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President

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PUBLIC UTILITIES
COMMISSION

The Honorable Chairman and Members of the
Hawai'i Public Utilities Commission
465 South King Street
Kekuanaoa Building, Room 103
Honolulu, Hawai'i 96813

Dear Commissioners:

Subject: Adequacy of Supply
Hawai'i Electric Light Company, Inc.

The following information is respectfully submitted in accordance with paragraph 5.3a of General Order No. 7, which states:

The generation capacity of the utility's plant, supplemented by electric power regularly available from other sources, must be sufficiently large to meet all reasonably expectable demands for service and provide a reasonable reserve for emergencies. A Statement shall be filed annually with the Commission within 30 days after the close of the year indicating the adequacy of such capacity and the method used to determine the required reserve capacity which forms the basis for future requirements in generation, transmission, and distribution plant expansion programs required under Rule 2.3h.1.

2020 Adequacy of Supply Report Summary

- The generation capacity of Hawai'i Electric Light Company, Inc. ("Hawai'i Electric Light" or the "Company") for the next three years (2020-2022) will be sufficient to meet reasonably expected demands for service and provide reasonable reserves for emergencies.
- The peak load experienced on the Big Island in 2019 was 192.1 MW net, and was served by Hawai'i Electric Light's total firm generating capability of 242.2 MW net, including firm power purchases. This represents a firm generating reserve margin of approximately 26.1% over the 2019 system net peak.

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1.0 Peak Demand and System Capability in 2019

Hawai'i Electric Light's 2019 system peak occurred on December 26,¹ at approximately 6:29 pm and was 192.1 MW-net based on system demand remaining after contribution from distributed generation.

Hawai'i Electric Light's 2019 total firm generating capability of 242.2 MW-net includes 60 MW from Hamakua Energy LLC ("HEP") but does not include Puna Geothermal Venture ("PGV")² due to volcanic activity that surrounded the facility.

The Hawai'i Electric Light system had a firm generating reserve margin of approximately 26.1% over the 2019 system peak net demand based on firm generation resources³. This calculation does not include any variable generation sources (hydro, wind, solar).

2.0 Estimated Reserve Margins

Table 1 in Appendix 1 shows the expected reserve margins over the next three years, 2020-2022, based on Hawai'i Electric Light's June 2019 Sales and Peak Forecast ("June 2019 Forecast"), which includes estimated self-generation, customer battery and energy efficiency impacts on net demand. Reserve margin values are calculated both with and without estimated capacity credit for variable generation and peak reduction benefits of Demand Response ("DR").

3.0 Criteria to Evaluate Hawai'i Electric Light's Adequacy of Supply

Hawai'i Electric Light's capacity planning criteria are applied to determine the adequacy of supply – whether or not there is enough generating capacity on the system. Hawai'i Electric Light's capacity planning criteria take into account that the Company must provide for its own backup generation since, as an island utility, it cannot import emergency power from a neighboring utility.

3.1 Hawai'i Electric Light's Capacity Planning Criteria

The following capacity planning criteria are used to determine the need for additional generation:

¹ Hawai'i Electric Light's system peak in 2019 occurred in the month of December. Typically, Hawai'i Electric Light's system peaks have occurred in the month of December. For the purposes of this report, it is assumed that Hawai'i Electric Light's future annual system peak will occur in December.

² PGV has been offline since May 2018. A capacity of 34.6 MW was assumed for PGV in the reserve margin calculations in previous Adequacy of Supply reports.

³ Refer to section 4.6., Table of Generating Unit Capacities, and Appendix 1, Table 1 for additional details.

Rule 1:

The total capability of the system must at all times be equal to or greater than the summation of the following:

- a. the estimated system peak load, less the total amount of interruptible loads;*
- b. the capacity of the unit(s) scheduled for maintenance; and*
- c. the capacity that would be lost by the forced outage of the largest unit in service.*

Reserve Margin:

Consideration will be given to maintaining a reserve margin of approximately 20% based on Net Top Load ratings.

Reserve Margin Sensitivity:

In the Hawaiian Electric Companies' PSIP Update Report: December 2016,⁴ a possible reserve margin planning standard of 30% was used for capacity planning analysis.⁵

3.2 Other Considerations in Determining the Timing of Unit Additions

The need for new generation is not based solely on the application of the criteria previously mentioned. As capacity needs become imminent, it is essential that Hawai'i Electric Light broaden its consideration to ensure timely installation of generation capacity necessary to meet its customers' energy needs.

Other near-term considerations may include:

1. the current condition and rated capacity of existing units;
2. required power purchase obligations and contract terminations;
3. the uncertainties surrounding non-utility generation resources;
4. the uncertainties surrounding new energy and generation resources;

⁴ The "Hawaiian Electric Companies" or "Companies" are Hawaiian Electric Company, Inc., Maui Electric Company, Limited, and Hawai'i Electric Light Company, Inc.

⁵ Refer to Appendix J of the *PSIP Update Report: December 2016*, filed December 23, 2016 in Docket No. 2014-0183.

