



February 23, 2018

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PUBLIC UTILITIES
COMMISSION

The Honorable Chair 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. 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 January 2018 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@hawaiianelectric.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 January 31, 2018):

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 January 31, 2018):

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

Hawaiian Electric did not have any contingency reserve activations for the month of January. Maui Electric and Hawai'i Electric Light do not operate with contingency reserve requirements. Therefore, Attachment 3 is not being provided for this reporting period.

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

Maui Electric's under frequency load shed activations are provided in Attachment 4. Hawaiian Electric and Hawai'i Electric Light did not have any under frequency load shed activations for the month of January.

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 are provided in Attachment 5. Hawai'i Electric Light currently does not have a 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 January 31, 2018):

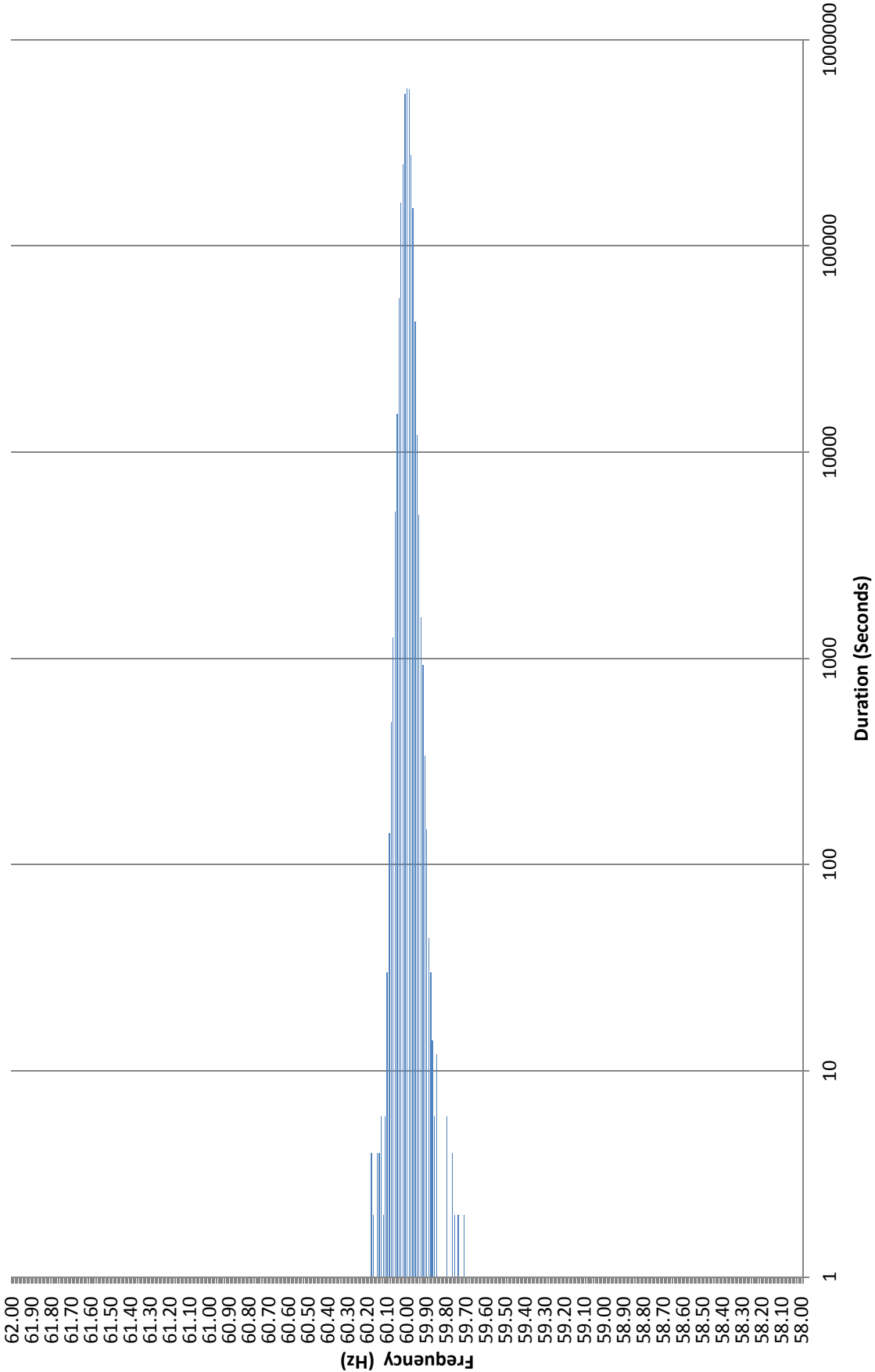
3a) Tabulation of each curtailment event for each resource including the starting date and time, duration, megawatt hours curtailed, peak MW curtailed, and reason for curtailment:

