



January 19, 2017

FILED

2017 JAN 19 P 3:37

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

PUBLIC UTILITIES
COMMISSION

Dear Commissioners:

Subject: Docket No. 2011-0206
Reliability Standards Working Group
Monthly Report

Pursuant to Ordering Paragraph 3 of the Commission's Order No. 30371, filed on May 4, 2012, in the above subject proceeding, enclosed as Exhibit A is the Hawaiian Electric Companies'¹ monthly report for December 2016 on (1) system frequency control performance during month; (2) significant system events during month; and (3) curtailment of non-dispatchable renewable resources.

In addition, an electronic copy of each report is also included with this filing. These files are voluminous, and therefore, the Companies are providing a compact disc ("CD") containing the electronic files to both the Commission and the Consumer Advocate. Copies of the CD will be available to any Party to this proceeding. Interested Parties should email Marisa Chun at marisa.chun@heco.com to request a copy.

If you have any questions on this matter, please contact Marisa Chun at (808) 543-4723.

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 "Hawaiian Electric Companies" or "Companies".

The Commission's Order No. 30371 (Docket No 2011-0206 – Relating To Various Matters in RSWG Process), filed May 4, 2012, ordered the following information for each island grid:

- (1) System frequency control performance during month:
 - a) Frequency duration plot based on the highest resolution SCADA data available for the month detailing how many seconds each power system operated at frequencies above 60 hertz and at frequencies below 60 Hz.
 - b) Tabulation of the number, magnitude and duration of frequency excursions (high and low) outside normal frequency control range (59.95 to 60.05 Hz).

The following provides information with respect to items 1a) through 1b) – (all statements are current as of the month ending December 31, 2016):

1a) Frequency duration plot based on the highest resolution SCADA data available for the month detailing how many seconds each power system operated at frequencies above 60 hertz and at frequencies below 60 Hz:

The frequency duration plots for Hawaiian Electric, Maui Electric (Maui Division) and Hawai'i Electric Light based on two-second data are provided in Attachment 1, and the enclosed Excel files. Refer to the electronic files for the individual data points because the information is voluminous and does not translate well to a hard copy.

1b) Tabulation of the number, magnitude and duration of frequency excursions (high and low) outside normal frequency control range (59.95 to 60.05 Hz):

Tabulation of the number, magnitude and duration of frequency excursions outside of the frequency range of 59.95 Hz to 60.05 Hz for Hawaiian Electric, Maui Electric (Maui Division) and Hawai'i Electric Light are provided in Attachment 2, and the enclosed Excel files. Refer to the electronic files for the individual data points because the information is voluminous and does not translate well to a hard copy.

- (2) Significant system events during month:
 - a) Tabulation of contingency reserve activations including date and time, MW magnitude, duration, and triggering event.
 - b) Tabulation of under frequency load shed activations including date and time, triggering frequency, MW magnitude, duration, and triggering event.
 - c) Tabulation of demand response activations for system events, including date and time, MW magnitude, duration, and triggering event, (excluding demand response utilization for unit commitment deferral or system operations economics.)

The following provides information with respect to items 2a) through 2c) – (all statements are current as of the month ending December 31, 2016):

2a) Tabulation of contingency reserve activations including date and time, MW magnitude, duration, and triggering event:

Hawaiian Electric's contingency reserve activations are provided in Attachment 3. Maui Electric and Hawai'i Electric Light do not operate with contingency reserve requirements.

2b) Tabulation of under frequency load shed activations including date and time, triggering frequency, MW magnitude, duration, and triggering event:

Hawaiian Electric, Hawai'i Electric Light and Maui Electric did not have any under frequency load shed activations for the month of December. Therefore, Attachment 4 is not being provided for this reporting period.

2c) Tabulation of demand response activations for system events, including date and time, MW magnitude, duration, and triggering event, (excluding demand response utilization for unit commitment deferral or system operations economics.)

Hawaiian Electric's demand response activations for system events is provided in Attachment 5. Hawai'i Electric Light currently does not have demand response program. Maui Electric has implemented the Fast Demand Response pilot program on a limited basis. Hawai'i Electric Light plans to use the findings of Maui Electric's pilot program to help in the evaluation and development of future demand response programs. Maui Electric executes a weekly testing protocol which measures customer participation. This program is not currently used in response to actual system events.

- (3) Curtailment of non-dispatchable renewable resources:
- (a) Tabulation of each curtailment event for each resource including the starting date and time, duration, megawatt hours curtailed, peak MW curtailed, and reason for curtailment.
 - (b) Total MWh of non-dispatchable renewable resources curtailed for the month.

The following provides information with respect to items 3a) through 3b) – (all statements are current as of the month ending December 31, 2016):

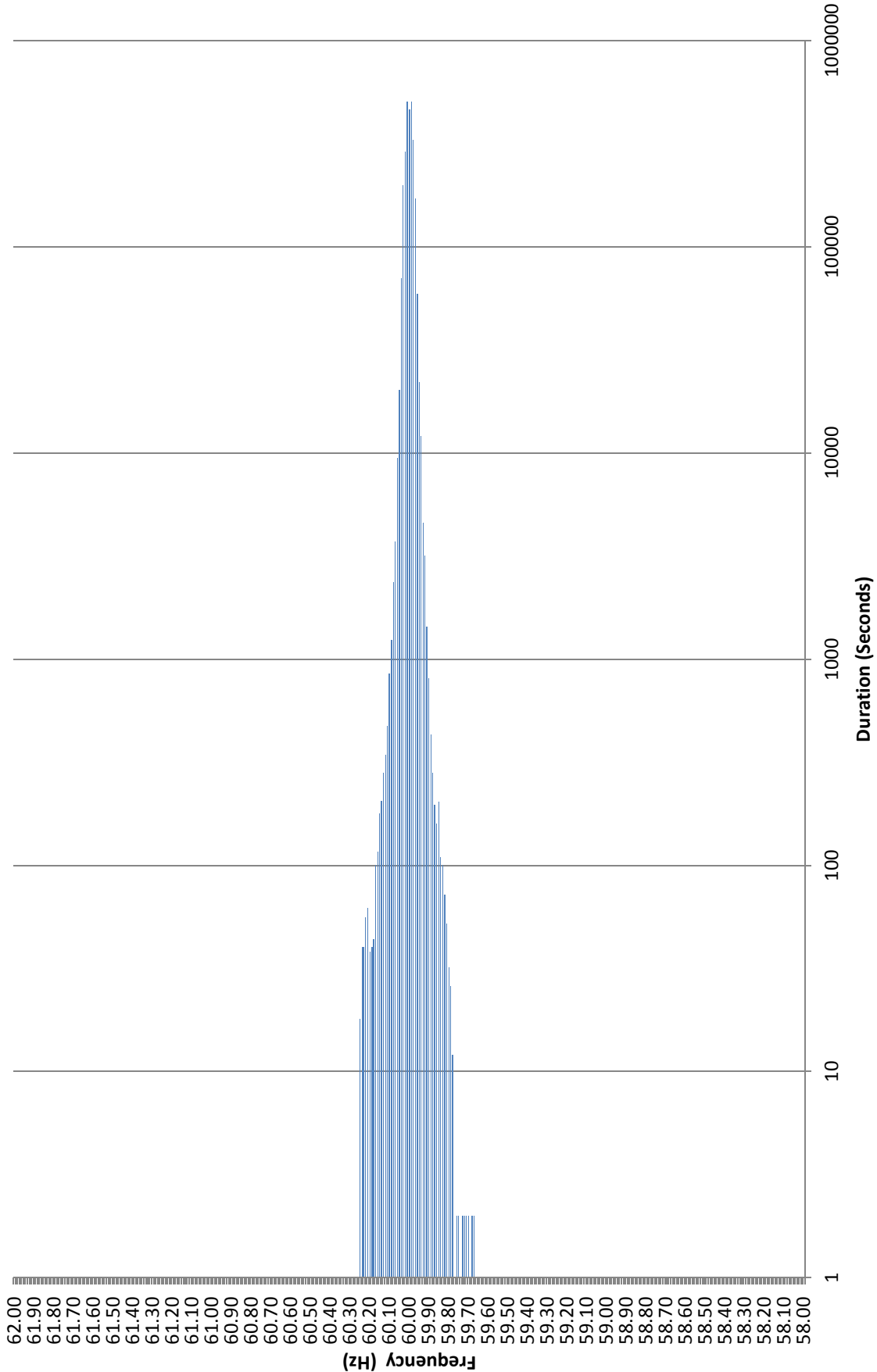
3a) Tabulation of each curtailment event for each resource including the starting date and time, duration, megawatt hours curtailed, peak MW curtailed, and reason for curtailment:

