



March 9, 2018

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

PUBLIC UTILITIES
COMMISSION

Dear Commissioners:

Subject: Docket No. 2014-0192 -- Instituting a Proceeding to Investigate Distributed Energy Resource Policies;
Revised Proposed Policy and Procedure for Adding to NEM Systems

In accordance with Ordering Paragraph No. 5 of Order No. 35266 issued February 5, 2018, in the subject proceeding, the Companies¹ submit their revised proposed policy and procedure that will allow Net Energy Metering ("NEM") customers to add non-export technology to their systems provided they update their NEM system with advanced inverters.

Sincerely,

Daniel G. Brown
Manager
Regulatory Non-Rate Proceedings

Enclosure

c: Service List

¹ Hawaiian Electric Company, Inc., Hawai'i Electric Light Company, Inc., and Maui Electric Company, Limited are collectively referred to as the "Companies".

**Hawaiian Electric Companies' Revised Proposed Policy and Procedure for Implementing
Commission's Ruling on Adding Non-Export Technology to NEM Systems**

March 9, 2018

I. INTRODUCTION

In response to the Commission's Order No. 35266, issued on February 5, 2018, in Docket No. 2014-0192 ("Order No. 35266"), the Hawaiian Electric Companies¹ submit this *revised* proposed policy and procedure for effectuating the Commission's ruling in Decision and Order No. 34924, issued October 20, 2017, in Docket No. 2014-0192 ("D&O 34924") that would permit Net Energy Metering ("NEM") customers to add non-export technology to their NEM system provided they update their NEM system with advanced inverters.²

II. BACKGROUND

In D&O 34924, the Commission ruled as follows:

Given the benefits of incentivizing NEM customers to remain connected to the grid, as well as upgrading their legacy equipment, the commission finds that it should re-visit its ruling in Decision and Order No. 33258 to clarify that its prohibition on "additional individual systems capacity" to approved or pending NEM systems does not apply to non-export technology intended to serve onsite load, such as what is provided for in the CSS program. However, as noted above, NEM customers who choose to add non-export technology will be required to update their systems with advanced inverters. In this regard, this option should also provide a benefit to the HECO Companies, as it offers an opportunity for legacy systems to be updated at little or no cost to the utility.³

¹ "Hawaiian Electric Companies" or "Companies" collectively refers to Hawaiian Electric Company, Inc., Hawai'i Electric Light Company, Inc., and Maui Electric Company, Limited.

² IEEE 1547 and UL 1741 SA are the normative references used in the Companies' Rule 14H to define the interconnection standards and technical requirements for an advanced inverter.

³ D&O 34924 at 115 (citation omitted).

In Ordering Paragraph No. 6 in D&O 34924, the Commission directed the Companies to “propose a policy and procedure to effectuate this ruling within thirty (30) days of this Decision and Order.”⁴

In response to D&O 34924, on November 21, 2017, the Companies filed a proposed policy and procedure to effectuate the Commission’s ruling on adding non-export technology to NEM systems (“November 2017 Policy”).

In Order No. 35266, the Commission declined to approve the November 2017 Policy, raising several questions that required additional clarification and refinement.⁵ Instead, the Commission directed the Companies to collaborate with the parties and re-submit a proposed policy and procedure within thirty days of Order No. 35266.⁶

The Companies have carefully reviewed the Commission’s guidance in Order No. 35266, and held a series of meetings with stakeholders during the week of February 19, 2018 to solicit their feedback on this topic. The Companies hereby submit this revised policy and procedure for adding non-export technology to NEM systems based upon the Commission’s guidance and stakeholder feedback.

III. DISCUSSION

a. Proposed Policy

i. Objectives

Similar to the objectives of the November 2017 Policy, the objectives of this proposed policy are to: (1) provide NEM customers an option to add non-exporting technology⁷ to their existing NEM system and keep their entire NEM system grid-connected (as opposed to removing load from the grid via a non-interconnected Distributed Energy Resources (“DER”) system); and (2) provide an opportunity to upgrade “legacy” NEM systems with advanced inverters, which will help to enable the Companies to integrate even higher levels of DER to the electric grid, while minimizing costs to all ratepayers.

Since the submittal of the November 2017 Policy, the Companies received additional feedback that customers would probably not elect to add to a NEM system, and if they did, not

⁴ *Id.* at 192.

⁵ *See* Order No. 35266 at 18-22.

⁶ *See id.* at 24.

⁷ As defined in D&O 34924, “non-export technology” means energy storage systems or non-exporting generating capacity technology. *See* D&O 34924 at 111.

keep the DER addition grid connected, under a policy that is too stringent. For example, NEM customers with legacy micro-inverters may find it cost prohibitive to remove panels, replace all inverters and re-wire their system under the November 2017 Policy.

