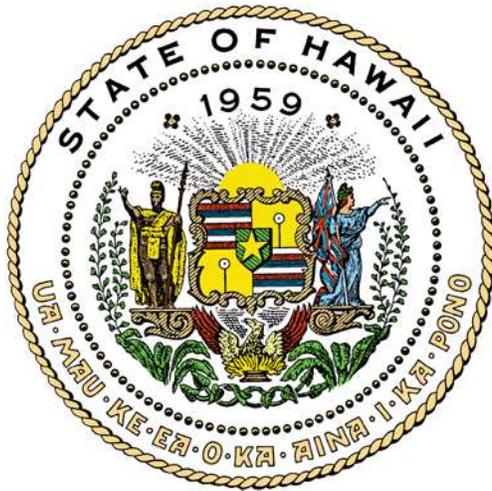


**Appendix M: PUC's Report To  
The 2019 Hawaii State's  
Legislature on RPS**



**STATE OF HAWAII  
PUBLIC UTILITIES COMMISSION**

**REPORT TO THE 2019 LEGISLATURE  
ON  
HAWAII'S RENEWABLE PORTFOLIO STANDARDS**

ISSUED PURSUANT TO SECTION 269-95(5)  
HAWAII REVISED STATUTES

DECEMBER 2018

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# 1 Executive Summary

The State of Hawaii’s (“State”) energy policy is driven, in significant part, by the State’s Renewable Portfolio Standards (“RPS”) that mandate the percentage of electricity that must be generated from renewable energy resources by the end of identified benchmark years. The RPS targets have evolved through several legislative amendments that have followed overall State energy policy developments since the RPS was first established in 2001. The current RPS, under § 269-92, Hawaii Revised Statutes (“HRS”), requires electric utilities in the State to generate at least the following amounts of electricity from renewable sources as a percentage of electricity sales:

**Table 1: Hawaii’s Renewable Portfolio Standards by Year**

<u>Year</u>	<u>RPS Requirement</u>
2010	10%
2015	15%
2020	30%
2030	40%
2040	70%
2045	100%

The Hawaii Public Utilities Commission’s (“Commission”) evaluation of and reporting on the effectiveness and achievability of the current RPS is submitted pursuant to HRS § 269-95(5). Measuring the success of Hawaii’s clean energy policies is an ongoing process. This report (“Report”) is part of a continuing body of study both directly and indirectly related to the impacts of RPS on the State. This Report examines and presents findings regarding the effectiveness and achievability of the existing RPS requirements, recognizing that there is uncertainty regarding the more distant future RPS targets. Several findings in this Report include:

- The RPS remains effective in helping the State achieve its policies and objectives with respect to developing renewable energy resources in Hawaii.
- Achievement of the 2020 RPS requirement of 30% is highly likely for both the HECO Companies<sup>1</sup> and Kauai Island Utility Cooperative (“KIUC”) (KIUC has already achieved the 2020 requirement).
- It appears likely that the 2030 RPS requirement of 40% is achievable for both the HECO Companies and KIUC, provided that reasonably expected amounts of utility-scale renewable energy projects and distributed renewable generation are successfully developed and integrated on the utility systems (KIUC has already achieved the 40% by 2030 requirement).

<sup>1</sup> The “HECO Companies” include Hawaiian Electric Company, Inc., Maui Electric Company, Ltd., and Hawaii Electric Light Company, Inc.

- The costs of renewable energy projects under development and recently proposed in Hawaii are below recent costs of most fossil fuel generation, making renewable projects cost-competitive alternatives compared to continuing to utilize fossil fuel generation resources.
- Reliability events that occurred on Kauai and Maui in 2017 and 2018, both islands with high levels of inverter-based renewable generation, suggest that continued research and development of grid integration technologies and grid management solutions will be necessary for reliable operation of the grid as the State progresses towards the longer-term RPS goals.

[RETURN]

### 1.1 Historical RPS and 2020 RPS Achievability

By the end of 2017, statewide renewable generation totaled 27.6% of utility sales. KIUC has been aggressively developing utility scale solar + storage projects and has already exceeded both the 2020 and 2030 RPS targets. However, the shutdown of the Puna Geothermal Venture facility (“PGV”) on the island of Hawaii is expected to result in a decrease of an estimated 3% contribution to the RPS. Nevertheless, even with PGV out of service, future renewable projects under construction or planned for the HECO Companies and KIUC should ensure that the State remains on track for meeting the 2020 and 2030 RPS targets. Figure 1 illustrates the RPS achievement of each utility in 2017, as well as the consolidated State progress to meeting the RPS.

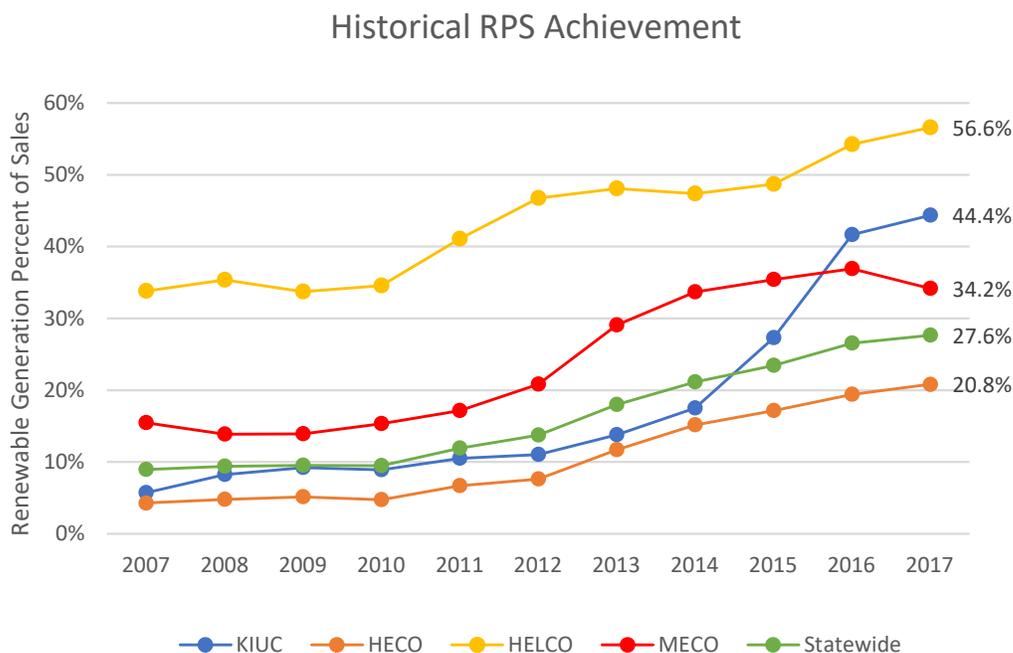


Figure 1: Historical RPS Achievement for each Utility and the State, 2007 – 2017

## 1.2 Achievability of the 2030 RPS Target

Given KIUC's and the HECO Companies' progress to date on acquiring renewable generation and reasonable expectations for additional renewable projects in the near future, it is likely that the 2030 RPS requirement of 40% is achievable for both the HECO Companies and KIUC, provided that reasonably expected amounts of utility-scale renewable energy projects and distributed renewable generation are successfully developed and integrated on the utility systems. As noted above, KIUC has already achieved the 2030 RPS requirement, and several additional projects are planned or in construction that would further boost KIUC's RPS achievement in the near-term.

The HECO Companies have announced they are in active negotiations to procure up to eight new solar + storage projects on Oahu, Maui, and Hawaii island, through an ongoing competitive solicitation for new renewable energy. These projects are expected to begin operations in the 2020 to 2022 timeframe, and would substantially contribute to the HECO Companies 2030 RPS achievement. In addition, a second phase of this competitive solicitation will commence in 2019.

Furthermore, the proposed projects from this solicitation, as well as other recent renewable projects, show that renewable energy can be developed in Hawaii at prices below the cost of fossil fuel generation. The HECO Companies' avoided energy costs have ranged between 12 and 28 cents/kWh over the last year (depending on which island) and have recently trended upward.<sup>2</sup> Going forward, new renewable energy projects are expected to offer notable savings to ratepayers as the projects are integrated into the energy resource mix.

## 1.3 Effectiveness of the RPS Requirements

The RPS requirements continue to serve as an effective driver of renewable generation implementation. The establishment of the RPS by the Hawaii State Legislature ("Legislature") serves as a clear statement of standing policy and priority, and the objective of achieving the RPS requirements has been embraced as a mandate by Hawaii's electric utilities and independent renewable power producers. The policy established by the Legislature in the RPS statute provides strong guidance for the Commission in reviewing utility applications and plans that are subject to Commission review and approval.

<sup>2</sup> See [https://www.hawaiianelectric.com/documents/billing\\_and\\_payment/rates/avoided\\_energy\\_cost/avoid\\_energy\\_cost\\_table.pdf](https://www.hawaiianelectric.com/documents/billing_and_payment/rates/avoided_energy_cost/avoid_energy_cost_table.pdf).

## 2 Background

The purpose of Hawaii's Renewable Portfolio Standards is to promote Hawaii's energy policy goals by encouraging the development and implementation of locally-sourced renewable energy generation connected to Hawaii's utility energy systems, while displacing existing fossil fuel generation and reducing the State's historical over-dependence on imported oil. Hawaii is among many states that have adopted RPS policies, and was the first in the nation to mandate a 100% RPS.

The Commission is required by statute to evaluate Hawaii's RPS every five years and report its findings to the Legislature. The objective is to determine if the standards established by HRS § 269-92 remain effective and achievable based on progress to date and analysis of options to meet RPS targets in the future. This is the third RPS evaluation and status report since Hawaii first adopted a legally binding RPS in 2004.