The tabulation of each curtailment event for each resource is provided in Attachment 6.

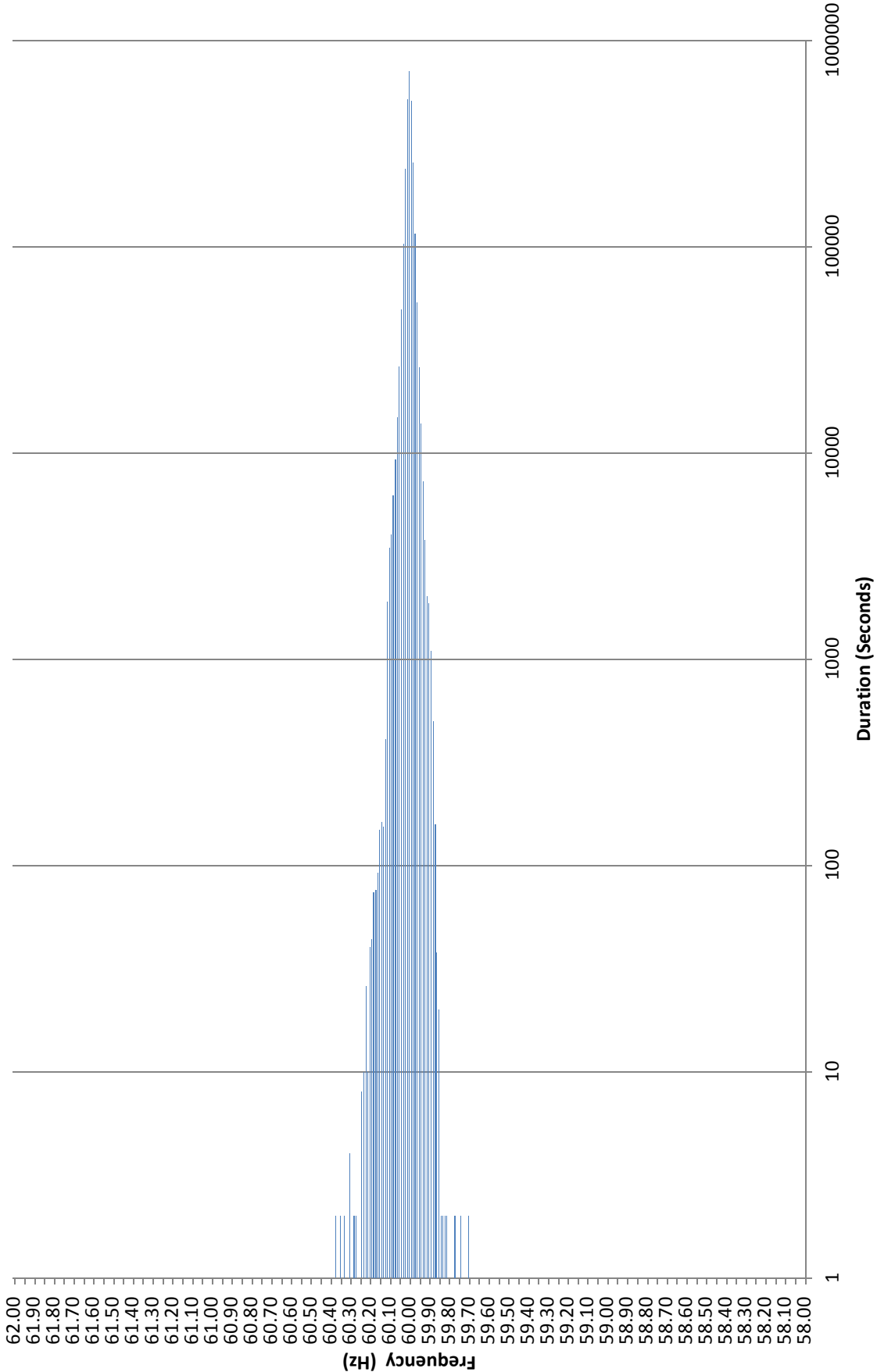
3b) Total MWh of non-dispatchable renewable resources curtailed for the month:

Curtailed MWh from non-dispatchable resources are difficult to determine due to the variability of the resource during curtailment periods. In some cases, the curtailed MWh estimates were provided by the IPPs under curtailment. The Hawaiian Electric Companies do not make any representations as to the accuracy of the curtailed MWh. The estimated MWh of non-dispatchable resources curtailed for the month are provided in Attachment 6, corresponding to each curtailment event.