In addition, after further consideration, in an effort to augment customer adoption and improve customer experience, the Companies sought to develop options that would allow a more streamlined interconnection review process. Thus, in this revised policy, the Companies propose several options discussed below that in the Companies' view are more aligned with customer preferences and market realities, but also support the transition to a modernized, reliable grid through greater deployment of advanced inverters.

i. Residential Option 1: Export Limitation to 3 kW

This option would apply to NEM customers who have systems sized below 10 kW. A customer who chooses this option will need to limit total export of the original NEM system and the non-export addition to 3 kW, regardless of the original NEM system size. This option allows the customer to bypass technical review; completeness review will ensure compliance with all parameters of this option.

In addition, only the new add-on must fully comply with advanced inverter requirements approved at the time of application. The existing NEM system must be re-programmed to activate the following functions per the latest advanced inverter requirements: voltage and frequency ride through and frequency-watt. To the extent feasible, the Companies will encourage customers to additionally reprogram their inverters to activate volt-watt and/or volt-var. The Companies understand that these functions are able to be re-programmed (in some cases remotely) in many legacy systems, such that customers can avoid having to remove and replace inverters in the legacy system. This option further accommodates customers who may make significant modifications behind the meter, i.e., add large loads like air conditioning systems or electric vehicles to the home. As long as total export of the system (i.e., power flowing from the customer across the point of common coupling to the grid) does not exceed 3 kW, the customer will be able to add as much non-export technology to meet the new demand, leverage remote reprogramming of legacy inverters, and enjoy a fast-tracked interconnection review process.

The 3 kW export limit is based on the amount of kW the Companies typically design the secondary portion of the distribution system to accommodate on a coincident basis. The 3 kW limit was also confirmed as typical coincident peak load through an analysis of data obtained through the Companies' Grid 20/20 monitoring devices.⁸ The Companies believe that limiting the total amount of export to 3 kW may help to mitigate many of the existing voltage issues

⁸ See Companies' response to CA/HECO-IR-6 filed in this docket on September 5, 2017.

caused by high exporting legacy NEM systems. This would have the added benefit of potentially creating more system and circuit hosting capacity during the day.

ii. Residential Option 2: Export Limitation of NEM System Size (kW)

This option would also apply to NEM customers who have systems sized below 10 kW. A customer who chooses this option will need to limit the combined export of the original NEM system and the non-export addition to the original NEM system size. Customers who choose this option will be required to upgrade their entire system (original plus add-on) to advanced inverters that are fully compliant with advanced inverter requirements approved at the time of application. In addition, the Companies will encourage, and allow on an opt-in basis, the activation of volt-watt.

The table below summarizes the technical review process for various NEM addition scenarios.

System Configuration	Technical Review Needed	Screens Required
NEM add-on fast track (3 kW export limit) ⁽¹⁾⁽²⁾	Bypassed; Completeness Review Only	Bypassed
NEM add-on export limited to NEM System Size (kW) ⁽¹⁾⁽²⁾	Partial	Screens ⁽³⁾ 2, 3, 5, 6, and 7
Emergency back up only	None; Completeness Review Only	None
(1) Applicable to systems with a program size ≤ 10 kW (2) Technical system sizing for hosting capacity accounting purposes will be the sum of the kW export and a 3 kW load offset factor. (3) If combined system is export limited to NEM system size – 1 kW then Screens 6 and 7 will be bypassed.		

iii. Larger Systems/Commercial Option: 100 kW Technical Size Limit

For systems greater than 10 kW and below 100 kW, customers will need to limit the kW capacity of the non-export add-on such that the total technical size⁹ does not exceed 100 kW, the size limit for NEM in Rule 18. For example, a NEM customer who has an executed system size of 90 kW may be allowed to add another 10 kW of non-export technology. This 10 kW could include a combination of panels, inverters, or energy storage. Likewise, a NEM customer who has an executed system size of 100 kW will not be allowed to further add any capacity. Additions to NEM systems under this option would need to go through full technical review.

⁹ Technical size is defined as the maximum amount of power capable being produced by all generators at the Generating Facility as measured at the output terminals of each generator.

Customers who choose this option will be required to upgrade their entire system (original plus add-on) to advanced inverters that are fully compliant with advanced inverter requirements approved at the time of application.

