the Company Interconnection Facilities are located on the Customer-Generator's premises, the Customer-Generator 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 Customer shall provide these at no expense to the Company.
- (2) The Customer-Generator agrees to pay to the Company: (1) a non-refundable contribution for the Company's investment in the Company Interconnection Facilities described in Exhibit D (Company-Owned Interconnection Facilities), subject to the terms and conditions included in Exhibit D 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 Generating Facility on the Company's system, ~~but will include the actual cost (or such lesser amount as the Company may specify to facilitate the processing of interconnection requests for similarly situated facilities) of additional technical study for the Generating Facility.~~

11. ~~**Purchase of Energy by the Company; Billing and Payment.** For Customer-Generator's full compensation under this Agreement, the Company agrees to purchase energy from the Customer-~~

~~Generator pursuant to the terms and conditions set forth in Exhibit E (Company's Payment Obligations) attached hereto.~~

~~12. Sale of Energy by the Company to the Customer-Generator. Sales of energy delivered by the Company to the Customer-Generator shall be governed by the applicable rate schedule and the Company's rules filed with the Commission.~~

13.11. Indemnification:

- (a) The Customer-Generator shall indemnify, defend and hold harmless the Company and its officers, directors, agents and employees, from and against all liabilities, damages, losses, fines, penalties, claims, demands, suits, costs and expenses (including reasonable attorney's fees and expenses) to or by third persons, including the Company's employees or subcontractors, for injury or death, or for injury to property, arising out of the actions or inactions of the Customer-Generator (or those of anyone under its control or on its behalf) with respect to its obligations under this Agreement, and/or arising out of the installation, operation and maintenance of the Generating Facility and/or the Customer-Generator Interconnection Facilities, except to the extent that such injury, death or damage is attributable to the gross negligence or intentional act or omission of the Company or its officers, directors, agents or employees.
- (b) The Owner/Operator shall indemnify, defend and hold harmless the Company and its officers, directors, agents and employees, from and against all liabilities, damages, losses, fines, penalties, claims, demands, suits, costs and expenses (including reasonable attorney's fees and expenses) to or by third persons, including the Company's employees or subcontractors, for injury or death, or for injury to property, arising out of the actions or inactions of the Owner/Operator (or those of anyone under its control or on its behalf) with respect to its obligations under this Agreement, and/or arising out of the installation, operation and maintenance of the Generating Facility and/or the Interconnection Facilities, except to the extent that such injury, death or damage is attributable to the gross negligence or intentional act or omission of the Company or its officers, directors, agents or employees.
- (c) The Company shall indemnify, defend and hold harmless the Customer-Generator, and its officers, directors, agents and employees, from and against all liabilities, damages, losses, fines, penalties, claims, demands, suits, costs and expenses (including reasonable attorney's fees and expenses) to or by third persons, including the Customer-Generator's employees or subcontractors, for injury or death, or for injury to property, arising out of the actions or inactions of the Company (or those of anyone under its control or on its behalf) with respect to its obligations under this Agreement, and/or arising out of the installation, operation and maintenance of the Company Interconnection Facilities, except to the extent that such injury, death or damage is attributable to the gross negligence or intentional act or omission of the Customer-Generator or its officers, directors, agents or employees.

Provided, however, where the Customer-Generator is an agency of the United States, the following Section shall be applicable in place of Paragraphs 14(a) and (b):

“The United States understands that it may be held liable for loss, damages expense and liability to third persons and injury to or death of persons or injury to property caused by the United States in its engineering design, construction ownership or operations of, or the making of replacements, additions betterment to, or by failure of, any of such party’s works or facilities used in connection with this Agreement to the extent allowed by the Federal Tort Claims Act 28 U.S.C. § 2671 et seq. and the Agreement Disputes Act of 1978, 41 U.S.C. §§ 601-613.

Company shall be responsible for damages or injury caused by Company, Company’s agents, officers, and employees in the course of their employment to the extent permitted by law.”

Provided, however, where the Customer-Generator is an agency of the State of Hawaii (the “State”), the following Section shall be applicable in place of Paragraphs 14(a) and (b):

“The State shall be responsible for damages or injury caused by the State’s agents, officers, and employees in the course of their employment to the extent that the State’s liability for such damage or injury has been determined by a court or otherwise agreed to by the State. The State shall pay for such damage and injury to the extent permitted by law. The State shall use reasonable good faith efforts to pursue any approvals from the Legislature and the Governor that may be required to obtain the funding necessary to enable the State to perform its obligations or cover its liabilities hereunder. The State shall not request Company to indemnify the State for, or hold the State harmless from, any claims for such damages or injury.

Company shall be responsible for damages or injury caused by Company, Company’s agents, officers, and employees in the course of their employment to the extent that Company’s liability for such damage or injury has been determined by a court or otherwise agreed to by Company, and Company shall pay for such damage and injury to the extent permitted by law. Company shall not request the State to indemnify Company for, or hold Company harmless from, any claims for such damages or injury.”

- (d) Nothing in this Agreement shall create any duty to, any standard of care with reference to, or any liability to any person not a party to it.