Hawaii's initial RPS established in 2001 (Act 272, Session Laws of Hawaii 2001) set forth voluntary targets to realize the "economic, environmental, and fuel diversity benefits of renewable energy" by establishing policies to encourage the development of local renewable energy resources and the creation of a market for those resources. The Legislature subsequently set mandatory RPS provisions in Act 95, Session Laws of Hawaii 2004 ("Act 95"). Act 95 also increased the RPS percentage requirements and expanded the types of resources included in the definition of "renewable energy." While maintaining the same target for 2005, the renewable energy requirements to be met or exceeded, as a percentage of electricity sales, were set to 10% by 2010, 15% by 2015, and 20% by 2020.

HRS § 269-91, as amended by Act 162, Session Laws of Hawaii 2006, authorizes the Commission to establish standards for each utility that prescribe what portion of the RPS shall be met by specific types of renewable electrical energy resources; provided that: (1) at least 50% of the RPS shall be met by electrical energy generated using renewable energy as the source, (2) where electrical energy is generated or displaced by a combination of renewable and nonrenewable means, the proportion attributable to the renewable means shall be credited as renewable energy; and (3) where fossil and renewable fuels are co-fired in the same generating unit, the unit shall be considered to generate renewable electrical energy (electricity) in direct proportion to the percentage of the total heat value represented by the heat value of the renewable fuels.

HRS § 269-91 also defined "renewable energy" as energy generated or produced utilizing the following sources: (1) wind; (2) sun; (3) falling water; (4) biogas (including landfill and sewage-based digester gas); (5) geothermal; (6) ocean water, currents and waves; (7) biomass (including biomass crops, agricultural and animal residues and wastes, and municipal solid waste); (8) biofuels; and (9) hydrogen produced from renewable energy sources. A utility failing to meet the RPS is subject to penalties to be established by the PUC unless the PUC determines that the utility is unable to meet the RPS due to reasons beyond the reasonable control of the utility.

In January of 2008, the State executed a memorandum of understanding with the U.S. Department of Energy establishing the Hawaii Clean Energy Initiative (“HCEI”). The HCEI agenda featured energy efficiency measures and plans to replace fossil fuel use in both the transportation and electrical power sectors by 70% by the year 2030. Act 155, Session Laws of Hawaii 2009, increased the RPS goals as a percentage of electricity sales to meet or exceed 25% by 2020 and 40% by 2030. Act 155 also established a separate Energy Efficiency Portfolio Standard in which 4300 gigawatt-hours (“GWh”) of future energy savings by the year 2030 must be met from energy efficiency and energy management technologies, roughly equivalent to achieve a 30% reduction in forecasted 2030 energy consumption at the time of the Act 155’s passage.

Effective January 1, 2015, Act 155 specified that the entire RPS for 2015, 2020 and 2030 shall not include energy efficiency and energy offset technologies as had previously been permitted, and only be met by electrical generation from renewable energy sources.

Effective July 1, 2015, the RPS targets have been increased to 100% by 2045, including interim RPS requirements of 30% by 2020, 40% by 2030, and 70% by 2040 (see Table 1, above).

### 3 Historical RPS Achievement

Since the inception of RPS in Hawaii, the RPS has effectively applied to two utility entities – KIUC and the HECO Companies.<sup>3</sup>

As described in the 2013 RPS Report, both KIUC and the HECO Companies met the 2010 RPS requirement of 10%. At the time of the 2013 RPS report, it appeared the State’s electric utilities were likely to meet or exceed the 2015 RPS goal as well. Based on data currently available (through 2017), each of the State’s electric utilities exceeded the 2015 RPS, individually and collectively. The historical achievement of the RPS for both KIUC and the HECO Companies are shown below.

**Table 2: Historical RPS Achievement, 2007-2017**

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
HECO	4.3%	4.8%	5.1%	4.7%	6.7%	7.6%	11.7%	15.2%	17.2%	19.4%	20.8%
HELCO	33.8%	35.4%	33.7%	34.6%	41.1%	46.7%	48.1%	47.4%	48.7%	54.2%	56.6%
MECO	15.4%	13.9%	13.9%	15.3%	17.1%	20.8%	29.1%	33.7%	35.4%	36.9%	34.2%
<i>HECO Cos.</i>	<i>9.1%</i>	<i>9.4%</i>	<i>9.5%</i>	<i>9.5%</i>	<i>12.0%</i>	<i>13.9%</i>	<i>18.2%</i>	<i>21.3%</i>	<i>23.2%</i>	<i>25.8%</i>	<i>26.8%</i>
KIUC	5.7%	8.2%	9.2%	8.9%	10.5%	11.0%	13.8%	17.5%	27.3%	41.7%	44.4%
<b>Statewide</b>	<b>8.9%</b>	<b>9.4%</b>	<b>9.5%</b>	<b>9.5%</b>	<b>11.9%</b>	<b>13.7%</b>	<b>18.0%</b>	<b>21.1%</b>	<b>23.4%</b>	<b>26.6%</b>	<b>27.6%</b>

Source: HECO/KIUC RPS Reports 2007-2017

Figure 1 and Table 2, above, show the historical RPS achievement for KIUC and the HECO Companies according to the 2015 RPS definition, which applies to the RPS requirements for 2015 and all years thereafter. Consistent with the 2015 definition, “renewable electrical energy” includes only energy generated from renewable sources including utility-owned and non-utility-owned renewable generation sources connected to the grid.<sup>4</sup> Although this statutory definition did not take effect until January 1, 2015, for simplicity, the historical achievement of the RPS is shown below using the current RPS definition.

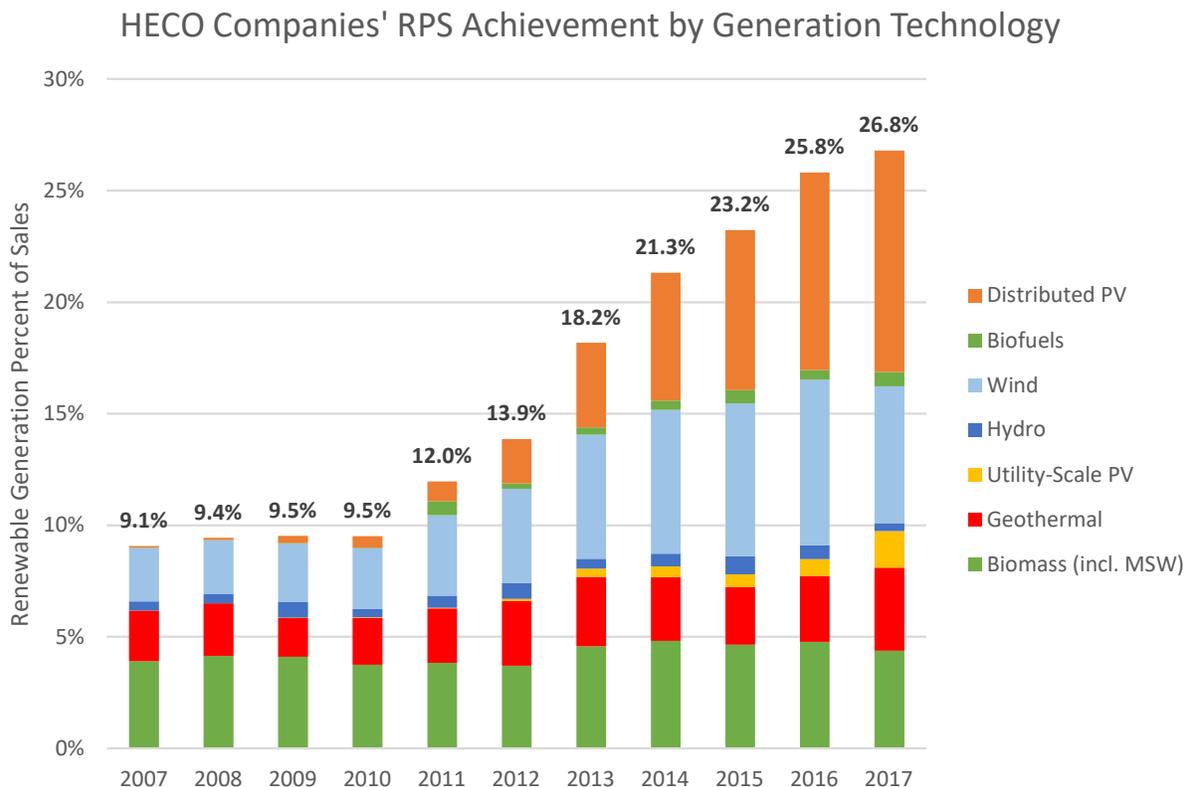
<sup>3</sup> On the island of Kauai, electric utility service had previously been provided by Citizens Communications Company, Kauai Electric Division, until a change of ownership to KIUC was completed in 2002. The HECO Companies, being affiliated electric utility companies, are allowed under the current RPS statute to combine renewable resources to meet the RPS on an aggregated basis, and have elected to do so. See Haw. Rev. Stat. § 269-93(a).

<sup>4</sup> Prior to 2015, the definition of “renewable electrical energy” included utility-owned and non-utility-owned renewable generation resources, as well as the impacts of energy efficiency programs, efficiency measures that include heat pump water heating, energy off-set technologies that include solar water heating and customer-sited, grid-connected renewable energy systems. Beginning January 1, 2015, the impacts of energy efficiency programs and energy off-set technologies are included in the Energy Efficiency Portfolio Standards, under Haw. Rev. Stat. § 269-96.

Hawaii’s ambitious renewable energy policies have proven effective at driving significant levels of renewable energy penetration on each of its six separate island grids. The HECO Companies submitted their Renewable Portfolio Standard Status Report for 2017 covering utility operations on the islands of Oahu, Molokai, Lanai, Maui, and Hawaii. The report shows that by the end of 2017, the HECO Companies had achieved a RPS of 26.8%, within 3.2 percentage points of the 2020 target of 30 percent and within 13.2 percent of the 2030 target.