It is anticipated that the majority of customers choosing to add non-export technology will be residential customers who have executed NEM system sizes of less than 10 kW. Allowing larger commercial customers to add to their NEM systems is more complicated, and has the potential to excessively expand the NEM program in certain scenarios. For example, if a customer has an executed NEM of 100 kW and their loads are larger, their system may not export much energy to the grid as it stands. However, if a 75 kW (or larger) energy storage device is added, this could dramatically reduce daytime load and increase exports from the original 100 kW NEM. This has the potential to result in pronounced increases of kWh credited to the customer at NEM retail rates, and reductions in hosting capacity. Since October 2015, when the Commission closed the NEM Program, the Commission has supported a market evolution for DER in Hawai'i.¹⁰ The Companies believe this type of outcome falls outside the Commission's intent in allowing non-export technology additions to NEM, and that the proposed limitation to 100 kW total technical size is a reasonable measure to avoid unintended, negative outcomes of the policy. There are other options, such as executing a Standard Interconnection Agreement, that are available to large commercial customers who seek to add large non-exporting systems to offset their loads without implicating concerns underlying the Commission's closure of the NEM program.

iv. Exceptions to Policy

This policy will not apply in cases where NEM customers request to add storage for emergency back-up purposes only. Specifically, for purposes of this exception, "emergency back-up system" means a generating system designed to provide power to critical loads only during the event of a power outage. These customers must register their storage addition pursuant to the requirements of Rule 3B, but these customers will not be required to upgrade their existing NEM system with advanced inverters because the emergency back-up system does

¹⁰ As stated by the Commission in D&O 34924:

This Decision and Order supports the continued DER market transition underway in Hawaii. In October 2015, the commission determined that the NEM program, which obligates the electric utility to accept energy exported by a customer's system and compensate the customer at the retail rate, was not designed for DER adoption at scale. Accordingly, the commission capped enrollment in the NEM program and established two new interim DER options: CGS and CSS. . . . Challenges remain, however, and the interim CGS and CSS programs alone do not adequately address the technical and economic issues of uncontrolled exports to the grid. DER programmatic options must be balanced so as to encourage cost-effective DER adoption while avoiding unnecessary risks to grid reliability and safety.

D&O 34924 at 6.

not generate power in parallel with the utility and is not subject to Rule 14H interconnection requirements.

b. Proposed Application Process

Customers pursuing any of the above options must submit to the Companies for review and approval a request to add non-export technology to their existing NEM system. Customers may apply by using the Companies' "Amendment to Existing Agreement Form" ("Amendment Form"). "Attachment 1" hereto is a proposed draft of this Amendment Form. Additional improvements and modifications to this form may be made pending the Commission's approval of this policy. As a part of the Amendment Form, the customer would need to verify the new inverters that the customer will be using that meet the Companies' requirements. More specifically, this form will include information on the entire (old+proposed) system showing new inverter(s), panels, and other modifications (i.e., energy storage) or additional information. This Amendment Form will be made available in the online Customer Interconnection Tool.

In addition, customers will be required to provide updated electrical drawings of the system and clearly illustrate the method used for non-export on the addition to the NEM system. Methods can include, but are not limited to, software controls, hardware modifications, or energy management controls.

The original NEM program size will remain the NEM program size. The total NEM program size of the original and add-on will depend on how the system is configured. For purposes of calculating the hosting capacity impact, the Companies intend to account for the system by summing the kW export and a 3 kW (non-export) load offset. For example, Option 1, above, would have a hosting capacity impact of the sum of 3kW export limit and 3 kW load offset. Option 2 would have a hosting capacity impact of the sum of the NEM system size and a 3 kW load offset. In the Companies' view, this represents a reasonable proxy value for the impact of a non-export system, and is less conservative than the Companies' initial proposed approach of adding the original NEM system size and the non-export addition. This proxy value will be refined (positively or negatively) over time as the Companies learn more about these types of systems.

c. Proposed Enforcement and Monitoring Process

During meetings with the parties to discuss this revised proposal, the Companies' proposed methods for enforcement and monitoring in the November 2017 Policy were generally accepted by the parties. Thus, the Companies have not changed the overall approach for enforcement and monitoring, but provide additional clarification to the original proposal below.

The Companies continue to propose installation of an advanced meter, paid for by the Companies, at the customer's premises that will be used for monitoring the NEM system's performance and for compliance purposes to track both the kW and kWh that are exported from the NEM system, as amended with the addition of non-export technology. The Companies plan to replace the customer's existing NEM meter with an advanced meter and not add a second meter or separately meter the non-export addition. Depending on the option (described above) that the customer chooses, the Companies will track kW received from the non-export system addition plus the original NEM system through the advanced meter on a monthly basis to ensure that the system complies with the applicable export limit. As an example, a customer who chooses to limit export to 3 kW will be tracked such that the export will not exceed 3 kW in a given bill period. Additionally, as explained below, this customer will need to limit kWh exported to the grid to 18 kWh/day [3 kW X 6 sunhours/day], which will also be tracked based on the number of days in a given bill period.