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

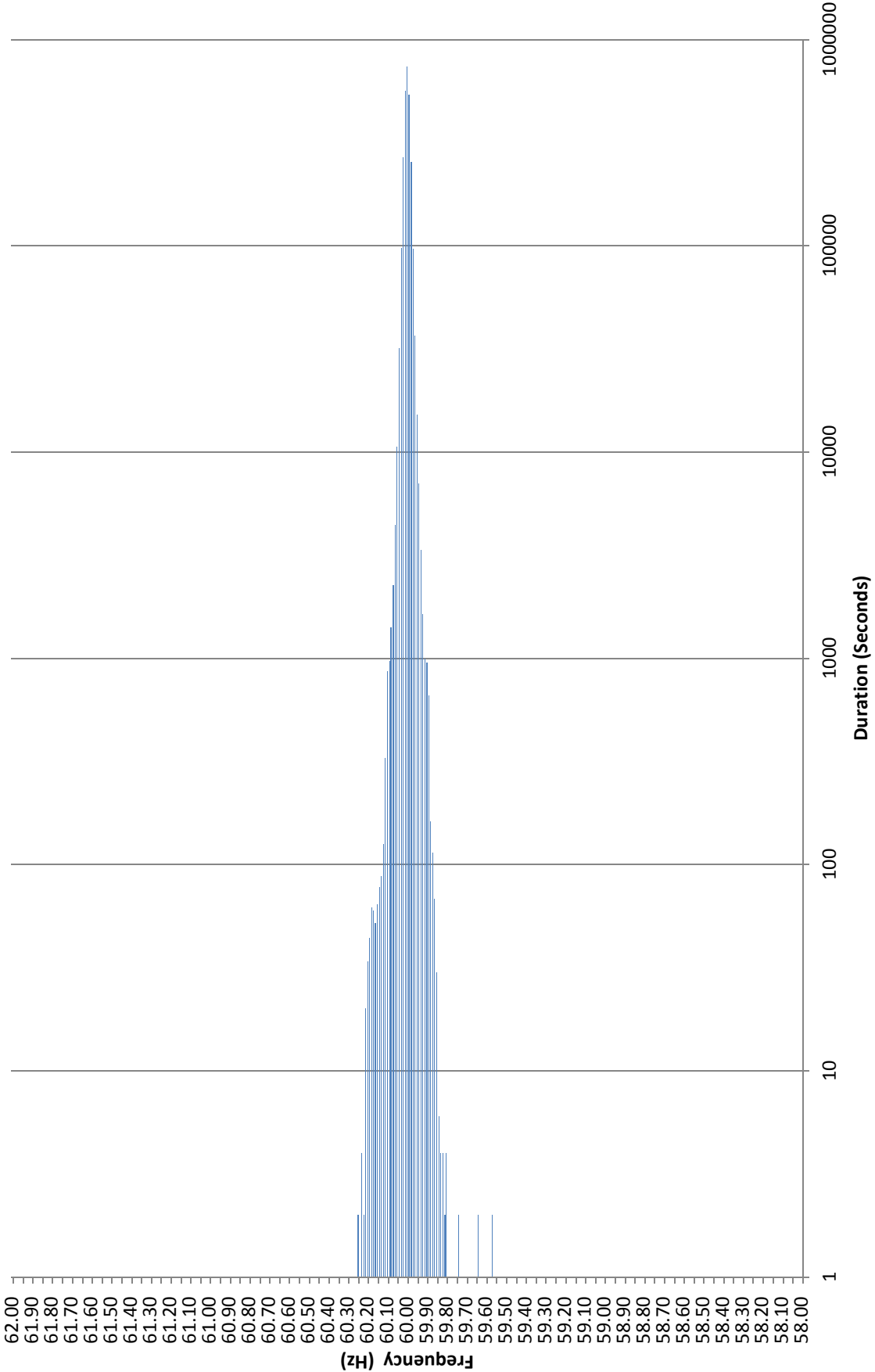
3b) Total MWh of non-dispatchable renewable resources curtailed for the month:

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.