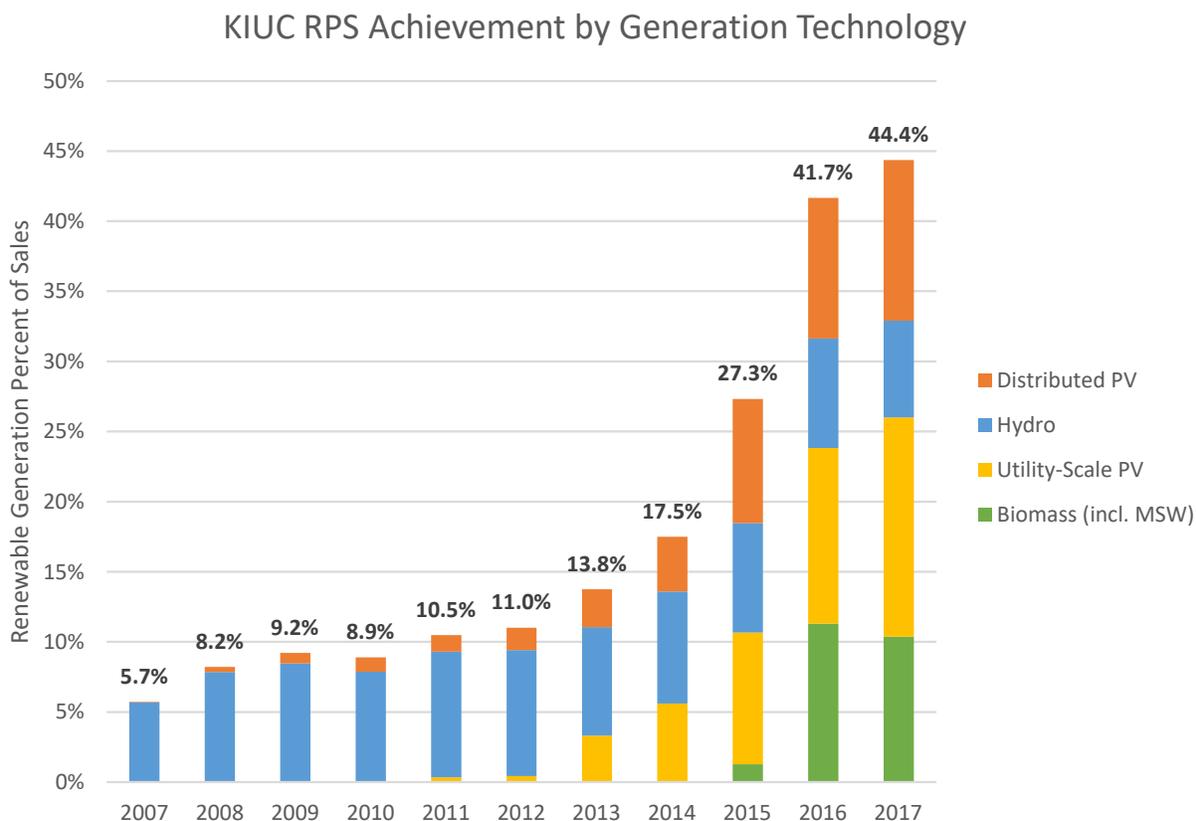
With a particularly strong performance in 2016, the KIUC improved its RPS percentage by 14 percentage points due mostly to new biomass and solar generation. In its Renewable Portfolio Standard Status Report for 2017, KIUC improved to an RPS of 44.4%. KIUC has exceeded its 2020 RPS requirement to reach 30% of KIUC’s net electricity sales with electrical energy generated by renewable resources by more than 14%. As a result, KIUC has already exceeded its 40% 2030 RPS mandate.

In terms of generation technology, solar PV provides the largest contribution to the RPS for both the HECO Companies and KIUC. However, KIUC has comparatively greater contribution from utility-scale PV, while for the HECO Companies, distributed solar PV provides a more substantial contribution relative to other generation technologies. In addition, the HECO Companies benefit from a broader array of generation technologies, including wind and geothermal resources, which are not developed or available for use by KIUC.



**Figure 2: HECO Companies' RPS Achievement by Generation Technology, 2007 – 2017**

The breakdown of renewable generation by resource, is summarized in Figure 2 and Figure 3. While wind, geothermal, and biomass (including municipal solid waste [“MSW”]) were early contributors, by the end of 2017, the largest component of the HECO Companies’ renewable generation portfolio was customer-sited distributed solar PV. It should be noted that generation from distributed PV has a larger impact on RPS attainment than other forms of renewable generation, because distributed PV has the additional effect of reducing total utility sales.



**Figure 3: KIUC RPS Achievement by Generation Technology, 2007 – 2017**

Wind continues to provide a substantial amount of renewable generation; however, near-term future deployment is expected to be limited due to lack of available land-based sites. While geothermal has historically provided a large component of renewable generation, the near-term outlook is uncertain due to the 2018 eruption of Kilauea on Hawaii island, which shut down the PGV power plant. It is not clear whether or when the PGV facility may return to service. Taking these observations into consideration, it is expected that renewable generation growth through 2020 and into 2030 will be predominately from solar PV, at both customer-sited and utility-scale levels. Additional discussion of the achievability of the 2020 and 2030 RPS requirements are provided in the sections below.

## 4 Effectiveness and Achievability of the Renewable Portfolio Standards

State law requires that the Commission periodically review whether the RPS remain effective and achievable. HRS § 269-95(4) requires the Commission to:

Evaluate the renewable portfolio standards every five years, beginning in 2013, and may revise the standards based on the best information available at the time to determine if the standards established by section 269-92 remain effective and achievable; (emphasis added)

The determination of the effectiveness and achievability of the RPS is the central focus of this Report. The Commission's interpretation and determination of effectiveness and achievability are discussed generally below. The achievability of the RPS is discussed in more detail individually regarding each of the 2020 and 2030 RPS requirements in later sections of this Report.

### 4.1 Effectiveness of the RPS

Hawaii has long-standing policies to reduce imports of fossil fuels, increase the use of indigenous renewable resources, and maintain affordable energy services.<sup>5</sup> The RPS was initially created by Act 272, which states:

It is the intent of the legislature to recognize the economic, environmental, and fuel diversity benefits of renewable energy resources and to encourage the establishment of a market for renewable energy in Hawaii using the State's renewable energy resources and to encourage the further development of those resources.... Accordingly, the legislature finds that it should establish goals for electric utilities to guide them in incorporating renewable resources into their resource portfolios to reduce the use of imported oil. (Part I, Section 1, Act 272, Session Laws of Hawaii 2001.)

The Legislature has expressed similar intent in subsequent enactments amending Hawaii's RPS.<sup>6</sup> As such, the Commission's assessment of the effectiveness of the RPS considers (1) whether the RPS are effective at increasing the amount of renewable energy generation resources implemented on Hawaii's utility systems, and (2) whether the increased utilization of renewable resources is effectively reducing the use of imported oil and, more generally, promoting Hawaii's policies to increase use of indigenous resources while maintaining affordable energy services. As explained in this Report, the RPS has been effective in both respects.

<sup>5</sup> See, e.g., Haw. Rev. Stat. § 226-18. In particular, Act 100, Session Laws of Hawaii 1978, which was codified as HRS § 226-18, identified the establishment of “[d]ependable, efficient, and economical statewide energy and communication systems” and “[i]ncreased energy self-sufficiency” as two primary energy/utility planning objectives of the State. See Section 2, Act 100, Session Laws of Hawaii 1978.

<sup>6</sup> See Section 1, Act 95, Session Laws of Hawaii 2004. See also Part I, Section 1, Act 155, Session Laws of Hawaii 2009.

It is generally accepted that implementation of renewable energy generation promotes Hawaii's energy policies regarding fuel use. Generation using Hawaii sources of renewable energy increases the use of indigenous resources and decreases reliance on imported fuels. As noted above, the Legislature has recognized the economic, environmental, and fuel diversity benefits of renewable energy resources. This Report does not attempt to further substantiate the nature of the benefits of increased utilization of renewable resources in achieving Hawaii's fuel use policies beyond those which are clear from legislative intent.

The RPS requirements serve as an effective driver of renewable generation implementation. The establishment of the RPS by the Legislature serves as a clear statement of standing policy and priority, and the objective of achieving the RPS requirements has been embraced as a mandate by Hawaii's electric utilities and independent renewable power producers. The Commission concurs with and implements the clear policy enunciated by the Legislature in the RPS statute in establishing and implementing the Commission's own policies and in reviewing the utility applications and plans that are subject to Commission review and approval. There is no doubt that Hawaii is further along the path to increased utilization of renewable and indigenous resources, reduction in use of imported petroleum fuels, and diversifying its fuel portfolio due to the RPS in conjunction with Hawaii's other energy policies and programs.

#### 4.2 Achievability of the RPS

Achievability addresses whether the RPS requirements can be met by each of the utilities, or, as allowed under statute, by utilities on an aggregated basis. Two principal considerations are:

- Whether sufficient renewable energy resources currently exist or can be feasibly developed on each utility system to achieve the RPS requirements. This includes consideration of whether sufficient renewable resources are reasonable in terms of cost and can be successfully sited, which considers factors such as land availability, site control and the ability to successfully permit projects.
- Whether the required amounts of renewable energy resources can be connected to and accommodated by the utility electric systems. On the system generation level, this includes consideration of the extent to which each utility system can accommodate assumed levels of variable renewable generation resources. On the distribution circuit level, this includes whether assumed levels of distributed generation resources can be accommodated on distribution circuits economically, safely, and reliably.

As discussed in more detail in the following section, both the HECO Companies and KIUC appear well positioned to achieve the 2020 RPS. Furthermore, the 2030 RPS requirement appears achievable based on current and reasonably expected future projects under development. However, for both of the considerations above, there are some uncertainties regarding the achievability of the 2040 and 2045 RPS.