The Companies intend to use kW as a primary check for compliance with this policy. However, as an additional check, the Companies will monitor kWh exported from the system by using the kW size of the original NEM system multiplied by 6 sunhours/day. As an example, a customer having a 4.0 kW NEM system that adds a 3.0 kW non-export system will be limited to having 4.0 kW x 6 sunhours/day, which equals 24 kWh/day of energy exported to the grid. This daily kWh limit will be applied to the number of days in a customer bill cycle. However, the Companies may make exceptions to this limit when in the best interest of customers in cases where the original NEM system experiences more production than 6 sunhours/day in certain months of the year.

The Companies intend to enforce compliance with this policy consistent with the existing process for enforcing compliance with requirements for the Customer Self Supply ("CSS") Program. The primary goal of this enforcement process will be to remedy any system that does not comply with this policy, as finally approved by the Commission. If at any time a NEM system that adds additional non-export technology is unable to meet requirements under this policy, compliance action will be required by the contractor and customer to address issues and bring the system into full compliance.

Similar to non-compliant CSS systems, the Companies will actively work with the contractor for up to six months in order to bring the system into compliance. It is expected that the contractor will work diligently with the inverter and equipment manufacturers to troubleshoot and diagnose system issues, and make all necessary modifications to the software and system equipment required to bring the system into compliance.

If the system is not deemed compliant within six months after the violation is first reported to the contractor and customer, a series of three letters will be sent to the contractor and customer, requesting that the necessary actions to remedy the non-compliant system be taken.¹¹ After the third and final letter, if no response is made within fifteen days, the customer's system will be locked out until such time that the system can be brought into compliance.

d. Proposed Review Process

The Companies intend to implement this policy on an interim basis upon Commission approval, and review it within one year, at which point the Companies may modify this policy to address any unforeseen negative impacts to customers or the electric grid. The Companies note that the two fast tracked options above for systems under 10 kW are expected to use the same non-export technology that is used for CSS systems. The Companies continue to see a relatively large percentage of non-compliant CSS systems, and have been working with these contractors and customers to bring the systems into compliance. Thus, the Companies find it prudent to allow additional time for the non-export technology to mature before making this policy permanent. Because the Companies propose this policy on an interim basis, the Companies do not plan on revising Rule 14H at this time to reflect changes related to this policy, but will consider doing so upon review of the policy in one year after implementation.

¹¹ Contractors will have thirty days following the first and second letters to respond prior to the subsequent letter.



Hawaiian Electric
Maui Electric
Hawai'i Electric Light

Distributed Energy Resources
AMENDMENT TO EXISTING AGREEMENT

This Amendment No. _____ ("Amendment") is entered into by and between Hawaiian Electric Company, Inc. ("Company") and the "Customer- Generator" referenced herein, and amends that certain Distributed Energy Resources Agreement ("Agreement") dated _____ as stated herein. As hereby amended, the Agreement is hereby ratified and confirmed and shall remain in full force and effect, subject to all of the terms, covenants and conditions therein and herein set forth. This Amendment is effective as of _____.

This Amendment may be executed in two or more counterparts, each of which is deemed an original but all constitute one and the same instrument binding all Parties notwithstanding that all of the Parties are not signatories to the same counterparts. Signatures may be provided in original ("wet") form or by other means intended to preserve the original graphic and pictorial appearance of the signature, such as a photocopy. A copy of a Party's signature shall be considered an "original" signature for purposes of this Amendment.

Please Include: Single Line Diagram Three Line Diagram (if applicable) Site Plan and/or Elevation

PROGRAM _____

NEM CGS CSS CGS+ Smart Export SIA Agreement ID and Meter Number: _____

CUSTOMER-GENERATOR

Name: _____ Email: _____
 Service Address: _____ TMK: _____
 City: _____ Zip Code: _____
 Mailing Address: _____
 City: _____ State: _____ Zip Code: _____
 Daytime Phone: _____ Email: _____

Existing New

Name: _____
 Mailing Address: _____
 City: _____ State: _____ Zip Code: _____
 Daytime Phone: _____

ELECTRICAL CONTRACTOR INFORMATION

Electrical Company: _____ Hawaii License #: _____
 Mailing Address: _____
 City: _____ State: _____ Zip Code: _____
 Daytime Phone: _____

GENERATING SYSTEM CITY & COUNTY PERMIT #: (To be filled out by the company)