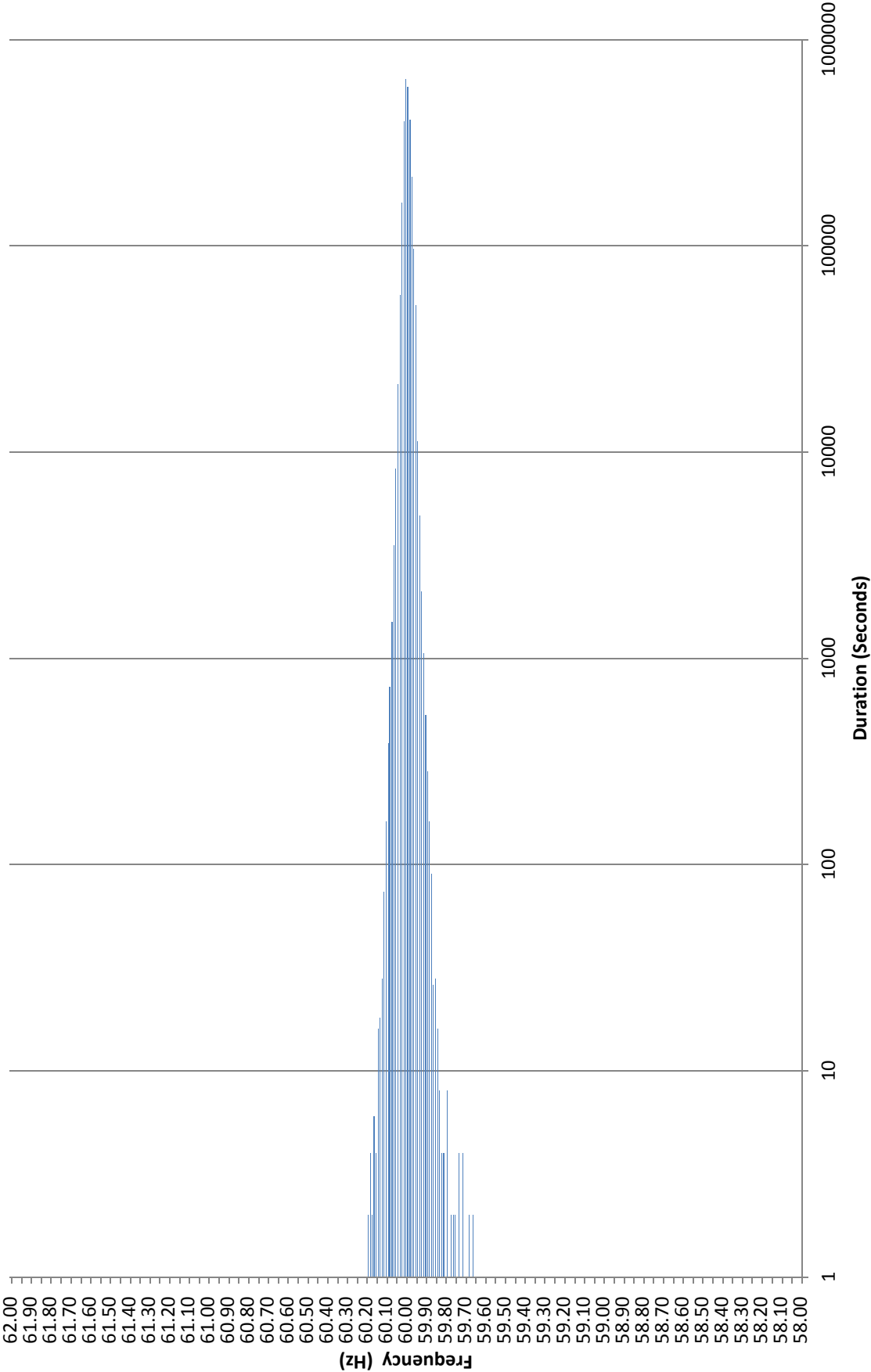
Frequency Distribution Plot - Hawaiian Electric January 2018