The achievability of the 2020 and 2030 RPS is dependent on several utility-scale renewable energy projects at identified sites that have been approved or are under construction. While uncertainty remains regarding whether many of the proposed projects will ultimately reach commercial operations, each being subject to several contingencies, including obtaining necessary permits, approvals by the Commission, and successful financing and project implementation.

Achievability of the 2040 and 2045 RPS is not possible to determine with certainty at this time for several reasons including:

- The long timeframe presents uncertainties regarding the amount of growth in electricity demand. Since the RPS requirements are expressed in terms of percentages of electricity sales, the amount of required renewable resources depends on uncertain future economic trends.
- Since the RPS percentage requirements are significantly higher for 2040 (70%) and 2045 (100%), the ability of the utility systems to accommodate increasing proportions of variable utility-scale generation and distributed generation becomes an increasingly important consideration.
- Achievement of the longer-term RPS depends, in part, upon development of renewable resources that are not currently proposed, known, or sited.
- Community acceptance regarding the siting of renewable energy resources and the potential impacts of unforeseen technological advancements are also key uncertainties in determining 2040 and 2045 RPS achievability.

An effort is made in this Report to make reasonable considerations regarding incorporation of renewable generation on each utility system. This Report does not, however, attempt to resolve these uncertainties. Several significant challenges in achieving the longer-term RPS requirements are discussed in a later section of this Report.

#### Methodology: RPS Achievability

This section outlines the methodology and considerations involved in the Commission's evaluation of the RPS. Examination of the achievability of the RPS includes consideration of several factors:

- Existing and possible future renewable energy generation resources are identified, and the expected or possible amount of energy generation is quantified.
- Projections of future utility sales are held constant at 2017 levels for simplicity in order to determine the amount of renewable generation necessary to meet future RPS targets. As noted, RPS generation requirements are stated as percentages of utility electricity sales.

In performing the analysis necessary for this Report, the Commission relied on several sources of information including:

- Annual Utility RPS Status Reports – Each of Hawaii’s electric utilities provides annual reports identifying the amount of energy generated by renewable sources and the achievement of the RPS requirements.<sup>7</sup> These reports identify renewable generation resources that are operating as of the dates of the reporting periods. The Commission relies on these reports to quantify historical and existing renewable energy generation. The most recent reports by each utility, provided in Appendix A of this Report, indicate RPS achievement information for the calendar year 2017.
- Future Renewable Generation Projects – This includes new renewable generation projects that provide electrical power to each utility. Expected renewable generation for these projects is provided by the utilities, based on current estimates. The Commission relies in this Report on approved applications to quantify expected renewable energy generation from projects that are under construction or substantially in progress. In addition, for the HECO Companies, the ongoing competitive-bid process for new renewable generation includes information regarding the possible scope of new renewable resources in the near- to-mid-term.<sup>8</sup>
- Mid- and Long-Range Utility Planning Estimates – Hawaii’s electric utilities also provide the Commission with mid-term and long-range planning information and projections of expected and possible capital expenditures in filed reports and periodic briefings. Planning information includes identification of possible specific future renewable generation projects, possible requests for proposals and general estimates of possible resource potential.<sup>9</sup>

Information regarding existing generation and projects that are under construction is substantially more certain than information regarding possible future projects or general estimates of resource potential. For the 2020 RPS requirement, sufficient verified information is available for projects that are existing and/or approved and under construction on a project-by-project basis without need for methodical consideration of uncertainties. For the 2030 RPS

<sup>7</sup> For copies of the utilities’ annual RPS reports submitted to the Commission, see Docket No. 2007-0008 or the Commission’s website at <http://puc.hawaii.gov/reports/energy-reports/renewable-portfolio-standards-rps-annual-reports/>.

<sup>8</sup> Information from the utilities is used to inform estimates of possible generation potential, but no specific assumptions regarding the outcomes of specific matters currently under review are presumed in the quantifications used in this Report.

<sup>9</sup> As used in this Report, renewable energy generation projects include all resources that count towards achievement of the RPS, including contracts or provisions for using renewable fuels in existing generation resources.

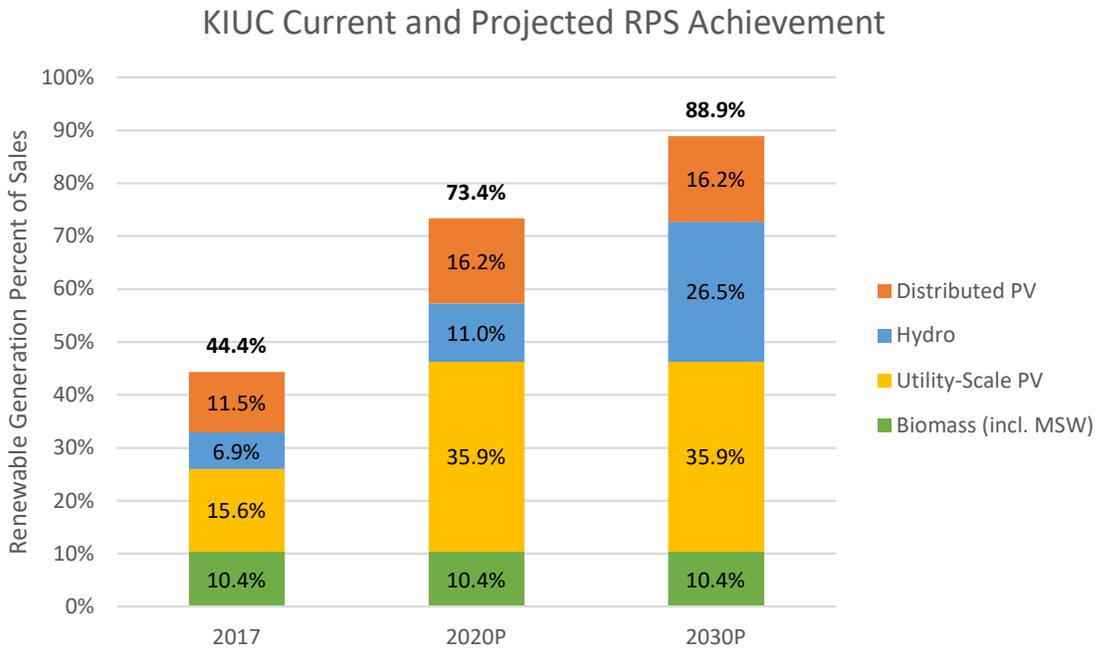
requirement, projections are substantially more uncertain compared to previous years' benchmarks. However, this uncertainty is limited to several near-term projects, or in the case of the HECO Companies, to the results of the ongoing competitive solicitation for new renewables. In this Report, due to the substantially greater uncertainty, the Commission does not make a determination on the achievability of the 2040 and 2045 RPS requirements. Several challenges are described in the later sections of this Report in order to illustrate key considerations for further research and development.

## 5 Achievability of the 2020 and 2030 RPS Requirements

Both the HECO Companies and KIUC appear to be well positioned to achieve the 2020 RPS of 30%. At end of 2017, the HECO Companies had achieved nearly 27%, while KIUC had achieved more than 44% RPS. KIUC already exceeds both the 2020 RPS goal and the 2030 RPS goal. Based on reasonable expectations about future renewable projects and reasonable assumptions about future electricity sales, the 2020 and 2030 RPS requirements appear achievable for both the HECO Companies and KIUC.<sup>10</sup>

### 5.1 KIUC

As noted above, KIUC has already exceeded the 2020 RPS requirement of 30%, with over 44% RPS achieved at the end of 2017. This achievement is also in excess of the 2030 RPS requirement of 40%. As such, assuming existing projects continue to produce at average historical levels, KIUC will exceed both the 2020 and 2030 RPS requirements. Additional projects planned for Kauai would further boost KIUC’s RPS achievement.



**Figure 4: KIUC Current and Projected RPS Achievement**

<sup>10</sup> Electricity sales are an important determinant of each utility’s RPS achievement. For purposes of this report, future electricity sales are assumed to remain flat through the 2020 and 2030 target dates (approximately 8,690 GWh for the HECO Companies and 445 GWh for KIUC). This is consistent with HECO and KIUC forecasts showing modest demand growth due to population and electrification, offset by continued investments in energy efficiency and growth in customer-sited distributed solar PV, which have the effect of reducing net sales. If electricity sales increase compared to recent experience, then RPS achievement will decrease compared to projections in this report, all else equal. Conversely, if electricity sales fall compared to recent experience, then RPS achievement will increase compared to projections in this report.