14.12. Continuity of Service.

- (a) The Company may require the Seller to temporarily curtail, interrupt or reduce deliveries of energy 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, accommodating the installation and/or testing of non-utility owned facilities to the Company system; or if the Company determines that such curtailment, interruption or reduction is necessary because of a

system emergency, forced outage, operating conditions on its system; or the inability to accept deliveries of energy due to excess energy conditions; or if either the Generating Facility does not operate in compliance with good engineering and operating practices or acceptance of energy from the Seller by the Company would require the Company to operate the Company system outside of good engineering and operating practices which in this case shall include, but not be limited to, excessive system frequency fluctuations or excessive voltage deviations, and any situation that the Company system operator determines, at his or her sole discretion, could place in jeopardy system reliability.

- (b) In the event that the Company temporarily curtails, interrupts, or reduces deliveries of energy pursuant to Section ~~14~~12(a), the Company shall not be obligated to accept or ~~pay-~~apply credit for any energy from the Seller except for such energy that the Company notifies the Seller that it is able to take during this period. The Company shall take all reasonable steps to minimize the number and duration of interruptions, curtailments or reductions. Whenever feasible, Company shall give Seller reasonable notice of the possibility that interruption or reduction of deliveries may be required.

~~(c) The Company shall not be required to purchase energy during any period during which, due to operational circumstances, purchases from the Seller will result in costs greater than those which the Company would incur if it did not make those purchases, but instead generated an equivalent amount of energy itself. Without limiting the foregoing, conditions when curtailment of energy delivery by the Seller may be implemented by the Company may include when, during excess energy conditions, the Company would have to (i) cycle off-line any Base Load Unit, or (ii) remove one or more components of a combined cycle unit (such as shutting off one combustion turbine or one combustion turbine and the steam turbine of a dual-train combined cycle unit (consisting of two combustion turbines and one steam turbine)) in order to purchase energy from the Seller.~~

- ~~(d)~~(c) In the event that the Company temporarily curtails or interrupts deliveries of energy from the Generating Facility pursuant to this Section ~~14~~12, the Generating Facility shall not energize a de-energized utility line under any circumstances, but may operate the Generating Facility isolated from the utility system with an open tie point in accordance with Section 4.1 of Appendix I to Rule 14H.

~~15.~~ Curtailment Methodology

- ~~(a) Pursuant to Article 14 (Continuity of Service) of this Agreement, Company may at times have limited ability to integrate energy produced by Seller into the Company System for engineering and/or operating reasons and may be required to curtail energy deliveries by Seller. When a curtailment control signal is received by the Generating Facility through the Curtailment Control Interface, the corresponding action (e.g., decrease in the Generating Facility's output) shall be initiated without delay. Further curtailment may be implemented if conditions warrant and the Company system operator deems it necessary. As conditions warrant, Company shall end or reduce the curtailment when Company reasonably determines that the reason for the curtailment is no longer in existence. The Company system operator shall end or reduce the curtailment through the Curtailment~~

~~Control Interface. Seller may request that the Facility be restored no sooner than one hour after Company has curtailed the Facility.~~

- ~~(b) When Company determines that curtailment of energy becomes necessary for reasons other than those directly attributable to the Generating Facility, curtailments shall be made to the extent possible in reverse chronological order of the chronological seniority dates determined by Company for the power purchase agreements, with deliveries under the power purchase agreements with the most recent chronological seniority date being the first curtailed, and deliveries under the power purchase agreement with the earliest chronological seniority date being the last curtailed. The chronological seniority date shall be the Effective Date. If Seller does not achieve a Commercial Operations Date on or before 18 months following the Effective Date, the chronological seniority date for curtailment will change by adding one Day for each Day the Commercial Operations Date is later than 18 months after the Effective Date. Small generation projects (such as photovoltaic net energy metering projects, feed-in tariff projects, etc.) that are allowed to be installed without curtailment controls will not be curtailed before the Generating Facility. When Company determines that curtailment of energy becomes necessary for engineering and/or operating reasons that are directly attributable to the Generating Facility, reverse chronological curtailment order may not apply.~~
- ~~(c) If this Agreement has the same chronological seniority date as one or more other power purchase agreements, all power purchase agreements with the same chronological seniority date (including this Agreement) shall be treated as a block (collectively, the "Curtailment Block") for purposes of curtailments to be made in reverse chronological order of seniority date.~~
- ~~(d) If the Curtailment Control Interface is unavailable, due to loss of communication link, RTU failure, or other event resulting in the loss of the remote control by Company, provision must be made for Seller to be able to institute, within 30 minutes or such other period as Company accepts in writing, local curtailment raise and lower control and change in voltage regulation target via the local controls upon verbal request by the Company system operator.~~
- ~~(e) If all local and remote curtailment controls become unavailable or fail, the Generating Facility shall, without intentional delay, disconnect from the Company's System.~~
- ~~(f) If the direct transfer trip is unavailable, due to loss of communication link, RTU failure, or other event resulting in the loss of the remote control by the Company, provision must be made for the Seller to trip the main circuit breaker.~~

16.13. Personnel and System Safety. If at any time the Company determines that the continued operation of the Generating Facility may endanger any person or property, the Company's electric system, or have an adverse effect on the safety or power quality of other customers, the Company shall have the right to disconnect the Generating Facility from the Company's electric system remotely or otherwise. The Generating Facility shall remain disconnected until such time as the Company is satisfied that the endangering or power quality condition(s) has been

corrected, and the Company shall not be obligated to accept any energy from the Generating Facility during such period. The Company shall not be liable, directly or indirectly, for permitting or continuing to allow an attachment of the Generating Facility for the acts or omissions of the Customer-Generator that cause loss or injury, including death, to any third party.