Frequency Distribution Plot - Maui Electric January 2018



**Frequency Distribution Plot - Hawai'i Electric Light
January 2018**



Hawaiian Electric Frequency Excursion Statistics January 2018		
Data Rounded to the nearest	<59.95 Hz	>60.05 Hz
Number of Excursions	1251	1755
Maximum Duration (sec)	174	260
Maximum Deviation (Hz)	59.705	60.183
Total Duration of Excursions (sec)	11898	11692

Maui Electric Frequency Excursion Statistics January 2018		
	<59.95 Hz	>60.05 Hz
Number of Excursions	3714	2246
Maximum Duration (sec)	270	492
Maximum Deviation (Hz)	59.570	60.246
Total Duration of Excursions (sec)	20848	14888

Hawai'i Electric Light Frequency Excursion Statistics January 2018		
	<59.95 Hz	>60.05 Hz
Number of Excursions	7726	1642
Maximum Duration (sec)	122	92
Maximum Deviation (Hz)	59.662	60.189
Total Duration of Excursions (sec)	46788	9562

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Hawaiian Electric Curtailment Report January 2018

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
01/03/18 06:47	0.0	14.00	01/03/18 07:59	0	*	KWF	System constraints
01/03/18 06:44	0.0	1.00	01/03/18 07:48	0	*	Makai	System constraints
01/03/18 06:23	0.0	0.00	01/03/18 16:18	0	*	North	System constraints
01/03/18 06:23	0.0	0.00	01/03/18 16:20	0	*	South	System constraints
01/03/18 14:53	0.0	11.40	01/03/18 15:20	0	*	KWF	System constraints
01/03/18 14:54	0.0	2.60	01/03/18 15:18	0	*	Makai	System constraints
01/05/18 06:08	0.0	0.00	01/06/18 16:50	0	*	KLS2	System constraints
01/05/18 06:13	0.0	0.00	01/05/18 07:07	0	*	KREP	System constraints
01/06/18 06:53	0.0	0.00	01/06/18 17:39	0	*	KREP	System constraints
01/08/18 13:24	0.0	4.30	01/08/18 14:50	0	*	KLS2	System constraints
01/08/18 13:26	0.0	1.70	01/08/18 14:53	0	*	KREP	System constraints
01/12/18 06:56	0.0	0.00	01/12/18 17:25	0	*	North	System constraints
01/12/18 06:57	0.0	0.00	01/12/18 17:25	0	*	South	System constraints
01/15/18 05:56	0.0	3.60	01/15/18 19:44	0	*	KWF	System constraints
01/15/18 06:11	0.0	0.10	01/15/18 19:42	0	*	Makai	System constraints
01/15/18 06:12	0.0	2.10	01/15/18 08:45	0	*	Mauka	System constraints
01/15/18 14:46	0.0	20.40	01/15/18 19:42	0	*	Mauka	System constraints
01/19/18 07:04	0.0	0.00	01/19/18 19:25	0	*	KLS2	System constraints
01/19/18 16:50	0.0	0.50	01/19/18 17:39	0	*	Aloha1	System constraints
01/19/18 17:05	0.0	2.60	01/19/18 17:40	0	*	Waianae	System constraints
01/20/18 06:43	0.0	0.00	01/20/18 06:48	0	*	KREP	System constraints
01/20/18 11:57	0.0	4.00	01/20/18 12:28	0	*	KREP	System constraints
01/25/18 07:49	0.0	0.00	01/25/18 16:15	0	*	Makai	System constraints
01/25/18 07:51	0.0	4.00	01/25/18 09:51	0	*	Mauka	System constraints
01/25/18 07:56	0.0	7.20	01/25/18 16:06	0	*	KWF	System constraints
01/25/18 14:41	0.0	6.00	01/25/18 16:14	0	*	Mauka	System constraints
01/27/18 07:17	0.0	0.00	01/27/18 07:56	0	*	KREP	System constraints
01/27/18 12:26	0.0	4.40	01/27/18 12:45	0	*	KREP	System constraints
01/29/18 09:33	0.0	0.00	01/29/18 10:36	0	*	Mauka	System constraints
01/30/18 07:31	0.0	0.10	01/30/18 07:44	0	*	Aloha1	System constraints
01/30/18 15:55	0.0	0.30	01/30/18 17:19	0	*	Waianae	System constraints
01/30/18 16:07	0.0	3.60	01/30/18 17:00	0	*	Aloha1	System constraints