With respect to the 2030 RPS requirement, assuming electricity sales remain flat over the next decade, KIUC’s 2017 RPS of 44% is expected to rise to nearly 89% by 2030. This projection includes a new hydro project nearing completion, two solar + storage projects approved and under construction, as well as a larger pumped storage hydro project KIUC is actively planning to develop in this timeframe. The KIUC projection does not include CBRE projects, which could further boost KIUC’s RPS achievement. In addition, growth in customer-sited distributed PV could provide a substantial contribution over and above the projection based on expected large-scale projects.<sup>11</sup>

**Table 3: KIUC Renewable Generation from Existing and Future Renewable Projects, GWh**

<b>Existing Projects</b>	<b>Type</b>	<b>2017</b>	<b>2020P</b>	<b>2030P</b>
KIUC Hydro	Hydro	6.5	6.8	6.8
Gay & Robinson Hydro	Hydro	3.5	3.6	3.6
Kauai Coffee Hydro	Hydro	19.0	19.3	19.3
KAA Hydro	Hydro	1.6	3.1	3.1
Green Energy Hydro	Hydro	0.1	0.1	0.1
Pioneer Solar	Solar	0.4	0.4	0.4
Kapaa Solar	Solar	1.8	1.8	1.8
MP2 Kaneshiro Solar	Solar	0.5	0.5	0.5
McBryde Solar	Solar	10.6	10.5	10.5
KRS2 Koloa Solar	Solar	20.9	21.1	21.1
KRS1 Anahola Solar	Solar	20.7	20.5	20.5
Green Energy Biomass	Biomass	46.2	47.9	47.9
Tesla Solar	Solar	14.5	14.5	14.5
<b>Total Existing Projects</b>		<b>146.4</b>	<b>150.2</b>	<b>150.2</b>
<b>Future</b>				
Gay & Robinson Hydro (6 MW)	Hydro	0.0	18.0	18.0
AES Lawai	Solar	0.0	53.8	53.8
AES Kekaha	Solar	0.0	36.6	36.6
West Side Pumped Hydro	Hydro	0.0	0.0	69.0
<b>Total Future Projects</b>		<b>0.0</b>	<b>108.4</b>	<b>177.4</b>

Source: KIUC data

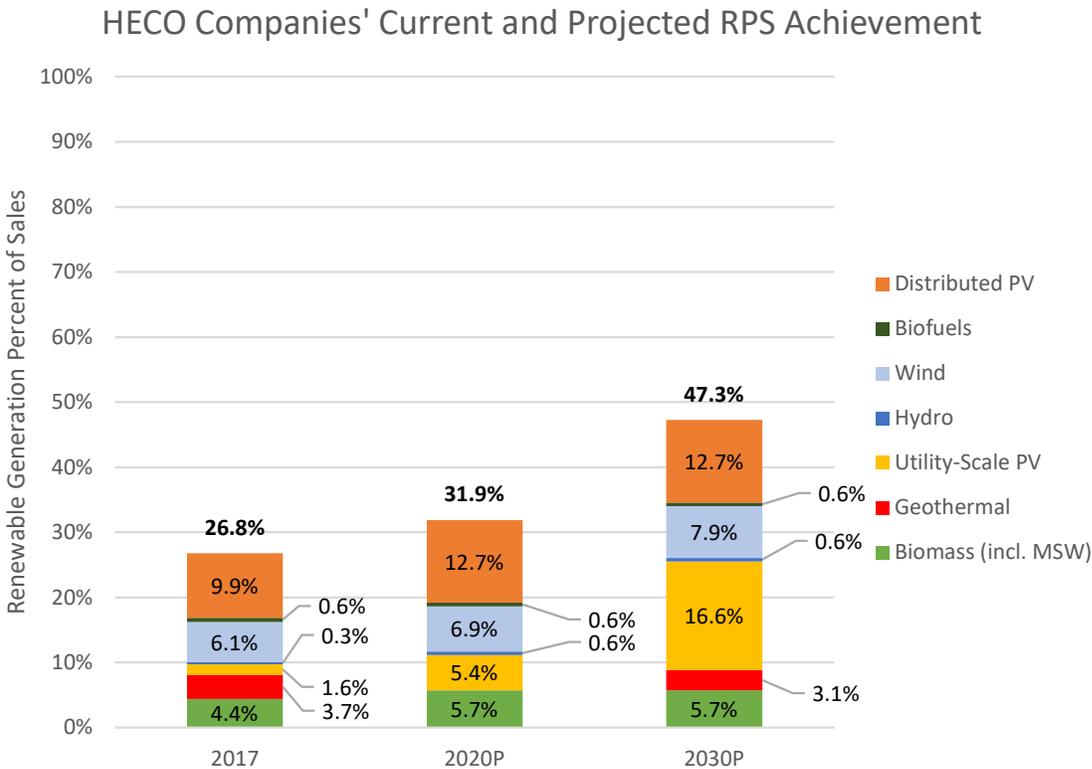
## 5.2 HECO Companies

The loss of the PGV facility on Hawaii island is expected to reduce the HECO Companies’ near-term RPS by more than 3%. It is not known whether or when the PGV facility may return to

<sup>11</sup> For purposes of this report, distributed PV is projected to grow at a constant rate through 2020 equal to the 2017 growth rate (approximately 80 GWh per year for the HECO Companies and 7 GWh per year for KIUC). The 2030 projection does not attempt to forecast a long-term growth rate, given the uncertainty in future deployment of distributed PV. As such, the 2030 RPS projection is a conservative estimate of future RPS achievement.

service. Therefore, for purposes of this report, PGV is not included in the 2020 RPS projection. However, PGV has indicated their intention to restart operations if possible, so the 2030 RPS projection assumes PGV is able to return to service within that timeframe.

Several other projects in the HECO Companies’ service territories are likely to become operational by 2020, including utility-scale solar PV projects on Oahu, Maui, and Molokai, as well as a biomass facility on Hawaii island, and CBRE projects (primarily solar PV) across all islands. These projects, combined with continued growth in customer-sited, distributed solar PV, are expected to boost HECO Companies’ consolidated RPS to more than 31%, offsetting the loss of PGV on Hawaii island.



**Figure 5: HECO Companies' Current and Projected RPS Achievement**

With respect to the 2030 RPS for the HECO Companies, renewable generation from utility-scale solar PV is expected to increase significantly, similar to KIUC. The HECO Companies are in the final stages of negotiating power purchase agreements as part of the first phase of a competitive solicitation for new renewable projects. The HECO Companies have announced awards to eight solar + storage projects located on Oahu, Maui, and Hawaii island.<sup>12</sup> In addition, the HECO Companies anticipate contributions to the 2030 RPS from an approved wind project on Oahu, as well as CBRE projects across all islands. As noted above, growth in customer-sited, distributed PV

<sup>12</sup> Renewable generation from this competitive solicitation is referred to as “2018 Competitive RFP” in the tables below.

could provide a substantial contribution over and above the projection based on expected large-scale projects.<sup>13</sup>

**Table 4: HECO Companies' Renewable Generation from Existing and Future Renewable Projects, GWh**

<b>HECO</b>				
<b>Existing Projects</b>	<b>Type</b>	<b>2017</b>	<b>2020P</b>	<b>2030P</b>
CT-1	Biofuel	54.3	48.1	48.1
Airport DSG	Biofuel	0.7	0.7	0.7
H-Power Biomass	Biomass	376.5	386.1	386.1
AES MSW	Biomass	4.6	9.1	9.1
Kalaeloa Renewable Energy Park	Solar	8.5	8.9	8.9
Kalaeloa Solar Two	Solar	10.8	11.3	11.3
Kapolei Sust. Energy Park	Solar	1.9	1.9	1.9
Waianae Solar (Eurus)	Solar	60.7	60.7	60.7
FIT HECO	Solar	47.1	31.2	31.2
Kahuku Wind	Wind	71.3	80.2	80.2
Kawailoa Wind	Wind	120.2	133.6	133.6
<b>Total Existing Projects</b>		<b>756.7</b>	<b>771.8</b>	<b>771.8</b>
<b>Future Projects</b>	<b>Type</b>	<b>2017</b>	<b>2020P</b>	<b>2030P</b>
"Waiver" PV Projects	Solar	0.0	260.2	260.2
West Loch PV	Solar	0.0	43.8	43.8
Schofield	Biofuel	0.0	0.1	0.1
Na Pua Makani	Wind	0.0	0.0	89.5
CBRE Phase 1	Solar	0.0	10.7	10.7
CBRE Phase 2	Solar	0.0	0.0	93.5
2018 Competitive RFP	Solar	0.0	0.0	485.0
<b>Total Future Projects</b>		<b>0.0</b>	<b>314.8</b>	<b>982.8</b>
<b>HELCO</b>				
<b>Existing Projects</b>	<b>Type</b>	<b>2017</b>	<b>2020P</b>	<b>2030P</b>
Puna Geothermal	Geothermal	322.6	0.0	271.1
Other Hydro	Hydro	0.5	0.8	0.8
Waiau/Puueo Hydro	Hydro	9.8	16.1	16.1
Wailuku Hydro	Hydro	19.4	32.1	32.1
FIT HELCO	Solar	4.2	3.6	3.6
HRD Wind	Wind	33.0	34.8	34.8
Tawhiri Wind	Wind	76.6	94.4	94.4
<b>Total Existing Projects</b>		<b>466.1</b>	<b>181.8</b>	<b>452.9</b>

<sup>13</sup> The 2030 projection does not attempt to forecast a long-term growth rate for distributed PV. See note 11, *supra*.

<b>Future</b>	<b>Type</b>	<b>2017</b>	<b>2020P</b>	<b>2030P</b>
Hu Honua	Biomass	0.0	102.9	102.9
CBRE Phase 1	Solar	0.0	1.3	1.3
CBRE Phase 2	Solar	0.0	0.0	12.4
2018 Competitive RFP	Solar	0.0	0.0	95.0
<b>Total Future Projects</b>		<b>0.0</b>	<b>104.2</b>	<b>211.6</b>

### **MECO**

<b>Existing Projects</b>	<b>Type</b>	<b>2017</b>	<b>2020P</b>	<b>2030P</b>
Maui Biodiesel Testing	Biofuel	1.0	1.0	1.0
HC&S	Biomass	0.0	0.0	0.0
Makila Hydro	Hydro	0.6	0.9	0.9
FIT	Solar	7.6	6.7	6.7
LSR PV	Solar	2.1	2.2	2.2
Kaheawa Wind 1 & 2	Wind	157.1	175.7	175.7
Sempra Auwahi	Wind	74.6	82.2	82.2
<b>Total Existing Projects</b>		<b>243.0</b>	<b>268.5</b>	<b>268.5</b>

<b>Future Projects</b>	<b>Type</b>	<b>2017</b>	<b>2020P</b>	<b>2030P</b>
SMRR & Kuia Solar	Solar	0.0	12.1	12.1
CBRE Phase 1	Solar	0.0	3.9	3.9
CBRE Phase 2	Solar	0.0	0.0	21.3
MNEP	Solar	0.0	10.9	10.9
2018 Competitive RFP	Solar	0.0	0.0	270.0
<b>Total Future Projects</b>		<b>0.0</b>	<b>26.9</b>	<b>318.2</b>

*Source: HECO Companies' data*

### **5.3 Cost-effectiveness of Renewable Generation Resources**

The cost-effectiveness of renewable resources has changed substantially over the past decade. In recent years, the price of petroleum fuels has varied considerably, and at times far exceeded expectations since the RPS was originally established. Indeed, the high costs of petroleum fuels have become an economic driver for developing alternatives in electricity production rather than any kind of perceived roadblock.