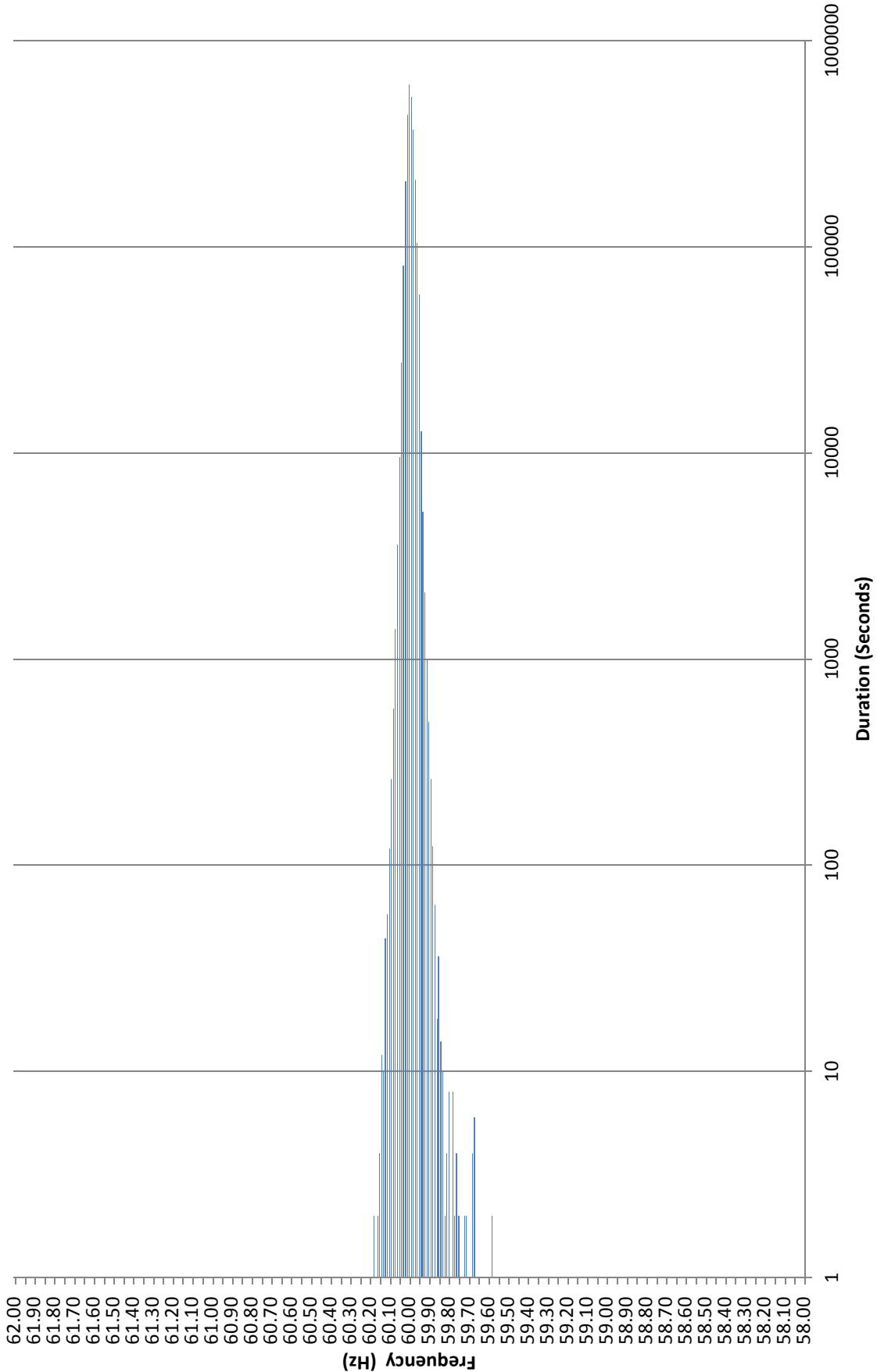
Frequency Distribution Plot - Hawaiian Electric December 2016



Maui Electric Frequency Distribution Plot - Maui December 2016



**Frequency Distribution Plot - Hawai'i Electric Light
December 2016**



Hawaiian Electric Frequency Excursion Statistics December 2016		
Data Rounded to the nearest	<59.95 Hz	>60.05 Hz
Number of Excursions	1995	1612
Maximum Duration (sec)	666	1810
Maximum Deviation (Hz)	59.675	60.252
Total Duration of Excursions (sec)	31640	25890

Maui Electric Frequency Excursion Statistics December 2016		
	<59.95 Hz	>60.05 Hz
Number of Excursions	5925	5714
Maximum Duration (sec)	744	710
Maximum Deviation (Hz)	59.7047	60.3682
Total Duration of Excursions (sec)	41672	51720

Hawai'i Electric Light Frequency Excursion Statistics December 2016		
	<59.95 Hz	>60.05 Hz
Number of Excursions	10914	2370
Maximum Duration (sec)	304	126
Maximum Deviation (Hz)	59.584	60.179
Total Duration of Excursions (sec)	52462	9686

This page intentionally left blank.

Hawaiian Electric Curtailment Report December 2016

Start Date/Time	Curtailment Set Point	MW output prior to start of curtailment	End Date/Time	MW output after curtailment released	Estimated MWh of curtailed energy during event (1)	IPP	Reason for Curtailment
12/01/16 06:50	0.0	0.00	12/01/16 06:58	0	*	Waianae	System constraints
12/01/16 20:11	0.0	0.00	12/02/16 15:20	0	*	North	System constraints
12/01/16 20:12	0.0	0.00	12/02/16 15:23	0	*	South	System constraints
12/01/16 20:18	0.0	0.00	12/01/16 20:50	0	*	Waianae	System constraints
12/02/16 14:12	0.0	0.90	12/02/16 14:52	0	*	KWF	System constraints
12/02/16 14:16	0.0	0.00	12/02/16 14:47	0	*	Makai	System constraints
12/03/16 16:18	0.0	0.50	12/03/16 18:03	0	*	KLS2	System constraints
12/05/16 07:01	0.0	0.00	12/05/16 07:09	0	*	Waianae	System constraints
12/05/16 19:00	0.0	0.00	12/05/16 19:38	0	*	Waianae	System constraints
12/09/16 06:01	0.0	0.00	12/09/16 07:59	0	*	Waianae	System constraints
12/09/16 17:21	0.0	0.00	12/09/16 18:40	0	*	Waianae	System constraints
12/12/16 06:30	0.0	0.00	12/12/16 14:31	0	*	North	System constraints
12/12/16 06:29	0.0	0.00	12/12/16 14:31	0	*	South	System constraints
12/25/16 11:48	0.0	11.00	12/25/16 12:29	0	*	Makai	Oversupply
12/25/16 11:52	0.0	1.70	12/25/16 12:44	0	*	KLS2	Oversupply

KLS2 = Kalaeloa Solar 2 PV Farm

KREP = Kalaeloa Renewable Energy Park

KWF = Kahuku Wind Farm

Makai = Kawailoa Makai Wind Farm

Mauka = Kawailoa Mauka Wind Farm

North = Waihonu North PV Farm

South = Waihonu South PV Farm

Waianae = Waianae Solar PV Farm (Plant not in Commercial operation. Curtailment times may be approximate due to commissioning testing occurring at same time.)

(1) The estimated MWh of energy curtailed during the event is supplied by Kahuku Wind Farm and/or Kawailoa Wind Farm, and HECO does not make any representation as to its accuracy.

* Data has not been provided by IPP.