Aloha1 = Aloha Solar 1 PV Farm
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

(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 representations 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
1/1/2018 0:37	0:35	KWP2	3.962	18.184	Oversupply
1/1/2018 3:28	0:03	KWP2	0.047	8.532	Oversupply
1/1/2018 3:38	0:08	KWP2	0.183	10.573	Oversupply
1/1/2018 3:49	0:01	KWP2	0.005	10.019	Oversupply
1/1/2018 4:05	0:30	KWP2	2.431	11.011	Oversupply
1/2/2018 4:38	0:01	KWP2	0.003	7.481	Oversupply
1/2/2018 4:41	0:10	KWP2	0.223	9.616	Oversupply
1/2/2018 4:53	0:01	KWP2	0.002	6.526	Oversupply
1/2/2018 4:55	0:05	KWP2	0.050	7.110	Oversupply
1/2/2018 5:04	0:02	KWP2	0.031	10.211	Oversupply
1/2/2018 5:07	0:05	KWP2	0.092	9.833	Oversupply
1/2/2018 5:15	0:46	KWP2	3.495	12.949	Oversupply
1/2/2018 7:35	0:02	KWP2	0.007	16.063	Oversupply
1/2/2018 7:38	0:03	KWP2	0.054	16.188	Oversupply
1/2/2018 11:00	0:03	KWP2	0.041	6.436	Oversupply
1/2/2018 11:31	0:26	KWP2	1.487	9.243	Oversupply
1/2/2018 22:47	0:01	KWP2	0.001	19.210	Oversupply
1/2/2018 22:54	0:09	KWP2	0.262	19.204	Oversupply
1/2/2018 23:04	1:30	KWP2	9.773	19.211	Oversupply
1/3/2018 0:48	0:03	KWP2	0.031	19.008	Oversupply
1/3/2018 0:52	3:13	KWP2	34.045	19.152	Oversupply
1/3/2018 2:54	0:01	AWE	0.005	20.000	Oversupply
1/3/2018 2:57	0:02	AWE	0.003	19.600	Oversupply
1/3/2018 4:27	0:03	KWP2	0.015	17.712	Oversupply
1/3/2018 4:36	0:02	KWP2	0.018	17.676	Oversupply
1/3/2018 4:39	0:58	KWP2	6.000	17.714	Oversupply
1/3/2018 11:12	0:01	KWP	0.320	19.672	Oversupply
1/3/2018 22:48	0:01	KWP2	0.000	19.211	Oversupply
1/3/2018 22:50	3:08	KWP2	40.896	19.211	Oversupply
1/4/2018 0:02	0:01	AWE	0.005	20.300	Oversupply
1/4/2018 0:59	0:01	AWE	0.001	20.700	Oversupply
1/4/2018 1:01	0:01	AWE	0.000	20.700	Oversupply
1/4/2018 1:03	0:02	AWE	0.006	20.500	Oversupply
1/4/2018 1:06	0:03	AWE	0.010	20.600	Oversupply
1/4/2018 1:10	0:10	AWE	0.091	20.600	Oversupply
1/4/2018 1:28	0:26	AWE	0.903	20.700	Oversupply
1/4/2018 3:20	0:04	AWE	0.042	20.400	Oversupply
1/4/2018 4:27	0:10	AWE	0.564	21.000	Oversupply
1/4/2018 4:41	0:01	AWE	0.006	14.000	Oversupply
1/4/2018 4:44	0:02	KWP2	0.039	1.914	Oversupply
1/4/2018 5:18	0:01	KWP2	0.001	12.725	Oversupply
1/4/2018 5:21	0:36	KWP2	3.549	18.458	Oversupply
1/4/2018 8:37	0:01	KWP2	0.000	0.011	Oversupply
1/4/2018 10:02	1:31	KWP2	7.884	15.306	Oversupply
1/4/2018 11:35	0:01	KWP2	0.013	5.813	Oversupply
1/4/2018 11:42	0:01	KWP2	0.000	4.413	Oversupply
1/4/2018 11:47	0:01	KWP2	0.005	4.973	Oversupply
1/4/2018 11:51	0:02	KWP2	0.012	3.996	Oversupply
1/4/2018 12:08	0:01	KWP2	0.016	2.848	Oversupply
1/4/2018 12:14	1:35	KWP2	11.535	11.277	Oversupply
1/4/2018 12:20	1:19	AWE	3.823	17.700	Oversupply
1/4/2018 13:40	0:05	AWE	0.050	17.600	Oversupply
1/4/2018 13:51	1:00	KWP2	7.242	16.239	Oversupply
1/4/2018 14:52	0:02	KWP2	0.010	14.486	Oversupply
1/4/2018 14:57	0:06	KWP2	0.107	16.645	Oversupply
1/4/2018 15:04	0:03	KWP2	0.023	16.878	Oversupply
1/4/2018 19:35	0:01	KWP2	0.045	14.831	Oversupply
1/4/2018 22:46	0:05	KWP2	0.024	16.217	Oversupply
1/4/2018 23:01	0:01	KWP2	0.002	16.161	Oversupply
1/4/2018 23:13	0:02	KWP2	0.005	16.217	Oversupply
1/4/2018 23:18	0:02	KWP2	0.015	16.217	Oversupply
1/4/2018 23:46	0:19	KWP2	0.807	16.217	Oversupply
1/5/2018 0:09	0:13	KWP2	0.879	16.211	Oversupply
1/5/2018 1:49	1:31	KWP2	15.534	16.217	Oversupply
1/5/2018 2:35	0:01	AWE	0.009	20.400	Oversupply
1/5/2018 2:37	0:01	AWE	0.008	20.600	Oversupply
1/5/2018 2:39	0:07	AWE	0.045	20.500	Oversupply
1/5/2018 2:47	0:02	AWE	0.010	20.600	Oversupply
1/5/2018 2:52	0:20	AWE	0.235	20.700	Oversupply
1/5/2018 3:22	2:19	KWP2	20.961	16.217	Oversupply
1/5/2018 9:22	0:02	KWP2	0.068	17.007	Oversupply
1/5/2018 9:25	0:03	KWP2	0.142	16.900	Oversupply
1/5/2018 9:30	0:01	KWP2	0.055	17.189	Oversupply
1/5/2018 9:32	3:19	KWP2	28.295	19.193	Oversupply
1/5/2018 10:56	0:02	AWE	0.007	17.700	Oversupply
1/5/2018 13:53	0:05	KWP2	0.121	7.738	Oversupply
1/5/2018 13:59	0:48	KWP2	4.797	16.245	Oversupply
1/5/2018 14:15	0:01	AWE	0.001	20.700	Oversupply
1/5/2018 22:53	0:04	KWP2	0.026	19.207	Oversupply
1/5/2018 23:00	4:21	KWP2	49.366	19.211	Oversupply
1/6/2018 2:45	0:02	AWE	0.007	15.900	Oversupply
1/6/2018 2:48	0:05	AWE	0.051	16.900	Oversupply