17.14. Prevention of Interference. The Customer-Generator shall not operate equipment that superimposes a voltage or current upon the Company's 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 Customer-Generator 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 Customer-Generator does not take timely corrective action, or continues to operate the equipment causing interference without restriction or limit, the Company may, without liability, disconnect the Customer-Generator's equipment from the Company's system.

18.15. Limitation of Liability. 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 Customer-Generator or leased by the Customer-Generator from third parties, including without limitation the Generating Facility and any structures, equipment, wires, appliances or devices appurtenant thereto.

19.16. Customer-Generator and Generating Facility Information. By signing this Agreement, the Customer-Generator expressly agrees and authorizes the Company to: (1) request and obtain from Customer-Generator and its contractors, vendors, subcontractors, installers, suppliers or agents (collectively "Customer-Generator Agents"), at no cost to Company, ~~any~~ information related to the Generating Facility, including but not limited to Watts, Vars, Watt Hours, current and voltage, status of the generating facility, inverter settings, any and all recorded event or alarm logs recorded, (collectively "~~Customer-Generating Facility~~ Data") that Company reasonably determines, ~~in its reasonable discretion~~, are needed to ensure the safe and reliable operation of the Generating Facility or the Company's system; or (2) make such modifications to the Customer-Generator's system, at no cost to the Company, that Company determines, in its reasonable discretion, are needed to ensure the safe and reliable operation of the Generating Facility or the Company's system. Customer-Generator expressly agrees and irrevocably authorizes Customer-Generator Agents to disclose such Customer-Generator Data to Company and to make such modifications to the Customer-Generator's Generating Facility upon request by Company.

20.17. Additional Information. The Company reserves the right to request ~~estire~~ additional information from Customer-Generator relating to the Generating Facility, where reasonably necessary, to serve the Customer-Generator under this Agreement or to ensure reliability, ~~and~~ safety of operation, and power quality of the Company's system.

21.18. No Material Changes to Generating Facility. The Customer-Generator agrees that no material changes or additions to the Generating Facility shall be made without having obtained prior

written consent from the Company, which consent shall not be unreasonably withheld. In no event may the Total Rated Capacity of the Generating Facility exceed 100 kW. If a Generating Facility changes ownership, the Company may require the new Customer-Generator and/or Owner/Operator to complete and execute an amended Agreement or new Agreement, as may be applicable.

22.19. 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 below. Changes in such designation may be made by notice similarly given. All written notices shall be directed as follows:

To Customer-Generator and Owner/Operator (if applicable): The Mailing Address listed in Exhibit B (Description of Generating Facility) attached hereto.

To Company:

Name: _____
Address: _____
Facsimile: _____
Email: _____

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.

23.20. Certification by Licensed Electrical Contractor. Generating and interconnection systems must comply with all applicable safety and performance standards of the National Electrical Code (NEC), Institute of Electrical and Electronic Engineers (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, in effect at the time of signing this agreement. This requirement shall include, but not be limited to, the interconnection provisions of the Company's Rule 14H, as authorized by the Commission. Licensed Electrical Contractor, as agent for Customer-Generator, certifies in Exhibit B (Description of Generating Facility) that once approved by the Company, the proposed Generating Facility will be installed to meet all preceding requirement(s).

24.21. Force Majeure. For purposes of this Agreement, "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: (a) 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. 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 part 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.

25.22. 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.
- (a) 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.

26.23. Insurance. The following insurance provisions are only applicable to Generating Facilities with a Total Rated Capacity greater than 10 kW but not exceeding 100 kW:

The Customer-Generator shall, at its own expense and during the term of the Agreement and any other time that the Generating Facility is interconnected with the Company's system, maintain in effect with a responsible insurance company authorized to do insurance business in Hawaii, the following insurance or its equivalent at Company's discretion that will protect the Customer-Generator and the Company with respect to the Generating Facility, the Generating Facility's operations, and the Generating Facility's interconnection with the Company's system:

A commercial general liability policy, covering bodily injury and property damage combined single limit of at least the following amounts based on the Total Rated Capacity of the generator (for solar systems—Total Rated Capacity of the generator or inverter, whichever is lower, can be used with appropriate technical documentation on inverter, if not higher Total Rated Capacity will be used), for any occurrence.