Maui Curtailment Report

Start Date and Time	Duration	IPP Curtailed	Estimated Curtailed MWH	Peak MW Curtailed	Reasons for Curtailment
12/1/2016 0:06	2:04	KWPPI	23.356	16.217	System constraint
12/1/2016 1:43	0:16	AWE	0.108	20.780	System constraint
12/1/2016 2:05	0:01	AWE	0.000	20.830	System constraint
12/1/2016 2:12	1:35	KWPPI	23.099	16.217	System constraint
12/1/2016 2:26	0:22	AWE	0.533	20.987	System constraint
12/1/2016 2:49	0:02	AWE	0.014	20.977	System constraint
12/1/2016 2:52	0:01	AWE	0.004	20.713	System constraint
12/1/2016 2:57	0:06	AWE	0.119	20.883	System constraint
12/1/2016 3:05	0:11	AWE	0.165	20.900	System constraint
12/1/2016 3:17	0:02	AWE	0.004	20.980	System constraint
12/1/2016 3:28	0:15	AWE	0.416	20.817	System constraint
12/1/2016 3:49	0:30	KWPPI	7.621	16.217	System constraint
12/1/2016 3:58	0:10	AWE	0.080	20.897	System constraint
12/1/2016 4:21	0:48	KWPPI	8.588	16.217	System constraint
12/1/2016 5:34	0:22	KWPPI	0.744	16.217	System constraint
12/1/2016 12:23	0:01	BS250	Data is not available	Data is not available	System constraint
12/1/2016 12:23	0:01	KWPPI	0.041	11.677	System constraint
12/1/2016 12:26	0:04	BS250	Data is not available	Data is not available	System constraint
12/1/2016 12:26	0:04	KWPPI	0.090	16.188	System constraint
12/1/2016 15:47	0:05	BS250	Data is not available	Data is not available	System constraint
12/1/2016 15:47	0:05	KWPPI	0.099	14.569	System constraint
12/1/2016 15:54	0:30	BS250	Data is not available	Data is not available	System constraint
12/1/2016 15:54	0:28	KWPPI	1.527	17.034	System constraint
12/1/2016 17:35	0:05	BS250	Data is not available	Data is not available	System constraint
12/1/2016 17:35	0:05	KWPPI	0.068	17.104	System constraint
12/9/2016 16:45	0:01	AWE	0.000	0.003	System constraint
12/14/2016 1:30	0:03	KWPPI	0.056	18.563	System constraint
12/14/2016 1:37	1:16	KWPPI	5.520	19.709	System constraint
12/15/2016 9:01	0:01	AWE	0.000	0.007	System constraint
12/15/2016 9:06	0:01	AWE	0.000	0.007	System constraint
12/15/2016 9:17	0:01	AWE	0.000	0.007	System constraint
12/15/2016 13:38	0:03	KWPPI	0.070	11.100	System constraint
12/16/2016 6:11	0:01	AWE	0.000	0.007	System constraint
12/16/2016 11:35	0:01	BS250	Data is not available	Data is not available	System constraint
12/16/2016 11:35	0:01	KWPPI	0.014	8.753	System constraint
12/16/2016 14:19	0:22	KWPPI	1.340	20.676	System constraint
12/16/2016 14:20	0:22	BS250	Data is not available	Data is not available	System constraint
12/16/2016 17:24	0:01	AWE	0.000	0.003	System constraint
12/16/2016 23:40	0:03	KWPPI	0.037	17.009	Oversupply
12/16/2016 23:44	0:13	KWPPI	0.572	18.151	Oversupply
12/17/2016 0:00	0:03	KWPPI	0.049	16.572	Oversupply
12/17/2016 0:07	0:52	KWPPI	5.503	18.027	Oversupply
12/17/2016 1:01	0:13	KWPPI	0.453	18.582	Oversupply
12/17/2016 2:56	0:02	KWPPI	0.043	15.015	Oversupply
12/17/2016 3:02	0:03	KWPPI	0.030	16.449	Oversupply
12/17/2016 3:08	0:31	KWPPI	1.726	19.084	Oversupply
12/17/2016 3:55	0:07	KWPPI	0.372	18.243	Oversupply
12/17/2016 7:00	0:01	AWE	0.000	0.003	Oversupply
12/17/2016 10:43	0:03	BS250	Data is not available	Data is not available	Oversupply
12/17/2016 10:44	0:09	KWPPI	0.130	16.078	Oversupply
12/17/2016 10:47	0:06	BS250	Data is not available	Data is not available	Oversupply
12/17/2016 10:54	0:03	BS250	Data is not available	Data is not available	Oversupply
12/17/2016 10:54	0:03	KWPPI	0.059	16.161	Oversupply
12/17/2016 11:12	0:11	KWPPI	0.284	14.872	Oversupply
12/17/2016 11:51	1:00	KWPPI	3.129	12.888	Oversupply
12/17/2016 13:15	0:01	BS250	Data is not available	Data is not available	Oversupply
12/18/2016 1:12	0:30	KWPPI	3.987	17.741	Oversupply
12/18/2016 1:52	1:48	KWPPI	12.608	17.343	Oversupply
12/18/2016 2:10	0:41	AWE	1.870	13.823	Oversupply
12/18/2016 2:55	0:05	AWE	0.125	12.570	Oversupply
12/18/2016 3:01	0:01	AWE	0.004	12.260	Oversupply
12/18/2016 3:05	0:32	AWE	2.175	20.600	Oversupply
12/18/2016 3:49	0:10	KWPPI	0.072	2.355	Oversupply
12/18/2016 3:49	0:19	AWE	0.662	20.360	Oversupply
12/19/2016 12:54	0:03	BS250	Data is not available	Data is not available	System constraint
12/19/2016 12:55	0:02	KWPPI	0.023	15.785	System constraint
12/19/2016 12:58	0:10	BS250	Data is not available	Data is not available	System constraint
12/19/2016 12:58	0:27	KWPPI	4.136	17.362	System constraint
12/19/2016 13:27	0:06	KWPPI	0.657	15.014	System constraint
12/20/2016 0:07	0:06	AWE	0.170	19.500	System constraint
12/20/2016 0:10	0:02	KWPPI	0.025	0.819	System constraint
12/20/2016 2:42	0:16	AWE	0.461	20.643	System constraint
12/20/2016 2:59	0:02	AWE	0.011	19.367	System constraint
12/20/2016 5:03	0:06	AWE	0.168	19.433	System constraint
12/20/2016 5:18	0:01	AWE	0.007	15.793	System constraint
12/20/2016 6:22	0:02	KWPPI	0.039	14.654	System constraint
12/20/2016 6:48	0:01	BS250	Data is not available	Data is not available	System constraint
12/20/2016 6:48	0:01	KWPPI	0.008	17.632	System constraint
12/20/2016 6:50	0:01	BS250	Data is not available	Data is not available	System constraint
12/20/2016 6:50	0:01	KWPPI	0.010	17.674	System constraint
12/20/2016 6:52	0:01	BS250	Data is not available	Data is not available	System constraint
12/20/2016 9:38	0:01	BS250	Data is not available	Data is not available	System constraint
12/20/2016 9:40	0:08	BS250	Data is not available	Data is not available	System constraint
12/20/2016 9:41	0:31	KWPPI	2.409	15.488	System constraint
12/20/2016 10:25	0:24	BS250	Data is not available	Data is not available	System constraint
12/20/2016 10:25	3:01	KWPPI	29.161	17.217	System constraint
12/20/2016 14:13	1:09	KWPPI	4.870	17.709	System constraint
12/20/2016 15:21	0:01	BS250	Data is not available	Data is not available	System constraint
12/20/2016 22:54	1:23	KWPPI	8.676	17.714	System constraint
12/21/2016 0:18	2:14	KWPPI	28.708	17.714	System constraint
12/21/2016 2:07	0:19	AWE	1.291	18.500	System constraint
12/21/2016 2:33	1:35	KWPPI	24.041	17.714	System constraint
12/21/2016 2:37	0:01	AWE	0.009	11.027	System constraint
12/21/2016 3:31	0:27	AWE	1.134	15.527	System constraint
12/21/2016 3:59	0:01	AWE	0.019	13.087	System constraint
12/21/2016 4:09	0:32	KWPPI	4.168	17.714	System constraint
12/21/2016 5:32	0:53	KWPPI	3.632	17.714	System constraint
12/21/2016 7:44	0:06	BS250	Data is not available	Data is not available	System constraint
12/21/2016 7:45	0:05	KWPPI	0.064	17.231	System constraint
12/21/2016 8:37	0:12	BS250	Data is not available	Data is not available	System constraint
12/21/2016 8:37	0:08	KWPPI	0.165	17.463	System constraint
12/21/2016 8:46	0:01	KWPPI	0.014	14.131	System constraint
12/21/2016 8:51	0:09	BS250	Data is not available	Data is not available	System constraint
12/21/2016 8:51	0:09	KWPPI	0.229	14.793	System constraint
12/21/2016 21:37	0:04	KWPPI	0.256	18.646	System constraint
12/21/2016 21:47	0:06	KWPPI	0.518	19.558	System constraint
12/21/2016 21:59	0:07	KWPPI	0.592	20.467	System constraint