The proposed projects from the HECO Companies' ongoing competitive solicitation, as well as experience of other recent renewable projects, shows that renewable energy can be developed in Hawaii at prices below the cost of fossil fueled generation. The HECO Companies' avoided energy costs have ranged between 12 and 28 cents/kWh over the last year (depending on which island) and have recently trended upwards. Going forward, new renewable energy projects are

expected to offer notable savings to ratepayers as the projects are integrated into the energy resource mix.

Thus, at current and expected future petroleum prices, economic forces are working generally in conjunction with the RPS and other Hawaii policies and programs to promote the implementation of renewable energy generation resources. The prices paid by utilities for the purchase of energy from renewable resources are now generally less than the avoided costs of the utilities' fossil-fueled generation.<sup>14</sup> As a result, the increased use of renewable generation resources on Hawaii's utility systems is expected to reduce costs paid by utility customers in the future.

<sup>14</sup> For recent renewable energy project prices, see e.g., Docket No. 2017-0443, Application for Approval of a Power Purchase Agreement with AES Kekaha; and HECO's Oct. 9, 2018 News Release <https://www.hawaiianelectric.com/hawaiian-electric-companies-select-7-solar-plus-storage-projects-for-record-increase-in-renewable-energy>.

## 6 Challenges and Considerations in Achieving Future RPS Targets

The findings of this report indicate that RPS targets for 2020 and 2030 are achievable for Hawaii's electric utilities; however, there are technical, regulatory, and economic challenges that will need to continue to be monitored and evaluated. If unmitigated, these challenges could limit the ability to achieve RPS targets, especially at higher levels of renewable energy. A brief explanation of challenges is provided in the section below.

Integration of Variable Renewable Generation on Utility Systems – Many of the most economical existing and proposed renewable generation projects are variable generation resources, producing energy only when the energy source (e.g., wind or sun) is available. Hawaii's grid operators must manage variability of both electricity demand as well as supply from variable resources. The grid must balance generation and load at all times, and grid operators must ensure that the grid is carrying adequate reserves to cover unexpected drops of wind and solar generation.

At high levels, variable generation resources require support provided by other technologies, including storage, demand response, and “dispatchable” resources in order to maintain reliable energy services. This ancillary support is currently provided primarily by existing fossil fuel generation units. The existing utility systems can accommodate some, but not an unlimited amount of variable renewable generation without additional mitigation measures or costs.

There are several types of utility system operation constraints that limit penetrations of particular types of generation additions unless mitigating measures are implemented. Variable generating resources, such as solar photovoltaic (“PV”) and wind turbines, require utility system resources to “ramp” in order to balance total instant generation with loads. Utilizing renewable energy generation that is available during times of low system demand may require operation of existing utility generating units at more-than-minimum-cost levels and sub-optimal configurations of operation. As the penetration of variable generation further increases, it may become necessary to replace or supplement existing, inflexible fossil fuel generation units with flexible, fast-start or fast-responsive generation technology, such as energy storage and demand response.

Low Synchronous Inertia: In order to maintain system frequency and voltage, avoid load shedding and potential grid collapse, the grid needs to quickly respond to restore balance between generation and load. This is done through several mechanisms that vary in time of response and duration of response. With increased wind and solar penetration, fossil generation is being displaced and synchronous inertia is reduced. As a result, the speed at which the system becomes unbalanced (rate of change of frequency) increases. This requires a faster response (fast frequency response) to maintain system stability either via additional synchronous inertia, frequency responsive wind, solar, and loads, or energy storage.

Distribution System Capacity: While the grid is still able to accommodate additional solar PV generation in most areas, there are local, distribution-level, constraints that could limit the further adoption of distributed PV in some locations. Additional solar PV generation on some

individual circuits is likely to require additional interconnection studies and/or upgrades may be required to meet utility's safety standards.

Reliability Events: Several reliability events experienced during 2017 and 2018 suggest that research and development of grid integration technologies and managing grid operations as the percentage of variable renewable generation increases must continue. The islands of Maui and Kauai both have high amount of variable renewable resources and have experienced major reliability events in the last year. Additional technologies, such as energy storage and demand response, coupled with system operational experience will be increasingly important as the State integrates more variable renewable resources.

Siting and Permitting of Renewable Generation Resources: The State has abundant natural renewable energy sources. However, the availability of sites for the construction of renewable generation that are not subject to environmental, community, or cultural concerns is more limited. The achievability of the longer-term RPS requirements depends on public acceptance and successful permitting and construction of sufficient renewable generation projects.

Optimal Resource Mix – The RPS provides mandates for the installation and use of required amounts of renewable generation by specific dates to reduce the State's reliance on imported petroleum fuels and increase the use of indigenous resources. This must be accomplished while maintaining reliable and economical delivery of electricity. Achieving the RPS requirements, providing reliable electric service and affordable electric service all require careful planning and optimization of a viable portfolio of resources on each utility system.

Providing the necessary sound analysis, planning, and regulatory guidance to develop an optimal resource mix that best meets State energy objectives, is a challenge that requires the collaboration of many stakeholders, including the utilities and the Commission.

## 7 Summary

This Report examined and presented findings regarding the effectiveness and achievability of the existing RPS requirements, recognizing that there is some uncertainty regarding the more distant future RPS targets. The existing RPS targets remain appropriate and effective at promoting the implementation and operation of renewable generation resources and are sufficiently achievable based on best currently available information. Several principal findings in this Report include:

- The RPS remains effective in helping the State achieve its policies and objectives with respect to developing renewable energy resources in Hawaii.
- Achievement of the 2020 RPS requirement of 30% is highly likely for both the HECO Companies and KIUC (KIUC has already achieved the 2020 requirement).
- It appears likely that the 2030 RPS requirement of 40% is achievable for both the HECO Companies and KIUC, provided that reasonably expected amounts of utility-scale renewable energy projects and distributed renewable generation are successfully developed and integrated on the utility systems (KIUC has already achieved the 2030 requirement).
- The cost of renewable projects under development and recently proposed are below recent costs of most fossil fuel generation, making renewable projects cost competitive alternatives to continuing to utilize fossil fuel generation resources.
- Reliability events that occurred on Kauai and Maui in 2017 and 2018, both islands with high levels of inverter-based renewable generation, suggest that continued research and development of grid integration technologies and grid management solutions will be necessary for reliable operation of the grid as the State progresses towards the longer-term RPS goals.

The Commission will continue to take steps to investigate uncertainties and will monitor the progress of each utility's efforts and achievement of the RPS. As provided by the RPS statutes, the Commission will consider, on an ongoing basis, whether the RPS remain effective and achievable and whether the RPS requirements need to be amended, reporting findings to the Legislature every five years.

## **Appendix A**

The following annual RPS status reports are included in this Appendix:

1. Hawaiian Electric Company, Maui Electric Company, Hawaii Electric Light Company  
2017 Renewable Portfolio Standard Status Report  
Filed February 8, 2018  
Docket No. 2007-0008
  
2. Kauai Island Utility Cooperative  
2017 Annual Renewable Portfolio Standards (“RPS”) Status Report  
Year Ending December 31, 2017  
Filed March 29, 2018  
Docket No. 2007-0008



JOSEPH P. VIOLA  
Vice President  
Regulatory Affairs

February 8, 2018

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PUBLIC UTILITIES  
COMMISSION

The Honorable Chairman and Members  
of the Hawai'i Public Utilities Commission  
Kekuanaoa Building, 1st Floor  
465 South King Street  
Honolulu, Hawai'i 96813

Dear Commissioners:

Subject: Docket No. 2007-0008  
Renewable Portfolio Standards Law Examination

In accordance with Decision and Order No. 23912 and the Framework for Renewable Portfolio Standards, issued December 20, 2007, attached is the Renewable Portfolio Standard Status Report for the year ended December 31, 2017 for Hawaiian Electric Company, Inc., Hawai'i Electric Light Company, Inc. and Maui Electric Company, Limited.

Sincerely,

Attachment

c: Division of Consumer Advocacy  
R.J Hee/T. Blume  
H. Curtis

## 2017 Renewable Portfolio Standard Status Report

Hawaiian Electric Company, Inc.  
Hawai'i Electric Light Company, Inc.  
Maui Electric Company, Limited

For the Year Ended December 31, 2017

This report is submitted pursuant to the Framework for Renewable Portfolio Standards adopted by the Hawaii Public Utilities Commission ("Commission") in Docket No. 2007-0008.<sup>1</sup>

Hawaiian Electric Company and its subsidiaries, Hawai'i Electric Light Company and Maui Electric Company (collectively, the "Hawaiian Electric Companies"), have achieved a consolidated Renewable Portfolio Standard ("RPS") of 26.8% in 2017. In accordance with present RPS guidelines, this RPS calculation does not include the electrical energy savings from energy efficiency and solar water heating technologies.<sup>2</sup> The 26.8% RPS was achieved in 2017 through the use of diverse renewable energy resources (biomass, geothermal, photovoltaic, hydro, wind, and biofuels) and customer-sited, grid-connected technologies (primarily photovoltaic systems).

On June 8, 2015, Act 097 Relating to Renewable Standards was signed into law. Act 097 increased the 2020 RPS target to 30%, maintained the 2030 RPS target at 40%, added a 2040 RPS target of 70%, and added a 2045 RPS target of 100%.