Commercial General Liability Coverage Amount	Total Rated Capacity of the Generating Facility
\$1,000,000	Greater than 30 kW and less than or equal to 100 kW
\$500,000	Greater than 10 kW and less than or equal to 30 kW

The Customer-Generator has responsibility to determine if higher limits are desired and purchased. Said insurance shall name the Company, its directors, officers, agents, and employees as additional insureds, shall include contractual liability coverage for written Agreements and

agreements including this Agreement, and shall include provisions stating that the insurance will respond to claims or suits by additional insureds against the Customer-Generator or any other insured thereunder. Customer-Generator shall immediately provide written notice 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 Customer-Generator 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 Customer-Generator shall make such increase to that extent and any increased costs shall be borne by the Customer-Generator. The insurance required hereunder shall provide that it is primary with respect to the Customer-Generator and the Company. The Customer-Generator shall provide evidence of such insurance, including insurer's acknowledgement that coverage applies with respect to this Agreement, by providing certificates of insurance to the Company within 30 days of any change. Initially, certificates of insurance must be provided to the Company prior to executing the Agreement and any parallel interconnection. The Customer-Generator's indemnity and other obligations shall not be limited by the foregoing insurance requirements. Any deductible shall be the responsibility of the Customer-Generator.

Alternatively, where the Customer-Generator is a governmental entity, Customer Generator 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.

27.24. Miscellaneous.

- (a) **Disconnection and Survival of Obligations.** Upon termination of this Agreement, the Generating Facility shall be disconnected from the Company's system. The termination of this Agreement shall not relieve the Parties of their respective liabilities and obligations, owed or continuing at the time of termination.
- (b) **Governing Law and Regulatory Authority.** 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. 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.
- (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) **Termination of Existing Agreement.** This Agreement shall supersede any existing agreement, if any, under which Customer-Generator is currently operating the Generating Facility and any such agreement shall be deemed terminated as of the date this Agreement becomes effective.
- (e) **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.
- (f) **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.
- (g) **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.
- (h) **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 Hawaii, which currently are included in the Commission's General Order Number 7, as either may be amended from time to time.
- (i) **Multiple Counterparts.** This Agreement may be executed in two or more counterparts, each of which is deemed an original but all constitute one and the same instrument.

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.

CUSTOMER-GENERATOR

By: _____
Signature
Title: _____
Name: _____
Print Date

OWNER/OPERATOR OF GENERATING FACILITY
(IF OTHER THAN CUSTOMER-GENERATOR)

By: _____
Signature
Title: _____

Name: _____
Print Date

HAWAIIAN ELECTRIC COMPANY, INC.

By: _____
Signature

Title: _____

Name: _____
Print Date

EXHIBIT A

NOTICE AND DISCLAIMER

POSSIBLE FUTURE RULES AND/OR RATE CHANGES AFFECTING YOUR GENERATING SYSTEM

- ~~The Transitional Renewable Energy~~Grid Supply Tariff ~~and Rule 14H (Company Rule 14, Paragraph H (Interconnection of Distributed Generating Facilities Operating in Parallel With The Company's Electric System), including but not limited to rules related to required system controls, electricity rates, charges and fees (collectively "Interconnection Rules"))~~ are ~~is~~ subject to modification by the Hawaii Public Utilities Commission ("Commission"). The credit rate associated with any electricity exported to the grid from your Generating Facility will be fixed for two (2) years from the effective date of the Grid-Supply Tariff; however, a future Commission can modify these terms.
- Your Agreement and Generating Facility ~~(e.g. PV system)~~ shall be subject to any future modifications ~~of the Interconnection Rules ordered~~ by the Commission. Such modifications ~~to the Interconnection Rules~~ may positively or negatively impact any potential savings or the value of your Agreement and Generating Facility. You agree to pay for any costs related to such Commission-ordered modifications ~~to the Interconnection Rules~~.

By signing below, you acknowledge that you have read, understand and agree to the above Notice and Disclaimer. Further, by signing this disclaimer, you confirm your understanding that any potential savings in your electricity bill that were calculated by you or presented to you to support your decision to buy or lease a Generating Facility may change.

Customer-Generator (signature)

Date

Owner/Operator (if applicable) (signature)

Date

EXHIBIT B

DESCRIPTION OF GENERATING FACILITY

(To Be Filled Out By Customer-Generator)

1. **Customer-Generator Information**

Name (print): _____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____

Service Address: _____
(If different from Mailing Address)

City: _____ State: _____ Zip Code: _____

Phone: (____) _____ Cell: (____) _____ Email: _____

Electric Service Account or Meter #: _____

2. **Owner/Operator (if different from Customer-Generator)**

Name: _____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____

Phone: (____) _____ Cell: (____) _____ Email: _____

3. **Generator Qualifications** (Check all that apply)

- ☐ Solar
- ☐ Wind Turbine
- ☐ Biomass
- ☐ Hydroelectric
- ☐ Hybrid (describe): _____

Generating Facility Location and Tax Map Key: _____

Maximum Site Load without Generation: _____ kW

Minimum Site Load without Generation: _____ kW

Maximum Generating Capability: _____ kW

Maximum Export: _____ kW

4. **Generator Technical Information**

Type of Generator:

- ☐ Synchronous
- ☐ Induction
- ☐ DC Generator or Photovoltaic with Inverter

Photovoltaic System Information:

Module Manufacturer	Model	Quantity	STC Rating (kW)

Total Module Capacity: _____ kW

Inverter Manufacturer	Model	Quantity	A/C Output Rating (kW)

Total Inverter Capacity: _____ kW

Total System Capacity (lower of Total Module Capacity and Total Inverter Capacity): _____ kW

DC Generator (e.g. Wind) System Information:

DC Generator Manufacturer: _____ Model Name: _____ Model #: _____

*** A copy of Generator Nameplate and Manufacturer's Specifications Sheet may be substituted.**

Total Capacity Rating: _____ kW (For solar kW_{DC})

Fault Current Contribution of Generator: _____ Amps

Inverter Manufacturer: _____ Model Name: _____ Model #: _____

*** A copy of Generator Nameplate and Manufacturer's Specifications Sheet may be substituted.**

Total Capacity Rating: _____ kW

Energy Storage System Information:

Energy Storage System Information: (Customer to provide data sheets)

Manufacturer: _____ Model: _____

Size kW: _____ Max Capacity kWh: _____

Rated kW discharge: _____ Rated kW Charge: _____

Description of Storage System Operations:

(Describe mode(s) of operation) - Example: How much export or non-export, load shifting, smoothing, peak shaving, etc.)

Will the distribution grid be used to charge the storage device?

- ☐ Yes If yes, charging periods: _____
- ☐ No

Will power be exported to the grid??

- ☐ Yes If yes, maximum export to the grid: _____
- ☐ No

5. **Technical Information for Synchronous and Induction Generators** [Not applicable for DC Generators or Solar with Inverter]

Number of starts per day: _____ Maximum Starting kVA: _____ Generator Operating Power Factor: _____

Generator Grounding Method:

- ☐ Effectively Grounded
- ☐ Resonant Grounded
- ☐ **Low**-Inductance Grounded
- ☐ Low-Resistance Grounded
- ☐ High Resistance Grounded
- ☐ Ungrounded

Generator Characteristic Data:

* Not needed if Generator Nameplate and Manufacturer's Specification Sheet are provided.

Direct Axis Synchronous Reactance, X_d : _____ P.U.

Direct Axis Transient Reactance, X'_d : _____ P.U.

Direct Axis Subtransient Reactance, X''_d : _____ P.U.

Inertia Constant, H: _____ P.U.

Excitation Response Ratio: _____

Direct Axis Open-Circuit Transient Time Constant, X_d : _____ Seconds

Direct Axis Open-Circuit Subtransient Time Constant, T''_{do} : _____ Seconds

6. **Interconnecting Equipment Technical Data**

Will an interposing transformer be used between the generator and the point of interconnection?

- ☐ Yes
- ☐ No

Transformer Data (if applicable):

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

Size: _____ KVA

Transformer Primary: _____ Volts

- ☐ Delta
- ☐ Wye
- ☐ Wye Grounded

Transformer Secondary: _____ Volts

- ☐ Delta
☐ Wye
☐ Wye Grounded

Transformer Impedance: _____ % on _____ KVA Base

Transformer Fuse Data (if applicable):

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

- ☐ At Primary Voltage; or
☐ At Secondary Voltage

Manufacturer: _____ Type: _____ Size: _____ Speed: _____

Transformer Protection (if not fuse):

Please describe: _____

Generator Circuit Breaker (if 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

Circuit Breaker Protective Relays (if applicable):

* Enclose copy of any proposed Time-Overcurrent Coordination Curves.

Manufacturer	Type	Style/Catalog No.	Proposed Setting

Current Transformer Data (if applicable):

* Enclose copy of Manufacturer's Excitation & Ratio Correction Curves)

Manufacturer	Type	Accuracy Class	Proposed Ratio Connection
			/5
			/5
			/5
			/5

Generator Disconnect Switch:

A generator disconnect device (isolation device) must be installed with features as described in the "Distributed Generating Facility Interconnection Standards, Technical Requirements" as set forth in Rule 14 (Paragraph H.1) of the Company's tariff, and which is readily and safely accessible to Company.

Manufacturer: _____ Type: _____ Catalog No.: _____

Rated Volts: _____ Rated Amps: _____

Phase:

- ☐ Single Phase
- ☐ Three Phase

Mounting Location: _____

7. **General Technical Information**

Enclose copy of the following documents:

- ☐ **Single Line Diagram:** Showing configuration and interconnection of all equipment, current and potential circuits and protection and control schemes.
- ☐ **Relay list and trip scheme:** Showing all protection, synchronizing and auxiliary relays that are required to operate the Generating Facility in a safe and reliable manner.
- ☐ **Three-line diagram** (if the Generating Facility's capacity is greater than or equal to 30 kW): Showing potential transformer and current transformer ratios, and details of the Generating Facility's configuration, including relays, meters, and test switches.

8. **Installation Details**

Installing Electrical Contractor: _____

License Holder: _____

Hawaii License #: _____

Mailing Address: _____

City: _____ State: _____ Zip Code: _____

Phone: (____) _____ Cell: (____) _____ Email: _____

Interconnection Date*: _____ (to be filled out by the Company upon the Company's approval and execution of the Agreement).