5. transmission system considerations;
6. meeting environmental compliance standards; and
7. system reliability considerations for Hawai'i Electric Light's isolated electrical system.

While meeting the planning criteria indicates a reasonable adequacy of supply, it is not equivalent to a guaranteed supply. As firm capacity resources are displaced to accommodate variable renewable energy, resource planning may need to include resource characteristics to mitigate adequacy of supply risks by having large amounts of offline reserves. This may include consideration of minimum fast-start capability and/or means to curtail demand on short notice. For example, in 2016, despite adequate supply based on the present criteria, Hawai'i Electric Light has experienced a generation shortfall when generation units at Keahole experienced forced outages while HEP was out of service for maintenance. There was insufficient time to bring online an additional unit such as the Puna steam unit to meet the evening peak, resulting in outages to certain customers for a two-hour period.

In the application of Hawai'i Electric Light's capacity planning criteria, the key inputs include (1) projected peak demand (including the anticipated peak reduction benefits of energy efficiency programs) and (2) the total firm capacity on the system. These key inputs (and others) are described in the following sections.

4.0 Key Inputs to the 2020 Adequacy of Supply Analysis

4.1 Period Under Review

As indicated in Hawai'i Electric Light's January 30, 2019 Adequacy of Supply letter, the Company's reserve margin was sufficiently high such that its generating capacity for the period 2019 to 2021 would be adequate to meet reasonably expected demands for service and provide reasonable reserves for emergencies. This adequacy of supply review covers the period 2020 to 2022. The *PSIP Update Report: December 2016* indicated that Hawai'i Electric Light might remove the Puna Steam and Hill 5 and 6 units from regular service as soon as 2020, but that was before PGV went offline due to lava flow in May 2018. The present planning assumption is that PGV will return to service in 2020 and Puna Steam, Hill 5 and Hill 6 remain available for the period under review.

4.2 June 2019 Forecast

Hawai'i Electric Light developed a sales and peak forecast in June 2019, which was subsequently approved by the Company for future planning purposes and used for this analysis.

Hawai'i Electric Light	
Year	Peak, Net MW
2020	189.4
2021	190.6
2022	192.2

4.3 Projected Peak Reduction Benefits of DR Programs

Hawai'i Electric Light is committed to pursuing DR programs designed to provide cost-effective resource options to meet capacity needs and support the reliable operation of the system, as identified in the Hawaiian Electric Companies Integrated Demand Response Portfolio Plan.⁶

In 2015, the Hawaiian Electric Companies submitted to the Commission an application for approval of a DR Portfolio in Docket No. 2015-0412. A Revised DR Portfolio was filed on February 10, 2017, which provided modified approval requests and DR program design and targets consistent with the DR Portfolio used in the *PSIP Update Report: December 2016*. On January 25, 2018 the Commission issued Decision and Order No. 35238, approving the Companies Revised DR Portfolio tariff structure framework.

On August 22, 2019, the Hawaiian Electric Companies issued Request for Proposal No. 103119-02 "Grid Services from Customer-sited Distributed Energy Resources". Final selections were made on January 9, 2020 where aggregators were selected that would offer grid services to the islands. For the purposes of the analysis, Hawai'i Electric Light's adequacy of supply was calculated both with and without 3.6 MW of annual peak reduction benefit from DR, for the period under review.

4.4 Planned Maintenance Schedules for the Generating Units on the System

Planned overhauls and maintenance outages reduce generating unit availabilities. The schedules for planned overhaul and maintenance outages change frequently due to unforeseeable findings during outage inspections, or to changes in priorities due to unforeseeable problems. When major revisions to planned and/or maintenance outages occur, or unplanned outages impact the available margins, the Planned Maintenance Schedule is revised with outages deferred (or reduced) to the extent possible, to meet the operational planning criteria of having

⁶ Refer to Docket No. 2007-0341.

sufficient available capacity, including offline capacity available within two hours or less, to serve anticipated demand, after loss of the largest operating unit.

4.5 Additions of Capacity

4.5.1 Firm Capacity Additions

On June 20, 2019 in Decision and Order No. 36382, the Commission reopened Docket 2017-0122 for Approval of an Amended and Restated Power Purchase Agreement with Hu Honua. The capacity from Hu Honua was not included in the analysis.

4.5.2 Non-Firm Resource Additions

In January 2017, Hawai'i Electric Light filed a letter with the Commission requesting to open a docket to solicit proposals for new renewable generation. The Commission subsequently issued Order No. 34856 and opened Docket No. 2017-0352 to receive filings, review approval requests, and resolve disputes, if necessary, related to the plan to proceed with competitive procurement of this generation. RFPs for the above docket were separated into 2 phases.

In phase 1, on December 28, 2018 the Company submitted to the Commission applications for approval of power purchase agreements for two solar projects with storage on Hawai'i Island. On March 25, 2019, in Decision and Order Nos. 36233 and 36234 under Docket 2018-0430 and Docket 2018-0432 respectively, the Commission approved two Power Purchase Agreements, between the Company, AES Waikoloa Solar, and Hale Kuawehi Solar, LLC, for two 30 MW/120 MWh PV/BESS projects. These systems are anticipated to be installed and operational by the end of 2022.