Maui Curtailment Report

Start Date and Time	Duration	IPP Curtailed	Estimated Curtailed MWH	Peak MW Curtailed	Reasons for Curtailment
1/6/2018 2:55	0:16	AWE	0.426	17.100	Oversupply
1/6/2018 3:14	0:01	AWE	0.001	15.400	Oversupply
1/6/2018 3:23	1:11	KWP	17.893	19.211	Oversupply
1/6/2018 3:55	0:05	AWE	0.042	15.900	Oversupply
1/6/2018 4:22	0:05	AWE	0.050	17.000	Oversupply
1/6/2018 4:35	2:02	KWP	21.200	19.211	Oversupply
1/6/2018 6:38	0:01	KWP	0.001	19.211	Oversupply
1/6/2018 8:07	1:04	KWP	0.649	19.672	Facility requested
1/6/2018 9:11	0:01	KWP	0.005	18.961	Oversupply
1/6/2018 9:29	0:01	KWP	0.002	16.241	Oversupply
1/6/2018 9:49	0:02	KWP	0.128	16.944	Oversupply
1/6/2018 9:53	1:35	KWP	14.428	19.048	Oversupply
1/6/2018 11:30	0:01	KWP	0.004	10.843	Oversupply
1/6/2018 11:35	2:09	KWP	19.844	17.868	Oversupply
1/6/2018 13:04	0:01	AWE	0.006	16.800	Oversupply
1/6/2018 13:06	0:02	AWE	0.012	16.800	Oversupply
1/6/2018 13:45	0:03	KWP	0.049	12.100	Oversupply
1/6/2018 13:53	0:04	KWP	0.066	12.776	Oversupply
1/6/2018 13:58	0:07	KWP	0.188	14.486	Oversupply
1/7/2018 0:33	0:36	KWP	2.919	19.211	Oversupply
1/7/2018 1:25	0:19	KWP	1.063	19.211	Oversupply
1/7/2018 1:55	3:56	KWP	37.065	19.211	Oversupply
1/7/2018 9:44	3:55	KWP	58.346	19.211	Oversupply
1/7/2018 11:15	0:02	AWE	0.014	17.300	Oversupply
1/7/2018 11:18	0:05	AWE	0.025	17.300	Oversupply
1/7/2018 11:24	0:08	AWE	0.028	17.700	Oversupply
1/7/2018 11:43	0:01	AWE	0.005	17.400	Oversupply
1/7/2018 11:47	0:03	AWE	0.034	17.600	Oversupply
1/7/2018 11:51	0:01	AWE	0.003	17.700	Oversupply
1/7/2018 11:57	0:24	AWE	1.005	17.700	Oversupply
1/7/2018 12:25	0:47	AWE	2.789	17.700	Oversupply
1/7/2018 13:15	0:02	AWE	0.003	16.800	Oversupply
1/7/2018 13:19	0:01	AWE	0.007	16.500	Oversupply
1/7/2018 13:22	0:03	AWE	0.009	17.800	Oversupply
1/7/2018 13:28	0:02	AWE	0.008	17.300	Oversupply
1/7/2018 13:41	1:41	KWP	19.038	19.211	Oversupply
1/7/2018 22:59	0:01	KWP	0.000	19.211	Oversupply
1/7/2018 23:03	0:13	KWP	0.265	19.211	Oversupply
1/8/2018 0:19	5:55	KWP	55.201	19.211	Oversupply
1/8/2018 12:30	0:01	KWP	0.001	0.062	Oversupply
1/12/2018 1:48	0:01	AWE	0.002	0.100	Oversupply
1/12/2018 12:32	0:01	KWP	0.000	0.007	Oversupply