Supply certification that the generating system will be installed and inspected in compliance with the local Building/Electrical code of the County of _____.

* Under no circumstances shall a Customer-Generator interconnect and operate a generating facility in parallel with the Company's electric system without prior written approval by the Company in the form of a fully executed Agreement. Generating facilities that incorporate the use of an energy storage device, e.g. battery storage, regardless of whether such energy storage device is intended to operate in parallel with the Company's transmission and/or distribution facilities, shall obtain an interconnection review by the Company pursuant to this Agreement. Energy storage systems that are intended to be installed by an Eligible Customer-Generator after Company's execution of an Agreement shall constitute a material change and addition to a generating facility and shall require interconnection review pursuant to this Rule prior to installation.

Generating System Building Permit # (Certificate of Completion or Notice of Electrical Inspection?): (to be filled out by the Company upon the Company's approval and execution of Agreement): _____.

9. **Generator/Equipment Certification**

Generating systems that utilize inverter technology must be compliant with *Institute of Electrical and Electronics Engineers IEEE Std 1547* and *Underwriters Laboratories UL 1703* and *UL 1741* in effect at the time this Agreement is executed.

Generating systems that use a rotating machine must be compliant with applicable National Electrical Code, Underwriters Laboratories, and Institute of Electrical and Electronics Engineers standards and rules and orders of the Public Utilities Commission of the State of Hawaii in effect at the time this Agreement is executed. **By signing below, the Applicant certifies that the installed generating equipment will meet the appropriate preceding requirement(s) and can supply documentation that confirms compliance.**

Customer-Generator: _____
Signature Date

Electrical Contractor: _____
Signature Date

10. **Insurance (if applicable)**

Insurance Carrier: _____

EXHIBIT C

CUSTOMER-GENERATOR-OWNED GENERATING FACILITY AND INTERCONNECTION FACILITIES

[To be filled out by Customer-Generator if Generating Facility greater than 10 kW]

1. Generating Facility

- a. Compliance with laws and standards. The Generating Facility, Generating Facility design, and Generating Facility drawings shall meet all applicable national, state, and local laws, rules, regulations, orders, construction and safety codes, and shall satisfy the Company's Distributed Generating Facility Interconnection Standards, Technical Requirements ("Interconnection Standards"), as set forth in Rule 14, Paragraph H.1 of the Company's tariff.
- b. Avoidance of adverse system conditions. The Generating Facility shall be designed, installed, operated and maintained so as to prevent or protect against adverse conditions on the Company's system that can cause electric service degradation, equipment damage, or harm to persons, such as:
 - Unintended islanding.
 - Inadvertent and unwanted re-energization of a Company dead line or bus.
 - Interconnection while out of synchronization.
 - Overcurrent.
 - Voltage imbalance.
 - Ground faults.
 - Generated alternating current frequency outside of permitted safe limits.
 - Voltage outside permitted limits.
 - Poor power factor or reactive power outside permitted limits.
 - Abnormal waveforms.
- c. Specification of protection, synchronizing and control requirements. The Customer-Generator 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 Generating Facility 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's system with which the Generating Facility is interconnected ("Facility Protection Devices/Schemes").
- d. Generating Facility protection. The Customer-Generator is solely responsible for providing adequate protection for the Generating Facility.
- e. Customer-Generator Interconnection Facilities.

- (i) The Customer-Generator shall furnish, install, operate and maintain interconnection facilities (such as circuit breakers, relays, switches, synchronizing equipment, monitoring equipment, and control and protective devices and schemes) designated by or acceptable to the Company as suitable for parallel operation of the Generating Facility with the Company's system ("Customer-Generator Interconnection Facilities"). Such facilities shall be accessible at all times to authorized Company personnel.
 - (ii) The Customer-Generator shall comply with the Company's Interconnection Standards. If a conflict exists between the Interconnection Standards and this Agreement, this Agreement shall control.
 - (iii) 1) Single-line diagram of the Generating Facility, 2) relay list, trip scheme and settings of the Generating Facility, 3) Generating Facility Equipment List, and 4) three-line diagram (if the Generating Facility's capacity is greater than or equal to 30 kW), 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 B 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 point of interconnection of the Generating Facility to the Company's system. The relay list, trip scheme and settings shall include all protection, synchronizing and auxiliary relays that are required to operate the Generating Facility in a safe and reliable manner. The three-line diagram shall show potential transformer and current transformer ratios, and details of the Generating Facility's configuration, including relays, meters, and test switches.
- f. **Approval of Design Drawings.** If the Generating Facility's capacity is greater than or equal to 30 kW, the single-line diagram, relay list, trip scheme and settings of the Generating Facility, 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.

2. **Verification Testing.**

- a. Upon initial parallel operation of the Generating Facility, or any time interface hardware or software is changed, a verification test shall be performed. A licensed professional engineer or otherwise qualified individual shall perform verification testing in accordance with the manufacturer's published test procedure. Qualified individuals include professional engineers, factory trained and certified technicians, and licensed electricians with experience in testing protective equipment. The Company reserves the right to witness verification testing or require written certification that the testing was performed.