Maui Curtailment Report

Start Date and Time	Duration	IPP Curtailed	Estimated Curtailed MWH	Peak MW Curtailed	Reasons for Curtailment
12/21/2016 22:21	0:33	KWP/II	2,414	20,115	System constraint
12/21/2016 23:07	0:01	KWP/II	0,028	14,768	System constraint
12/21/2016 23:09	2:53	KWP/II	36,402	18,792	System constraint
12/21/2016 23:09	0:03	AWE	0,051	20,267	System constraint
12/21/2016 23:49	0:25	AWE	1,125	20,647	System constraint
12/22/2016 0:15	0:03	AWE	0,086	19,990	System constraint
12/22/2016 0:22	1:36	AWE	7,526	21,000	System constraint
12/22/2016 2:05	0:04	KWP/II	0,087	4,699	System constraint
12/22/2016 2:12	0:18	KWP/II	0,817	6,647	System constraint
12/22/2016 2:31	1:39	KWP/II	14,254	14,194	System constraint
12/22/2016 2:34	0:04	AWE	0,055	20,767	System constraint
12/22/2016 2:39	1:31	AWE	8,908	20,937	System constraint
12/22/2016 4:24	0:26	KWP/II	1,275	6,687	System constraint
12/22/2016 4:25	0:01	AWE	0,012	20,800	System constraint
12/22/2016 4:59	0:10	KWP/II	0,771	12,922	System constraint
12/22/2016 5:00	0:02	AWE	0,015	20,837	System constraint
12/22/2016 9:57	0:01	BS250	Data is not available	Data is not available	System constraint
12/22/2016 9:57	3:37	KWP/II	18,133	20,614	System constraint
12/22/2016 13:58	0:01	BS250	Data is not available	Data is not available	System constraint
12/22/2016 14:00	0:01	BS250	Data is not available	Data is not available	System constraint
12/22/2016 19:41	0:01	KWP	0,000	0,005	System constraint
12/23/2016 2:57	0:01	AWE	0,003	19,223	System constraint
12/23/2016 3:03	0:01	AWE	0,003	19,360	System constraint
12/23/2016 3:05	0:02	AWE	0,011	20,247	System constraint
12/23/2016 14:33	0:01	KWP	0,000	0,001	System constraint
12/23/2016 23:51	0:20	KWP/II	0,512	18,782	Oversupply
12/24/2016 0:14	0:31	KWP/II	1,357	18,708	Oversupply
12/24/2016 0:46	0:09	KWP/II	0,475	17,626	Oversupply
12/24/2016 4:45	0:13	KWP/II	1,803	12,733	Oversupply
12/24/2016 4:50	0:02	AWE	0,040	20,057	Oversupply
12/24/2016 4:59	1:13	KWP/II	5,807	14,796	Oversupply
12/24/2016 6:17	0:36	KWP/II	2,095	19,204	Oversupply
12/24/2016 6:46	0:07	BS250	Data is not available	Data is not available	Oversupply
12/24/2016 6:56	0:01	BS250	Data is not available	Data is not available	Oversupply
12/24/2016 9:40	0:02	BS250	Data is not available	Data is not available	Oversupply
12/24/2016 9:43	0:16	BS250	Data is not available	Data is not available	Oversupply
12/24/2016 9:43	0:15	KWP/II	0,282	20,708	Oversupply
12/24/2016 10:22	1:01	KWP/II	4,937	20,705	Oversupply
12/24/2016 10:23	1:00	BS250	Data is not available	Data is not available	Oversupply
12/24/2016 11:27	0:26	BS250	Data is not available	Data is not available	Oversupply
12/24/2016 11:29	0:24	KWP/II	1,670	19,211	Oversupply
12/24/2016 11:54	0:10	BS250	Data is not available	Data is not available	Oversupply
12/24/2016 11:54	0:10	KWP/II	0,186	19,192	Oversupply
12/24/2016 12:06	0:01	BS250	Data is not available	Data is not available	Oversupply
12/24/2016 12:08	0:01	BS250	Data is not available	Data is not available	Oversupply
12/24/2016 12:11	0:22	BS250	Data is not available	Data is not available	Oversupply
12/24/2016 12:12	0:21	KWP/II	1,307	19,211	Oversupply
12/24/2016 12:37	2:32	BS250	Data is not available	Data is not available	Oversupply
12/24/2016 12:39	2:30	KWP/II	26,838	19,211	Oversupply
12/24/2016 23:42	0:05	KWP/II	0,147	19,211	Oversupply
12/24/2016 23:54	8:19	KWP/II	114,379	20,553	Oversupply
12/25/2016 1:55	0:01	AWE	0,009	19,147	Oversupply
12/25/2016 1:59	0:01	AWE	0,002	18,730	Oversupply
12/25/2016 2:01	2:13	AWE	11,510	20,063	Oversupply
12/25/2016 4:16	0:43	AWE	2,420	19,590	Oversupply
12/25/2016 5:08	0:01	AWE	0,007	19,813	Oversupply
12/25/2016 6:46	1:28	BS250	Data is not available	Data is not available	Oversupply
12/25/2016 8:22	0:01	BS250	Data is not available	Data is not available	Oversupply
12/25/2016 8:26	0:04	BS250	Data is not available	Data is not available	Oversupply
12/25/2016 8:26	0:07	KWP/II	0,203	20,144	Oversupply
12/25/2016 8:31	0:02	BS250	Data is not available	Data is not available	Oversupply
12/25/2016 8:34	0:13	BS250	Data is not available	Data is not available	Oversupply
12/25/2016 8:34	0:13	KWP/II	0,645	20,554	Oversupply
12/25/2016 8:58	0:03	BS250	Data is not available	Data is not available	Oversupply
12/25/2016 8:58	0:02	KWP/II	0,053	20,081	Oversupply
12/25/2016 9:05	0:01	BS250	Data is not available	Data is not available	Oversupply
12/25/2016 9:05	0:01	KWP/II	0,013	19,594	Oversupply
12/25/2016 9:07	0:04	BS250	Data is not available	Data is not available	Oversupply
12/25/2016 9:08	0:02	KWP/II	0,033	19,089	Oversupply
12/25/2016 9:12	0:02	BS250	Data is not available	Data is not available	Oversupply
12/25/2016 9:12	0:02	KWP/II	0,021	17,679	Oversupply
12/25/2016 9:15	0:01	BS250	Data is not available	Data is not available	Oversupply
12/25/2016 9:20	0:04	BS250	Data is not available	Data is not available	Oversupply
12/25/2016 9:21	0:02	KWP/II	0,042	13,529	Oversupply
12/25/2016 9:25	0:02	BS250	Data is not available	Data is not available	Oversupply
12/25/2016 9:28	0:01	BS250	Data is not available	Data is not available	Oversupply
12/25/2016 9:31	0:01	BS250	Data is not available	Data is not available	Oversupply
12/25/2016 9:31	0:01	KWP/II	0,022	16,558	Oversupply
12/25/2016 9:44	0:03	BS250	Data is not available	Data is not available	Oversupply
12/25/2016 9:45	0:02	KWP/II	0,084	17,599	Oversupply
12/25/2016 9:50	3:37	KWP/II	70,336	20,708	Oversupply
12/25/2016 9:55	0:13	AWE	0,607	20,920	Oversupply
12/25/2016 10:46	2:36	AWE	7,184	20,783	Oversupply
12/25/2016 13:29	1:25	KWP/II	11,658	20,708	Oversupply
12/25/2016 14:06	0:43	BS250	Data is not available	Data is not available	Oversupply
12/25/2016 14:50	0:03	BS250	Data is not available	Data is not available	Oversupply
12/25/2016 14:55	0:06	BS250	Data is not available	Data is not available	Oversupply
12/25/2016 14:55	0:06	KWP/II	0,027	20,690	Oversupply
12/25/2016 15:12	0:12	BS250	Data is not available	Data is not available	Oversupply
12/25/2016 15:13	0:11	KWP/II	0,207	20,708	Oversupply
12/25/2016 23:16	0:22	KWP/II	1,262	19,211	Oversupply
12/25/2016 23:43	0:07	KWP/II	0,116	19,211	Oversupply
12/25/2016 23:45	0:14	AWE	0,824	21,000	Oversupply
12/25/2016 23:53	0:30	KWP/II	3,537	19,211	Oversupply
12/26/2016 0:12	0:06	AWE	0,104	20,833	Oversupply
12/26/2016 0:24	0:08	AWE	0,284	20,467	Oversupply
12/26/2016 0:29	7:03	KWP/II	109,374	19,211	Oversupply
12/26/2016 1:16	3:20	AWE	15,205	20,800	Oversupply
12/26/2016 10:34	4:09	KWP/II	21,472	19,211	Oversupply
12/26/2016 23:20	5:50	KWP/II	87,522	17,714	System constraint
12/27/2016 1:23	3:37	AWE	13,292	20,800	System constraint
12/27/2016 5:12	1:00	KWP/II	8,750	17,714	System constraint
12/27/2016 10:14	0:02	BS250	Data is not available	Data is not available	System constraint
12/27/2016 10:20	3:31	KWP/II	19,102	17,714	System constraint
12/27/2016 22:06	0:06	KWP/II	0,173	17,690	Oversupply
12/27/2016 23:38	5:33	KWP/II	59,090	17,714	Oversupply
12/28/2016 4:00	0:02	AWE	0,028	16,130	Oversupply