The Hawaiian Electric Companies continued to increase their renewable energy portfolio. In calendar year 2017, new Net Energy Metering installations totaled 31.6 MW, new Standard Interconnection Agreement installations totaled 32.7 MW, new Customer Grid Supply installations totaled 12.3 MW, new Customer Self Supply installations totaled 2.3 MW, and new Feed-In Tariff installations totaled 6.2 MW. The 27.6 MW Waianae Solar project on O'ahu also began its first year of commercial operation in 2017. Electrical energy generated using renewable energy resources, including customer-sited, grid-connected technologies, increased by 45,072 megawatt hours in 2017, a 2.0% increase compared to the previous year.

The Hawaiian Electric Companies submitted their updated Power Supply Improvement Plan ("PSIP") on December 23, 2016 in Docket No. 2014-0183. That PSIP outlines a plan with specific near-term actions to achieve Hawai'i's 100 percent

<sup>1</sup> The Framework for Renewable Portfolio Standards was adopted by Decision and Order No. 23912, issued December 20, 2007, and revised by the Commission on December 19, 2008 (Order Relating to RPS Penalties).

<sup>2</sup> On April 25, 2011, Act 010 (Session Laws of Hawai'i 2011) Relating to Renewable Portfolio Standards was signed into law. Act 010 provided that, as of January 1, 2015, electrical energy savings from energy efficiency and solar water heating technologies do not count towards calculating RPS. It also amended the definition of "renewable electrical energy" to include, beginning January 1, 2015, customer-sited, grid-connected renewable energy generation.



Hawaiian Electric  
Maui Electric  
Hawai'i Electric Light

Page 1 of 3

RPS by 2045. The Hawaiian Electric Companies look forward to working together with all stakeholders to help Hawai'i achieve this important objective.



**2017 Renewable Portfolio Standard Status Report**  
**Hawaiian Electric Company, Inc. ("Hawaiian Electric")**  
**Hawai'i Electric Light Company, Inc. ("Hawai'i Electric Light")**  
**Maui Electric Company, Limited ("Maui Electric")**

**For the Year Ended December 31, 2017**  
*(In Net Megawatt Hours)*

	2017				2016
	Hawaiian Electric	Hawai'i Electric Light	Maui Electric	TOTAL	TOTAL
<b>Electrical Energy Generated Using Renewable Energy Sources</b>					
Biomass (including municipal solid waste) <sup>1</sup>	381,138			381,138	423,118
Geothermal <sup>1</sup>		322,609		322,609	260,116
Photovoltaic and Solar Thermal <sup>1</sup>	128,939	4,224	9,705	142,868	66,872
Hydro <sup>1</sup>		29,635	650	30,284	55,076
Wind <sup>1</sup>	191,560	109,626	231,688	532,875	656,678
Biofuels	55,023		959	55,982	38,475
Customer-Sited, Grid-Connected <sup>2</sup>	605,502	126,157	130,978	862,638	782,785
<b>TOTAL</b>	<b>1,362,163</b>	<b>592,251</b>	<b>373,979</b>	<b>2,328,394</b>	<b>2,283,120</b>
<b>TOTAL SALES</b>	<b>6,548,697</b>	<b>1,046,950</b>	<b>1,094,786</b>	<b>8,690,433</b>	<b>8,845,336</b>
<b>RPS PERCENTAGE</b>					
(Not Counting Energy Efficiency and Solar Water Heating)	20.8%	56.6%	34.2%	26.8%	25.8%

<sup>1</sup> Renewable electrical energy generation is based on recorded data from Feed-In Tariff contracts and Independent Power Producers with Power Purchase Agreements with the Hawaiian Electric Companies.

<sup>2</sup> Renewable electrical energy generated by customer-sited, grid-connected technologies is based on known system installations for 2017 including Net Energy Metering ("NEM") installations, non-NEM systems, and Sun Power for Schools installations. Recorded generation data was used when available. For systems where recorded data was not available, estimates were made based on reasonable performance assumptions for typical photovoltaic systems.



Hawaiian Electric  
 Maui Electric  
 Hawai'i Electric Light



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PUBLIC UTILITIES  
COMMISSION

March 27, 2018

The Honorable Chair and Members of the  
Hawaii Public Utilities Commission  
465 South King Street  
Kekuanaoa Building, Room 103  
Honolulu, HI 96813

Re: Docket No. 2007-0008 – In the Matter of Public Utilities  
Commission Instituting a Proceeding to Examine Hawaii's  
Renewable Portfolio Standards Law, Hawaii Revised Statutes  
("HRS") §§ 269-91 – 269-95, as Amended by Act 162, Session  
Laws of Hawaii 2006: Kauai Island Utility Cooperative's ("KIUC's")  
2017 Annual Renewable Portfolio Standards ("RPS") Status Report

Dear Commissioners and Commission Staff:

Please find enclosed KIUC's Annual RPS Status Report for the year ending  
December 31, 2017 ("2017 RPS Report").

As shown in the attached 2017 RPS Report, renewable energy resources and  
energy savings supplied 44.36% of KIUC's net electricity sales during the 2017 calendar  
year. This exceeds the year 2017 RPS goal of 30.0% to be achieved by each electric  
utility as established by HRS § 269-92(a)(1), as amended.

The attached 2017 RPS Report also includes a breakdown of the renewable  
energy resources on Kauai comprising the 44.36% RPS for 2017 and the RPS reached  
in 2005, 2006, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015 and 2016. Also  
included in said report is a discussion of KIUC's commitment to continue to increase the  
growth of renewable energy and energy savings on Kauai.

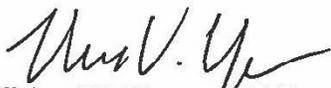
*The power of human connections.*  
4463 Pahe'e Street, Suite 1 • Lihue, Kaua'i, HI 96766-2000 • (808)246-4300 • [www.kiuc.coop](http://www.kiuc.coop)

KIUC is an equal opportunity provider and employer.

The Honorable Chairman and Members of the  
Hawaii Public Utilities Commission  
Page 2

We thank you for your consideration of this matter. If you should have any questions concerning this report, please call me at (808) 246-8208.

Very truly yours,



Michael V. Yamane, P.E.  
Chief of Operations & Technology

Enclosure

cc: Kent Morihara  
Consumer Advocate (3)  
Mr. Joseph Viola  
Mr. Dean Matsuura  
Mr. Jay Ignacio  
Ms. Sharon Suzuki  
Thomas W. Williams, Jr., Esq.  
Craig I. Nakanishi, Esq.  
Mr. David Bissell  
Mr. Timothy Blume  
Mr. Warren S. Bollmeier, II  
Mr. Henry Q. Curtis

## **Kauai Island Utility Cooperative Renewable Portfolio Standards (RPS) Status Report Year Ending December 31, 2017**

### **KIUC RPS Results for 2017**

Kauai Island Utility Cooperative (KIUC or Company) achieved a Renewable Portfolio Standard (RPS) percentage of 44.36% for calendar year 2017. This exceeds the State of Hawaii's 2020 RPS requirement of meeting 30% of KIUC's net electricity sales with electrical energy generated and/or displaced by renewable resources.<sup>1</sup> All of KIUC's 2017 RPS of 44.36% was met by electrical energy generated using renewable energy as the source.<sup>2</sup>

KIUC met the electrical energy needs of its customers with a combination of Company-owned fossil fueled generation, Company-owned renewable generation, and both non-firm and firm renewable power purchases.<sup>3</sup> In addition to this generated electricity, Photovoltaic (PV) systems and Demand Side Management (DSM) measures, including Solar Water Heating (SWH), also supplied some of KIUC consumers' energy needs, while at the same time, displacing fossil-fuel generated power. As of January 1, 2015, these sources are no longer counted toward KIUC's RPS. The portion of the RPS met by electrical energy generated using renewable energy as the source was 197,444 megawatt-hours (MWh), which is greater than the 2020 30% RPS requirement of 133,529 MWh.<sup>4</sup> Exhibit A, attached hereto, illustrates how KIUC met the energy needs of its approximately 37,000 accounts.

KIUC's 2017 RPS percentage of 44.36% is 2.70% more than KIUC's 2016 RPS percentage of 41.66%. This is due to the following:

1. The addition of the 13.0 MWac SolarCity / Tesla Solar and Storage project, which achieved In-Service on May 26, 2017.
2. Significant addition of customer-sited solar systems.

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<sup>1</sup> Hawaii Revised Statutes (HRS) § 269-92(a)(3).

<sup>2</sup> See HRS § 269-92(b).

<sup>3</sup> KIUC has eleven non-firm power purchase contracts to purchase electrical power from: Gay & Robinson (G&R) (hydro), McBryde Resources (hydro), Kekaha Agriculture Association (KAA) (hydro), Green Energy Team (hydro), Pioneer Seed (solar), Kapaa Solar (solar), McBryde Resources (solar), MP2 Hawaii (solar), KRS2 Koloa (solar), KRS1 Anahola (solar), and SolarCity / Tesla (solar and storage). KIUC also has one firm purchase power contract, Green Energy Team (biomass).

<sup>4</sup> 133,529 MWh is 30% of KIUC's 2017 sales of 445,098 MWh.