- b. Verification testing shall also be performed every four years. The Company reserves the right to perform, at its expense, additional verification testing. All verification tests prescribed by the manufacturer shall be performed. If wires must be removed to perform certain tests, each wire and each terminal shall be clearly and permanently marked. The Customer-Generator shall maintain verification test reports for inspection by the Company.
- c. Inverters shall be verified once per year as follows: once per year the Customer-Generator shall operate the customer generator system disconnect switch and verify the Generating Facility automatically shuts down and does not reconnect with the Company's system until the Company's system continuous normal voltage and frequency have been maintained for a minimum of 5 minutes. The Customer-Generator shall maintain a log of these operations for inspection by the Company.
- d. Any system that depends upon a battery for trip power shall be checked once per month for proper voltage. Once every four (4) years the battery shall either be replaced or have a discharge test performed. The Customer-Generator shall maintain a log of these operations for inspection by the Company.
- e. Tests and battery replacements as specified in this section 2 of Exhibit B shall be at the Customer-Generator's expense.

3. Inspection of the Generating Facility.

- 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 Customer-Generator), observe the construction of the Generating Facility (including but not limited to relay settings and trip schemes) and the equipment to be installed therein.
- b. Within fourteen days after receiving a written request from the Customer-Generator to begin producing electric energy in parallel with the Company's system, the Company may inspect the Generating Facility (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 begin producing electric energy based upon the inspection or verification test results.
- c. If the Company does not perform an inspection of the Generating Facility (including but not limited to relay settings and trip schemes) and observe the performance of verification testing within the fourteen-day period, the Customer-Generator may begin to produce energy after certifying to the Company that the Generating Facility 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 Generating Facility (including but not limited to relay settings and trip schemes) and make reasonable inquiries of the Customer-Generator, but only for purposes of determining whether the verification tests were properly performed. The Customer-

Generator 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.

- d. 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 Generating Facility (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 Generating Facility commences operations.

4. Operating Records and Procedures.

- a. The Company may require periodic reviews of the maintenance records, and available operating procedures and policies of the Generating Facility.
- b. The Customer-Generator must separate the Generating Facility from the Company's system whenever requested to do so by the Company's System Operator pursuant to this Agreement. It is understood and agreed that at times it may not be possible for the Company to accept electric energy due to temporary operating conditions on the Company's system, and these periods shall be specified by the Company's System Operator. Notice shall be given in advance when these are scheduled operating conditions.
- c. Logs shall be kept by the Customer-Generator 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.

5. Changes to the Generating Facility, Operating Records, and Operating Procedures.

- a. The Customer-Generator agrees that no material changes or additions to the Generating Facility as reflected in the single-line diagram, relay list, trip scheme and settings of the Generating Facility, Generating Facility Equipment List, and three-line diagram (if the Generating Facility's capacity is greater than or equal to 30 kW), 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 Generating Facility (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 Generating Facility, operating records, and operating procedures and policies are required by the Company, the Company shall specify such changes or additions to the Customer-Generator in writing, and the Customer-Generator shall, as soon as practicable, but in no event later than thirty (30) 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 Customer-Generator

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.

[Additional terms and provisions to be added as necessary. Note: This parenthetical phrase should be deleted when the agreement is finalized.]

6. Generating Facility Equipment List.

The Generating Facility shall include the following equipment:

[Specific items to be added as necessary. The Generating Facility Equipment List, together with the single-line diagram, relay list and trip scheme, and three-line diagram (if the Generating Facility's capacity is greater than or equal to 30 kW), should be attached to this Exhibit C. Note: This parenthetical phrase should be deleted when the agreement is finalized.]

EXHIBIT D

COMPANY-OWNED INTERCONNECTION FACILITIES

(To be filled out by Company if Generating Facility is greater than 10 kW)

1. **Description of Company Interconnection Facilities**

The Company will purchase, construct, own, operate and maintain all interconnection facilities required to interconnect the Company's system with the Generating Facility at ____ volts, up to the point of interconnection.

The Company Interconnection Facilities, for which the Customer-Generator agrees to pay, include:

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

2. **Customer-Generator Payment to Company for Company Interconnection Facilities, Review of Generating Facility, and Review of Verification Testing**

The Customer-Generator shall pay to the Company the total estimated interconnection cost to be incurred by the Company (Total Estimated Interconnection Cost), which is comprised 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 Generating Facility which allow interconnected operation, and iii) witnessing and reviewing the verification testing. The following summarizes the Total Estimated Interconnection Cost:

<u>Description</u>	<u>Estimated Cost (\$)</u>
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[Need to specify the estimated interconnection cost. If no cost, state "None".]

Total Estimated Interconnection Cost \$

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

Within thirty (30) days of receipt of an invoice, which shall be provided within fourteen (14) days of the final accounting, which shall take place within sixty (60) days of completion of construction of the Company Interconnection Facilities, the Customer-Generator shall remit to the Company the difference between the Total Estimated Interconnection Cost paid to date and

the total actual interconnection cost (Total Actual Interconnection Cost). The latter is comprised of (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 Generating Facility which allow interconnected operations as such are described in Exhibit B, and iii) reviewing the verification testing. 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 Customer-Generator within thirty (30) days of the final accounting.