1/12/2018 12:39	0:01	KWP	0.001	0.064	Oversupply
1/13/2018 1:22	0:01	KWP	0.003	0.202	Oversupply
1/13/2018 8:03	0:01	AWE	0.003	0.200	Oversupply
1/13/2018 11:21	0:01	KWP	0.000	0.009	Oversupply
1/13/2018 11:47	0:02	AWE	0.003	0.100	Oversupply
1/15/2018 23:36	0:01	AWE	0.003	0.200	Oversupply
1/16/2018 2:43	0:01	AWE	0.002	0.100	Oversupply
1/16/2018 11:03	0:02	KWP	0.013	17.712	Oversupply
1/16/2018 11:35	0:01	KWP	0.004	16.857	Oversupply
1/16/2018 11:41	1:16	KWP	8.642	18.682	Oversupply
1/16/2018 11:53	1:27	BS250	Data is not available	Data is not available	Oversupply
1/16/2018 13:06	0:01	KWP	0.039	15.363	Oversupply
1/16/2018 13:23	0:02	KWP	0.096	16.616	Oversupply
1/16/2018 13:30	0:01	KWP	0.044	15.608	Oversupply
1/17/2018 0:24	1:59	KWP	7.548	19.211	Oversupply
1/17/2018 2:29	2:30	KWP	16.246	19.211	Oversupply
1/17/2018 4:22	0:01	AWE	0.005	0.300	Oversupply
1/17/2018 9:29	0:04	KWP	0.070	19.211	Oversupply
1/17/2018 9:36	1:29	KWP	3.887	19.672	Facility requested
1/17/2018 9:48	3:29	BS250	Data is not available	Data is not available	Oversupply
1/17/2018 9:57	2:03	KWP	26.032	19.211	Oversupply
1/17/2018 11:23	0:33	AWE	3.019	20.700	Oversupply
1/17/2018 12:02	0:29	KWP	2.765	16.217	Oversupply
1/17/2018 12:32	0:44	KWP	3.788	14.720	Oversupply
1/17/2018 13:26	0:09	KWP	0.295	8.732	Oversupply
1/17/2018 13:27	0:09	BS250	Data is not available	Data is not available	Oversupply
1/17/2018 14:01	0:20	BS250	Data is not available	Data is not available	Oversupply
1/17/2018 14:02	0:18	KWP	0.669	8.732	Oversupply
1/17/2018 15:04	0:08	BS250	Data is not available	Data is not available	Oversupply
1/17/2018 15:04	0:07	KWP	0.162	10.229	Oversupply
1/17/2018 15:17	0:07	BS250	Data is not available	Data is not available	Oversupply
1/17/2018 15:17	0:06	KWP	0.179	10.229	Oversupply
1/17/2018 17:13	17:33	KWP	216.263	19.672	Facility requested
1/17/2018 19:29	0:01	KWP	0.021	1.247	Oversupply
1/18/2018 10:11	0:01	KWP	0.027	7.235	Oversupply
1/18/2018 11:38	2:07	KWP	25.109	17.714	Oversupply
1/18/2018 12:11	3:01	BS250	Data is not available	Data is not available	Oversupply
1/18/2018 12:19	1:09	AWE	7.652	17.800	Oversupply
1/18/2018 13:29	0:11	AWE	0.279	17.700	Oversupply
1/18/2018 13:46	0:48	KWP	5.111	17.714	Oversupply