Maui Curtailment Report

Start Date and Time	Duration	IPP Curtailed	Estimated Curtailed MWH	Peak MW Curtailed	Reasons for Curtailment
12/28/2016 4:05	0:03	AWE	0.031	16.827	Oversupply
12/28/2016 5:30	0:23	KWPPI	0.999	17.714	Oversupply
12/28/2016 9:51	0:26	BS250	Data is not available	Data is not available	Oversupply
12/28/2016 9:55	0:22	KWPPI	1.373	17.714	Oversupply
12/28/2016 10:24	0:11	BS250	Data is not available	Data is not available	Oversupply
12/28/2016 10:26	0:07	KWPPI	0.244	17.714	Oversupply
12/28/2016 10:43	0:32	BS250	Data is not available	Data is not available	Oversupply
12/28/2016 10:44	0:30	KWPPI	2.286	17.714	Oversupply
12/28/2016 11:31	0:01	BS250	Data is not available	Data is not available	Oversupply
12/28/2016 11:33	0:03	BS250	Data is not available	Data is not available	Oversupply
12/28/2016 11:41	0:01	BS250	Data is not available	Data is not available	Oversupply
12/28/2016 11:43	0:02	BS250	Data is not available	Data is not available	Oversupply
12/28/2016 11:46	0:01	BS250	Data is not available	Data is not available	Oversupply
12/28/2016 11:49	0:17	BS250	Data is not available	Data is not available	Oversupply
12/28/2016 11:49	0:17	KWPPI	0.550	17.675	Oversupply
12/28/2016 12:07	0:02	BS250	Data is not available	Data is not available	Oversupply
12/28/2016 12:08	0:01	KWPPI	0.026	17.603	Oversupply
12/28/2016 12:10	0:03	BS250	Data is not available	Data is not available	Oversupply
12/28/2016 12:10	0:02	KWPPI	0.037	17.405	Oversupply
12/28/2016 12:17	0:01	BS250	Data is not available	Data is not available	Oversupply
12/28/2016 12:19	0:04	BS250	Data is not available	Data is not available	Oversupply
12/28/2016 12:20	0:03	KWPPI	0.079	17.695	Oversupply
12/28/2016 12:24	0:03	BS250	Data is not available	Data is not available	Oversupply
12/28/2016 12:24	0:03	KWPPI	0.085	17.711	Oversupply
12/28/2016 12:28	0:03	BS250	Data is not available	Data is not available	Oversupply
12/28/2016 12:28	0:02	KWPPI	0.062	17.696	Oversupply
12/28/2016 12:33	0:22	BS250	Data is not available	Data is not available	Oversupply
12/28/2016 12:34	0:07	KWPPI	0.126	17.708	Oversupply
12/28/2016 12:43	0:12	KWPPI	0.319	17.708	Oversupply
12/28/2016 12:59	0:08	BS250	Data is not available	Data is not available	Oversupply
12/28/2016 13:00	0:06	KWPPI	0.165	17.710	Oversupply
12/28/2016 13:16	0:03	BS250	Data is not available	Data is not available	Oversupply
12/28/2016 13:18	0:01	KWPPI	0.009	17.713	Oversupply
12/28/2016 13:20	0:14	BS250	Data is not available	Data is not available	Oversupply
12/28/2016 13:22	0:11	KWPPI	0.420	17.713	Oversupply
12/28/2016 14:05	0:14	BS250	Data is not available	Data is not available	Oversupply
12/28/2016 14:06	0:14	KWPPI	0.477	17.714	Oversupply
12/28/2016 14:20	0:01	BS250	Data is not available	Data is not available	Oversupply
12/28/2016 23:29	0:12	KWPPI	0.356	17.714	Oversupply
12/29/2016 0:06	5:42	AWE	55.138	17.714	Oversupply
12/29/2016 0:06	5:42	KWPPI	55.138	17.714	Oversupply
12/29/2016 10:13	0:01	BS250	Data is not available	Data is not available	Oversupply
12/29/2016 11:10	0:14	BS250	Data is not available	Data is not available	Oversupply
12/29/2016 11:12	0:12	AWE	0.366	17.713	Oversupply
12/29/2016 11:12	0:12	KWPPI	0.366	17.713	Oversupply
12/29/2016 11:34	0:10	BS250	Data is not available	Data is not available	Oversupply
12/29/2016 11:35	0:08	AWE	0.354	17.709	Oversupply
12/29/2016 11:35	0:08	KWPPI	0.354	17.709	Oversupply
12/29/2016 11:46	0:02	BS250	Data is not available	Data is not available	Oversupply
12/29/2016 11:46	0:02	AWE	0.020	17.626	Oversupply
12/29/2016 11:46	0:02	KWPPI	0.020	17.626	Oversupply
12/29/2016 11:49	0:01	BS250	Data is not available	Data is not available	Oversupply
12/29/2016 12:45	0:01	BS250	Data is not available	Data is not available	Oversupply
12/30/2016 2:29	0:34	AWE	3.097	16.799	System constraint
12/30/2016 2:29	0:34	KWPPI	3.097	16.799	System constraint
12/30/2016 3:24	0:38	AWE	4.001	16.431	System constraint
12/30/2016 3:24	0:38	KWPPI	4.001	16.431	System constraint
12/30/2016 4:11	0:32	AWE	1.766	17.255	System constraint
12/30/2016 4:11	0:32	KWPPI	1.766	17.255	System constraint
12/31/2016 3:06	1:07	AWE	3.045	18.342	Oversupply
12/31/2016 3:06	1:07	KWPPI	3.045	18.342	Oversupply

Notes:
- Curtailment for Kaheawa Wind Power ("KWP"), Makila Hydroelectric ("MH"), AAAAA Rent-A-Space Maui LTD ("SA"), Bioreal Solar, LLC ("BS"), Auwahi Wind Energy ("AWE"), Kaheawa Wind Power II ("KWPPI") Bioreal Solar 250, LLC ("BS250") may now be controlled by Maui Electric's Automatic Generation Control System ("AGC") or a Maui Electric operator-entered curtailment limit. The AGC curtailment control automatically calculates the amount of Maximum Allowable Variable Generation ("MAVG") that Maui Electric can accept into the Maui system, based on the system current available variable generation ("CAVG"), regulating reserve down requirement ("RRDR"), and available regulating reserve down ("ARRD"). Thus, the AGC MAVG - calculated is equal to CAVG less (RRDR less ARRD). Additionally, the AGC curtailment control allows the Maui Electric operator to enter an AGC MAVG value. The AGC curtailment control will employ the lesser of the AGC MAVG - calculated and AGC MAVG - entered values in the control logic.
- The Estimated Curtailed MWH and Peak MW Curtailed are calculated with information provided by AWE, KWP, and KWPPI. Maui Electric does not make any representation as to its accuracy.
- The data to calculate the Estimated Curtailed MWH and Peak MW Curtailed is not provided by SA, BS, BS 250 or MH.
- Curtailment signals sent to SA, BS, or BS250 during nighttime hours are not recorded as curtailment events because no energy generation is possible during that time.
- The curtailment reasons have been modified to oversupply, system constraints, and facility requested, to provide continuity with HPUC Docket No. 2013-0141 Decoupling for HECO companies metrics.



Lanai Curtailment Report

Start Date and Time	Duration	IPP Curtailed	Estimated MWh Curtailed	Peak MW Curtailed	Reasons for Curtailment
12/31/2016 10:50	0:03	LSR	Data is not available	Data is not available	Oversupply
12/31/2016 11:06	0:02	LSR	Data is not available	Data is not available	Oversupply
12/31/2016 11:46	0:05	LSR	Data is not available	Data is not available	Oversupply
12/31/2016 11:55	0:01	LSR	Data is not available	Data is not available	Oversupply
12/31/2016 12:20	0:02	LSR	Data is not available	Data is not available	Oversupply
12/31/2016 12:30	0:01	LSR	Data is not available	Data is not available	Oversupply
12/31/2016 12:39	0:01	LSR	Data is not available	Data is not available	Oversupply
Notes:					
On June 27, 2012, Maui Electric notified LSR that although LSR has not operated in compliance with the revised ramp rate of 360 kW/minute, Maui Electric would conditionally allow LSR to operate at the allowed capacity of 1.2 MW while the Maui Electric-Lanai Diesel Operator was in the control room.					
LSR possible output data is not available. Therefore, Maui Electric assumes LSR is curtailed if the LSR curtailment set point is less than 1,200 kW and LSR's output is within 50 kW of the curtailment set point.					
The curtailment reasons have been modified to oversupply, system constraints, and facility requested, to provide continuity with HPUC Docket No. 2013-0141 Decoupling for HECO companies metrics.					

Hawai'i Electric Light Company Curtailment Report December 2016

Start Date/Time	MW output prior to start of curtailment	End Date/Time	MW output after curtailment released ¹	IPP	Reason for Curtailment
12/01/16 15:33	17.0 MW	12/01/16 20:27	16.9 MW	Tawhiri	Facility requested
12/02/16 02:10	18.7 MW	12/02/16 04:06	18.7 MW	Tawhiri	Oversupply
12/05/16 00:50	19.8 MW	12/05/16 04:34	15.7 MW	Tawhiri	Oversupply
12/19/16 02:04	16.9 MW	12/19/16 04:10	16.9 MW	Tawhiri	Oversupply
12/19/16 08:08	17.9 MW	12/19/16 09:18	15.4 MW	Tawhiri	Facility requested
12/19/16 15:48	17.9 MW	12/19/16 21:26	17.9 MW	Tawhiri	Facility requested
12/20/16 22:50	8.0 MW	12/21/16 05:01	9.3 MW	HRD	Facility requested
12/25/16 20:08	18.7 MW	12/27/16 10:09	15.0 MW	Tawhiri	Facility requested
12/26/16 03:07	27.2 MW	12/26/16 03:42	25.3 MW	PGV	Oversupply ²

¹ The MW output values are taken soon after curtailment is released by Hawai'i Electric Light and may not reflect their full output depending on ramp rate for the facility. The wind farms generally return immediately to full available levels, whereas PGV and Wailuku may take longer to return to scheduled or full available output levels.