The RFP for phase 2 of the above docket was issued on August 22, 2019, and bid evaluation is currently ongoing.

None of the variable renewable projects were included in the analysis.

4.5.3 Table of Generating Unit Capacities

NTL (Normal Top Load) ratings are used for reserve margin calculation and NDC (Net Dependable Capacity) ratings are shown for reference.

**Hawai'i Electric Light Adequacy of Supply
 2019 Unit Ratings (Firm Capacity at ACTUAL System Peak in December 2019)
 (Net MW)**

<u>Unit</u>	NTL Rating (MW)	NDC Rating (MW)
Hill 5	14.20	14.20
Hill 6	20.20	20.20
Puna	15.70	15.70
Kanoelehua D11	2.00	2.00
Waimea D12	2.50	2.50
Waimea D13	2.50	2.50
Waimea D14	2.50	2.50
Kanoelehua D15	2.50	2.50
Kanoelehua D16	2.50	2.50
Kanoelehua D17	2.50	2.50
Keahole D21	2.50	2.50
Keahole D22	2.50	2.50
Keahole D23	2.50	2.50
Kanoelehua CT1	11.50	10.25
Keahole CT2	13.80	13.80
Puna CT3	21.00	20.00
Keahole CT4/CT-5/ST-7	56.25	54.00
Panaewa D24	1.25	1.25
Ouli D25	1.25	1.25
Punaluu D26	1.25	1.25
Kapua D27	1.25	1.25
HELCO total	182.15	177.65
PGV	0.00	0.00
HEP	60.00	60.00
IPP Total	60.00	60.00
System total	242.15	237.65

5.0 Results of Analysis

5.1 Rule 1

With the assumed return of PGV in 2020, Rule 1 is met for 2020-2022, without assuming any capacity credit from variable generation.

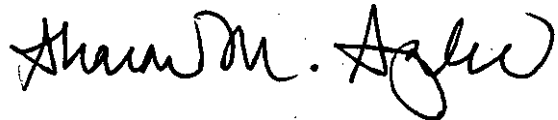
5.2 Reserve Margin

Reserve margin (see Table 1 in Appendix 1) for Hawai'i Electric Light for 2020-2022 is above the *PSIP Update Report: December 2016*'s proposed 30% guideline considering firm capacity generation. Unlike 2019, PGV is assumed to be back in service during this period. The methods for assigning a contribution of variable generation to capacity margin are continuing to evolve and may change in future capacity margin assessments.

6.0 Conclusion

Hawai'i Electric Light's generation capacity for the next three years (2020-2022) will be sufficient to meet reasonably expected demands for service and provide reasonable reserves for unplanned generation outages.

Very truly yours,



Sharon Suzuki
President

Attachment – Appendix 1

cc: Division of Consumer Advocacy (with Attachment)

Table 1
Adequacy of Supply

Year	System Capability at Annual Peak Load (net MW) [A] ^{III, IV, V, VI}	System Peak (net MW) [B] ^{I, II}	Reserve Margin w/o DR or Var. Gen. (%) [A-B] [B]	Demand Response (DR) (net MW) [C]	Variable Generation (net MW) [D]	Reserve Margin w/DR & Var. Gen. (%) [A+D-(B-C)] (B-C)
2019	242.2	192.1	26.1%	0.0	4.98	28.6%
2020	280.2	189.4	47.9%	3.6	4.98	53.5%
2021	280.2	190.6	47.0%	3.6	4.98	52.5%
2022	280.2	192.2	45.8%	3.6	4.98	51.2%

Notes:

- (I) System Peaks – The 2020-2022 annual forecasted system peaks are based on:
- Hawai‘i Electric Light’s June 2019 Forecast. The annual forecasted system peak is expected to occur in the month of December.
- (II) System Peaks (Recorded):
- The recorded system peak for 2019 includes the actual peak reduction benefit of the acquired energy efficiency programs and the Rider M and Schedule U contracts.
- (III) System Capability for 2019 included:
- Hawai‘i Electric Light units at a total of 182.15 MW net.
 - Firm independent power purchase contracts with a net total of 60 MW, from HEP only.
- (IV) System Capability for 2020 includes:
- Hawai‘i Electric Light units at a total of 182.15 MW net.
 - Firm independent power purchase contracts with a combined net total of 98.0 MW, from HEP (60.0 MW) and PGV (38.0 MW).
- (V) System Capability for 2021 includes:
- Hawai‘i Electric Light units at a total of 182.15 MW net.

- Firm independent power purchase contracts with a combined net total of 98.0 MW, from HEP (60.0 MW) and PGV (38.0 MW).

(VI) System Capability for 2022 includes:

- Hawai'i Electric Light units at a total of 182.15 MW net.
- Firm independent power purchase contracts with a combined net total of 98.0 MW, from HEP (60.0 MW) and PGV (38.0 MW).