GRANT OF AUTHORITY

- ❖ I hereby appoint and authorize the contractor listed to act on my behalf in all manners relating to my Distributed Energy Resources (DER) application, including but not limited to, the authority to (i) request, access and receive directly from Hawaiian Electric Company, on my behalf, all information and documentation relating to my proposed project, and (ii) make decisions and execute agreements, if required, regarding the proposed project.
- ❖ This Grant of Authority shall remain in effect until Hawaiian Electric Company receipt of written termination of such Grant of Authority by Customer or resubmission of an updated Grant of Authority.
- ❖ I acknowledge that this authorization is granted for the sole purpose of my application, and for managing questions related to the system post-installation. Utility service outside of the PV system is not included; unless said information directly affects processing of my application. I understand that a new form must be submitted if I change my installing contractor.

I certify that, to the best of my knowledge, all the information provided in this Amendment is true and correct. I will not interconnect and operate additions to the existing system without prior written approval by Hawaiian Electric.

Customer Generator:	_____	_____	_____
	<i>Print:</i>	<i>Sign:</i>	<i>Date:</i>
Owner-Operator of Generating Facility:	_____	_____	_____
	<i>Print:</i>	<i>Sign:</i>	<i>Date:</i>
Company Approval*:	<i>To be filled out by the company</i>	<i>To be filled out by the company</i>	<i>To be filled out by the company</i>
	_____	_____	_____
	<i>Print:</i>	<i>Sign:</i>	<i>Date:</i>

* Subject to the additional terms and conditions set forth in Exhibit A, if any.



Hawaiian Electric
Maui Electric
Hawai'i Electric Light

Distributed Energy Resources
AMENDMENT TO EXISTING AGREEMENT

Generating Facility (Modifications to DER System):

Please itemize each piece of equipment to be installed in revised system in the sections below. All equipment must comply with the safety and operating standards published in Rule 14H and operate in compliance with the Rules of the corresponding program.

These modifications will add non-export technology to NEM in compliance with the available options: 1 2 3 Not applicable

INVERTERS							
Micro Inverter	Central/ String Inverter	Energy Storage (Inverter)	Inverter Manufacturer	Inverter Model (Please list exact model #)	QTY	Peak AC Output Rating (kW) *	QTY x Peak AC Output Rating (kW)
<input type="checkbox"/> 1	<input type="checkbox"/> 1	<input type="checkbox"/> 1					
<input type="checkbox"/> 2	<input type="checkbox"/> 2	<input type="checkbox"/> 2					
<input type="checkbox"/> 3	<input type="checkbox"/> 3	<input type="checkbox"/> 3					
* All equipment ratings must match those listed on their manufacturer's specification sheets						Total Change in Rated Inverter Capacity (kW) =	

PHOTOVOLTAIC MODULES				
PV Module Manufacturer	PV Module (Please list exact model #)	QTY	STC (kW)	QTY x STC DC Output Rating (kW)
Total Change in PV Module STC Capacity (kW) =				
Total Program Size (kW) =				

ENERGY STORAGE					
Energy Storage Manufacturer	Model (Please list exact model #)	Size kW	Chg/Dis Chg (kW)	Max Capacity (kWh)	QTY
Total Rated Capacity (kW) =					
Total Technical System Size (kW) =					

Will the energy storage system be used only as an Emergency Backup System? Yes No Will the distribution grid be used to charge the storage device? Yes No

Mode of Operation Non-export Export Coincident with PV Export Non-coincident with PV Please Describe: _____

GENERATOR DISCONNECT				Not
Manufacturer	Catalog #	Type	Rated Amps	Rated

Select all that apply: Fused Non-fused Single Phase Three Phase Uses multiple disconnect

Mounting location: _____

Hawaiian Electric		Maui Electric		Hawai'i Electric Light	
All Programs except SIA	Standard Interconnection	All Programs	East Hawai'i	West Hawai'i	
Hawaiian Electric Distributed Energy Resources P.O. Box 2750, CP12-SE Honolulu, HI 96840 connect@HawaiianElectric.com	Hawaiian Electric Attn: SIA; CP10-SN P.O. Box 2750 Honolulu, HI 96840 SIAinfo@HawaiianElectric.com	Maui Electric Renewable Projects P.O. Box 398 Kahului, HI 96733 connect@MauiElectric.com	Hawai'i Electric Light Hilo Engineering Dept. 54 Halekaula St. Hilo, HI 96720 connect@HawaiElectricLight.com	Hawai'i Electric Light Kona Engineering Dept. 74-5519 Kaiwi Street Kaitua-Kona, HI 96740 connect@HawaiElectricLight.com	

SERVICE LIST
(Docket No. 2014-0192)

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