² Regarding the December 26, 2016 curtailment, Tawhiri had facility requested curtailment in effect, but Group B curtailment was inadvertently overlooked. HRD experienced control issues and could not be curtailed.

SERVICE LIST
(Docket No. 2011-0206)

DEAN NISHINA EXECUTIVE DIRECTOR DEPARTMENT OF COMMERCE AND CONSUMER AFFAIRS DIVISION OF CONSUMER ADVOCACY P.O. Box 541 Honolulu, HI 96809	2 Copies Via Hand Delivery
GREGG J. KINKLEY, ESQ. DEPARTMENT OF THE ATTORNEY GENERAL 425 Queen Street Honolulu, Hawaii 96813 Counsel for DBEDT	1 Copy Electronically Transmitted
DANIEL W.S. LAWRENCE, ESQ. DEPARTMENT OF THE CORPORATION COUNSEL CITY AND COUNTY OF HONOLULU 530 S. King Street, Room 110 Honolulu, HI 96813 Counsel for the CITY AND COUNTY OF HONOLULU	1 Copy Electronically Transmitted
MOLLY A. STEBBINS, ESQ. WILLIAM V. BRILHANTE, JR., ESQ. DEPARTMENT OF THE CORPORATION COUNSEL COUNTY OF HAWAII 101 Aupuni Street, Suite 325 Hilo, HI 96720 Counsel for the COUNTY OF HAWAII	1 Copy Electronically Transmitted
HENRY Q CURTIS VICE PRESIDENT FOR CONSUMER ISSUES LIFE OF THE LAND P.O. Box 37158 Honolulu, HI 96837-0158	1 Copy Electronically Transmitted
WARREN S. BOLLMEIER II PRESIDENT HAWAII RENEWABLE ENERGY ALLIANCE 46-040 Konane Place, #3816 Kaneohe, HI 96744	1 Copy Electronically Transmitted

SERVICE LIST
(Docket No. 2011-0206)

DOUGLAS A. CODIGA, ESQ.
SCHLACK ITO LLLC
Topa Financial Center
745 Fort Street, Suite 1500
Honolulu, HI 96813
Counsel for BLUE PLANET FOUNDATION

1 Copy
Electronically Transmitted

ISAAC MORIWAKE, ESQ.
DAVID HENKIN, ESQ.
EARTHJUSTICE
850 Richards Street, Suite 400
Honolulu, HI 96813-4501
Counsel for HAWAII SOLAR ENERGY ASSOCIATION

1 Copy
Electronically Transmitted

RICK REED
DIRECTOR
HAWAII SOLAR ENERGY ASSOCIATION
761 Ahua Street
Honolulu, HI 96819

1 Copy
Electronically Transmitted

KENT D. MORIHARA, ESQ.
KRIS N. NAKAGAWA, ESQ.
LAUREN M. IMADA-LEE, ESQ.
TANYA M. FERNANDES, ESQ.
Mori-hara Lau & Fong LLP
841 Bishop Street, Suite 400
Honolulu, Hawaii 96813
Counsel for KAUAI ISLAND UTILITY COOPERATIVE

1 Copy
Electronically Transmitted

ERIK W. KVAM
CHIEF EXECUTIVE OFFICER
ZERO EMISSIONS LEASING LLC
4188-4 Keanu Street
Honolulu, HI 96816

1 Copy
Electronically Transmitted

SANDRA-ANN Y.H. WONG, ESQ.
ATTORNEY AT LAW, A LAW CORPORATION
1050 Bishop Street, #514
Honolulu, HI 96813
Counsel for TAWHIRI POWER LLC

1 Copy
Electronically Transmitted

RILEY SAITO
73-1294 Awakea Street
Kailua-Kona, HI 96740
For SOLAR ENERGY INDUSTRIES ASSOCIATION

1 Copy
Electronically Transmitted

SERVICE LIST
(Docket No. 2011-0206)

DEAN T. YAMAMOTO, ESQ.
YAMAMOTO & SETTLE
700 Bishop Street, Suite 200
Honolulu, HI 96813
Counsel for CASTLE & COOKE HOMES HAWAII, INC.,
CASTLE & COOKE RESORTS, LLC and
LANAI SUSTAINABILITY RESEARCH, LLC

1 Copy
Electronically Transmitted

MICHAEL J. HOPPER, ESQ.
DEPUTY CORPORATION COUNSEL
DEPARTMENT OF THE CORPORATION COUNSEL
COUNTY OF MAUI
200 S. High Street
Wailuku, HI 96793
Counsel for the COUNTY OF MAUI

1 Copy
Electronically Transmitted

CURTIS SEYMOUR
SENIOR MANAGER, GOVERNMENT AFFAIRS
SUN EDISON LLC
600 Clipper Drive
Belmont, CA 94002

1 Copy
Electronically Transmitted

MONA W. CLARK, ESQ.
OFFICE OF THE COUNTY ATTORNEY
COUNTY OF KAUAI
4444 Rice Street, Suite 200
Lihue, HI 96766-1300

1 Copy
Electronically Transmitted

BRADLEY ALBERT
PRESIDENT
HAWAII PV COALITION
P.O. Box 81501
Haiku, HI 96708

1 Copy
Electronically Transmitted

HILTON H. UNEMORI
ECM, INC.
130 N. Market Street
Wailuku, HI 96793-1716
For SOUTH MAUI RENEWABLE RESOURCES, LLC

1 Copy
Electronically Transmitted

SERVICE LIST
(Docket No. 2011-0206)

SKY STANFIELD
SHUTE, MIHALY & WEINBERGER LLP
396 Hayes Street
San Francisco, CA 94102
For the INTERSTATE RENEWABLE ENERGY COUNCIL

1 Copy
Electronically Transmitted

PETE COOPER
SOLARCITY CORPORATION
REGIONAL DIRECTOR, HAWAII
599 Kahelu Street
Mililani, HI 96789

1 Copy
Electronically Transmitted

STANLEY ALLEN GRAY, SENIOR DEVELOPER
Pier 1, Bay 3
San Francisco, CA 94111
For MOLOKAI RENEWABLES LLC

1 Copy
Electronically Transmitted

ALISON SILVERSTEIN
19213 Luedtke Lane
Pflugerville, TX 78660

1 Copy
Electronically Transmitted

BRENDAN KIRBY
12011 SW Pineapple Court
Palm City, FL 34990

1 Copy
Electronically Transmitted