If the Agreement is terminated prior to the Customer-Generator'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 overcollected amount of the Total Estimated Interconnection Cost (or the portion of this cost which has been paid), such payments shall be made by the Customer-Generator or Company, as appropriate. If payment is due to the Company, the Customer-Generator shall pay within thirty (30) days of receipt of an invoice, which shall be provided within fourteen (14) days of the final accounting, which shall take place within sixty (60) days of the date the Agreement is terminated. If payment is due to the Customer-Generator, the Company shall pay within thirty (30) 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 Customer-Generator monthly and the Customer-Generator will, within 30 days after the billing date, reimburse the Company for any costs incurred in operating, maintaining 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 E

COMPANY'S PAYMENT OBLIGATIONS

Billing and Payment

~~A. — General:~~

~~(1) The metering and billing arrangement covered by the Transitional Renewable Energy Tariff Interconnection Agreement (100 kW or less) ("Agreement") shall be governed by the following mutually agreed-upon terms and conditions:~~

~~(2) Customer Generators under this Agreement shall be billed monthly for the billing period for the energy supplied by the Company, in accordance with the Company's Rule No. 8, the applicable rate schedule, and the Company's rules filed with the Commission.~~

~~(3) The measurement of kilowatthours supplied by the Company to the Customer Generator and the kilowatthours delivered by the Customer Generator to the Company for the first bill of the initial 12-month reconciliation period shall begin on the start date of the first billing period after the installation of the required meter(s).~~

~~(4) — Every 12 months, a reconciliation of the Customer Generator's energy consumption supplied by the Company with the energy credits delivered by the Generating Facility for that 12-month period will be performed as described in Section D of this Exhibit E (Company's Payment Obligations).~~

~~B. — Monthly Minimum Charge~~

~~Each month, the Customer Generator will be charged the Minimum Charge provided in the applicable rate schedule in effect during the billing period.~~

~~C. — Energy Credits~~

~~(1) — The Company shall pay for each kilowatt-hour of electricity delivered to the Company by Customer Generator ("Energy Credit") at the rate set forth in the Customer Grid Supply tariff.~~

~~(2) — The rates paid by the Company for the electric energy purchased under this Agreement, i.e. Energy Credit, may be adjusted periodically as ordered and approved by the Commission or as permitted under existing tariffs.~~

~~(3) — Payment will be made in the form of a bill credit on the customer's electric bill, subject to the terms described in Section D of this Exhibit E below.~~

~~D. — Energy Credits and Consumption Costs~~

~~(1) In each billing period, the Energy Credits delivered by the Generating Facility during such billing period shall be credited against the cost of the Customer-Generator's kWh consumption, i.e. energy delivered by the Company to the Customer-Generator for such billing period under the applicable rate schedule ("Consumption Costs"). Energy Credits shall not be credited against the Minimum Charge or any other applicable fixed charges for the billing period.~~

~~(2) When Energy Credits delivered by the Generating Facility during a billing period exceed the Consumption Costs for the same period, the unused Energy Credits shall be carried over to subsequent billing period(s) within the current 12-month reconciliation period as a monetary credit ("Unused Energy Credits").~~

~~(3) When Consumption Costs during a billing period exceed the Energy Credits delivered by the Generating Facility for the same period, and also exceed any Unused Energy Credits carried over from the prior months since the last 12-month reconciliation period, the Customer-Generator shall pay for the excess Consumption Costs.~~

~~E. Annual Reconciliation of Energy Credits~~

~~(1) The Energy Credits delivered by the Customer-Generator, Consumption Costs incurred by the Customer-Generator and Unused Energy Credits, if any, shall be recorded in each billing period of the 12-month reconciliation period. At the end of each 12-month reconciliation period, a final reconciliation will be made for any remaining Unused Energy Credits. Unused Energy Credits will be applied to the excess of the total of the electric bill for the 12-month reconciliation period above the minimum charge plus any other applicable fixed charges. Any Unused Energy Credits applied in this reconciliation shall be credited on the customer bill. Any Unused Energy Credits that remain unused at the end of each 12-month reconciliation period shall expire and not be carried over to the next 12-month reconciliation period.~~

~~(2) If a Customer-Generator terminates its Agreement service prior to the end of any 12-month reconciliation period, the Company shall reconcile the Customer-Generator's account in the same manner as the reconciliation that would have been performed at the end of the normal 12-month reconciliation period.~~

~~(3) The kilowatthours supplied by the Company and, if any, the kilowatthours delivered by the Customer-Generator, including an accounting of the Energy Credits since the last 12-month reconciliation period, the Energy Credits applied in each billing period of the current 12-month reconciliation period and the remaining t Unused Energy Credits, if any, will be included in the Customer-Generator's regular billing statement.~~

CERTIFICATE OF SERVICE

The foregoing order will be served on October 13, 2015 by mail,
postage prepaid, and properly addressed to the following parties:

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Certificate of Service

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