## KIUC Future RPS Activities

While KIUC has already exceeded the 2020 and 2030 RPS goals of 30% and 40%, respectively, the Company is committed to even further increasing the growth of renewable energy and energy savings. To accomplish this, KIUC is undertaking the following:

1. On May 26, 2017, the SolarCity / Tesla solar and storage project achieved COD. This facility is expected to increase KIUC's annual RPS by about one percentage point in its first full year of production (i.e. to approximately 46% in 2018).
2. On July 3, 2014, KIUC signed a PPA with Gay & Robinson for the purchase of electricity generated from a new hydroelectric facility. The Commission approved the PPA on March 14, 2016. The project began construction in 2017 and is expected to be in service in late 2018 or early 2019. This facility, given a full year of production in 2019, is expected to increase KIUC's annual RPS by about five percentage points (i.e. to approximately 51 % in 2019).
3. On December 30, 2016, KIUC signed a PPA with AES Distributed Energy for the purchase of electricity from a new solar and battery facility to be located in Lawai. The Commission approved the PPA on July 28, 2017 and the facility is expected to achieve COD before the end of 2018. This facility, given a full year of production in 2019, is expected to increase KIUC's annual RPS by about eleven percentage points (i.e. to approximately 62% in 2019).
4. On September 29, 2017, KIUC signed a PPA with AES Distributed Energy for the purchase of electricity from a new solar and battery facility to be located at Pacific Missile Range Facility (PMRF). If the Commission approves this PPA, the project is expected to achieve COD before the end of 2019. This facility, given a full year of production in 2020, is expected to increase KIUC's annual RPS by eight percentage points (i.e. to approximately 70% in 2020).
5. KIUC continues its efforts in securing a long-term water lease from the Department of Land and Natural Resources for the Waiahi hydro-electric facilities, to ensure that existing hydroelectric resources continue to contribute to KIUC's RPS.
6. KIUC continues its efforts in securing a long-term water lease from the Department of Land and Natural Resources and Department of Hawaiian Homelands for a new West Side hydro-electric facility that, if successful, could provide an additional ten to twenty percentage points toward KIUC's annual RPS when it comes online.
7. In addition to large utility-scale renewable energy projects, KIUC also recognizes the importance of small-scale PV, SWH, and DSM systems,

despite not being able to count these projects toward future RPS goals. To this end, KIUC is also continuing its residential energy efficiency programs, commercial retrofit program, and its SWH programs.

### **Conclusion**

KIUC's 2017 RPS percentage of 44.36% surpasses the 30% by 2020 RPS requirement by 14.36% and the 40% by 2030 RPS requirement by 4.36%. With current renewable energy sources and the future activities identified above, KIUC is on target to exceed the next RPS requirement of 70% by 2040. KIUC recognizes the benefits that renewable energy and energy savings provide to the visitors, residents, and commercial sectors of Kauai, as well as the positive impacts on global environmental, societal, and economic issues. As such, KIUC will continue to evaluate, promote, and incorporate renewable energy and energy savings to meet the needs of its members, the Kauai community, and the State.

Exhibit A

KIUC RPS Status Report	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
	MWh	MWh	MWh										
1. Net Fossil Generation	413,355	419,451	441,154	417,986	399,325	400,307	392,689	389,180	376,778	360,103	335,162	279,451	276,387
2. Net Renewable Generation / Electrical Energy Generated Using Renewable Energy As Source <sup>1</sup>													
KIUC Hydro	4,232	4,561	926	7,968	7,454	7,896	6,974	7,591	8,063	7,598	6,961	6,904	6,455
Gay & Robinson Hydro	3,501	3,921	2,845	2,385	3,574	3,450	4,871	4,142	3,355	2,878	3,051	4,183	3,547
Kauai Coffee Hydro	26,292	25,613	20,612	22,149	21,756	18,296	21,208	23,038	18,501	18,693	19,566	19,283	19,010
KAA Hydro	3,466	3,024	2,079	3,106	4,141	4,374	5,457	3,775	3,154	4,922	3,915	3,804	1,637
Green Energy Hydro					5	189	407	366	278	200	153	147	106
Pioneer Solar							21	23	22	372	434	435	435
Kapaa Solar							1,468	1,858	1,827	1,759	1,787	1,802	1,826
MP2 Kaneshiro Solar									530	535	547	550	547
McBryde Solar									11,945	11,393	10,772	10,260	10,612
KRS2 Koloa Solar										10,042	20,654	21,604	20,934
KRS1 Anahola Solar											6,456	20,275	20,662
Green Energy Biomass											5,465	49,656	46,192
SolarCity / Tesla Solar and Storage													14,486
NEM											1,256	1,247	1,245
NEM Pilot											3,601	5,595	5,909
Larger Systems (No Buyback)											6,912	6,970	8,438
Schedule Q											26,497	30,209	35,402
<b>Total</b>	<b>37,491</b>	<b>37,120</b>	<b>26,462</b>	<b>35,607</b>	<b>36,930</b>	<b>34,205</b>	<b>40,407</b>	<b>40,793</b>	<b>47,674</b>	<b>58,392</b>	<b>118,026</b>	<b>182,904</b>	<b>197,444</b>
3. Electrical Energy Savings <sup>2</sup>													
From Renewable Displacement or Off-Set Technologies <sup>3</sup>													
Customer Renewable Generation (own use)	121	153	268	1,712	3,316	4,499	5,176	6,925	11,710	16,810	0	0	0
From Use of Energy Efficiency Technologies <sup>4</sup>													
Demand Side Management (DSM)	20,855	21,349	21,361	19,233	19,217	16,911	18,264	24,368	22,441	21,370	19,947	33,549	34,900
<b>Total</b>	<b>20,976</b>	<b>21,502</b>	<b>21,629</b>	<b>20,945</b>	<b>22,533</b>	<b>21,410</b>	<b>23,440</b>	<b>31,293</b>	<b>34,151</b>	<b>38,180</b>	<b>19,947</b>	<b>33,549</b>	<b>34,900</b>
4. Total Sales / Total Electrical Energy Sales / Net Electricity Sales <sup>5</sup>	448,611	452,080	466,896	453,791	436,273	434,533	434,745	433,159	431,478	429,924	432,078	439,088	445,098
Total Renewable Electrical Energy													
5. (2015 & after: Item 2 Total, pre-2015: Item 2 Total + Item 3 Total)	58,467	58,622	48,091	56,552	59,463	55,615	63,847	72,086	81,825	96,572	118,026	182,904	197,444
<b>Total / RPS Percentage (Item 5 / Item 4)</b>	<b>13.03%</b>	<b>12.97%</b>	<b>10.30%</b>	<b>12.46%</b>	<b>13.63%</b>	<b>12.80%</b>	<b>14.69%</b>	<b>16.64%</b>	<b>18.96%</b>	<b>22.46%</b>	<b>27.32%</b>	<b>41.66%</b>	<b>44.36%</b>
<b>Percent of Net Electricity Sales supplied by Item 2 Above</b>	<b>8.36%</b>	<b>8.21%</b>	<b>5.67%</b>	<b>7.85%</b>	<b>8.46%</b>	<b>7.87%</b>	<b>9.29%</b>	<b>9.42%</b>	<b>11.05%</b>	<b>13.58%</b>	<b>27.32%</b>	<b>41.66%</b>	<b>44.36%</b>
<b>Percent of Net Electricity Sales supplied by Item 3 Above</b>	<b>4.68%</b>	<b>4.76%</b>	<b>4.63%</b>	<b>4.62%</b>	<b>5.16%</b>	<b>4.93%</b>	<b>5.39%</b>	<b>7.22%</b>	<b>7.91%</b>	<b>8.88%</b>	<b>4.62%</b>	<b>7.64%</b>	<b>7.84%</b>

<sup>1</sup> Renewable electrical energy generated via power purchase agreements with independent power producers is based on recorded data of the energy generated from the power producer facility, which is typically the net electricity energy sold to the utility, adjusted downward for system losses. Pursuant to the definition of "renewable electrical energy" under HRS Section 269-91, beginning January 1, 2015, this includes customer-sited, grid-connected renewable energy generation (e.g., net energy metering, Schedule Q).

<sup>2</sup> Pursuant to HRS Section 269-92(b)(2), beginning January 1, 2015, electrical energy savings shall not count toward the RPS.

<sup>3</sup> Pursuant to HRS Section 269-91, under the definition of "Renewable electrical energy," these types of technologies include solar water heating, sea-water air-conditioning district cooling systems, solar air-conditioning, and (up until, but not on or after January 1, 2015) customer-sited, grid-connected renewable energy systems.

Pursuant to Section III.A.3. of the RPS Framework: "Electrical energy savings brought about by the use of renewable displacement or off-set technologies shall be determined using actual recorded energy produced by the displacement or off-set technologies, if that information is available to the utility, and the corresponding estimated electrical savings. Where the recorded energy produced by the displacement or off-set technologies is not available to the utility, as in the case of customer-sited renewable energy systems, the utility may make reasonable estimates of the energy produced by such systems, and provide an explanation of the calculation of the estimates. The electrical energy savings shall be expressed at a comparable level to the electrical energy generated using renewable energy sources (i.e., at the net generation level)."

<sup>4</sup> Pursuant to HRS Section 269-91, under the definition of "Renewable electrical energy," energy efficiency technologies include heat pump water heating, ice storage, ratepayer-funded energy efficiency programs, and use of rejected heat from co-generation and combined heat and power systems, excluding fossil-fueled qualifying facilities that sell electricity to electric utility companies and central station power projects.

Pursuant to Section III.A.4. of the RPS Framework: "Electrical energy savings brought about by the use of energy efficiency technologies shall be determined using the actual gross energy savings (i.e., gross of (including) free-riders) reported by the utility or third-party DSM administrator in its annual DSM program report to the Commission excluding any electrical energy savings brought about by the use of renewable displacement or off-set technologies. The electrical energy savings shall be expressed at a comparable level to the electrical energy generated using renewable energy sources (i.e., at the net generation level)."

<sup>5</sup> Pursuant to Section I of the RPS Framework "total electrical energy sales" or "net electricity sales" means the total MWhs of electrical energy sold by a utility to its customers during a given year. KIUC notes that Item 1 (Net Fossil Generation) plus Item 2 (Net Renewable Generation) does not equal Item 4 (Net Electricity Sales). This is because prior to January 1, 2015, and as required by HRS § 269-91, Item 2 (Net Renewable Generation) did not include customer-sited, grid-connected renewable energy generation. Beginning January 1, 2015, Item 2 (Net Renewable Generation) includes customer-sited, grid-connected renewable energy generation, including exported energy and behind-the-meter energy. KIUC's sales of such customer-sited, grid-connected renewable energy generation (i.e. only the exported portion) are included in Item 4 (Net Electricity Sales).