Maui Curtailment Report

Start Date and Time	Duration	IPP Curtailed	Estimated Curtailed MWH	Peak MW Curtailed	Reasons for Curtailment
1/18/2018 14:35	0:04	KWP2	0.095	17.714	Oversupply
1/18/2018 23:31	0:05	KWP2	0.049	16.217	Oversupply
1/19/2018 1:02	2:45	KWP2	14.637	16.217	Oversupply
1/19/2018 3:59	0:02	KWP2	0.036	12.316	Oversupply
1/19/2018 4:02	0:03	KWP2	0.034	13.055	Oversupply
1/19/2018 5:28	0:01	KWP2	0.001	9.641	Oversupply
1/19/2018 7:10	0:01	KWP2	0.000	0.010	Oversupply
1/19/2018 12:13	0:01	KWP2	0.000	0.009	Oversupply
1/19/2018 12:56	0:06	AWE	0.153	20.700	Oversupply
1/20/2018 0:56	0:01	KWP2	0.000	0.015	Oversupply
1/21/2018 3:25	0:01	KWP2	0.003	4.182	Oversupply
1/21/2018 3:27	0:03	KWP2	0.093	7.536	Oversupply
1/21/2018 3:31	0:46	KWP2	4.766	10.337	Oversupply
1/21/2018 3:58	0:02	AWE	0.012	20.700	Oversupply
1/21/2018 4:01	0:01	AWE	0.002	20.300	Oversupply
1/21/2018 4:04	0:01	AWE	0.005	20.300	Oversupply
1/21/2018 4:07	0:02	AWE	0.033	19.900	Oversupply
1/21/2018 4:10	0:02	AWE	0.013	20.500	Oversupply
1/21/2018 4:20	0:37	KWP2	3.069	11.842	Oversupply
1/21/2018 9:18	0:02	KWP2	0.018	2.324	Oversupply
1/21/2018 9:26	0:01	KWP2	0.007	2.348	Oversupply
1/21/2018 10:38	0:55	KWP2	5.938	12.484	Oversupply
1/21/2018 11:06	0:20	AWE	0.846	20.200	Oversupply
1/21/2018 11:35	1:24	KWP2	17.919	15.525	Oversupply
1/21/2018 11:38	0:17	AWE	0.254	20.200	Oversupply
1/21/2018 11:59	0:02	AWE	0.002	20.700	Oversupply
1/21/2018 12:09	0:03	AWE	0.013	20.100	Oversupply
1/21/2018 12:13	0:01	AWE	0.001	19.100	Oversupply
1/21/2018 12:15	0:03	AWE	0.033	20.300	Oversupply
1/21/2018 12:23	0:01	AWE	0.001	20.400	Oversupply
1/21/2018 12:25	0:03	AWE	0.042	20.100	Oversupply
1/21/2018 12:33	0:02	AWE	0.008	20.300	Oversupply
1/21/2018 12:46	0:03	AWE	0.033	20.400	Oversupply
1/21/2018 12:51	0:04	AWE	0.039	20.200	Oversupply
1/21/2018 13:01	0:13	KWP2	2.817	15.113	Oversupply
1/21/2018 13:06	0:04	AWE	0.044	20.200	Oversupply
1/21/2018 13:16	0:54	KWP2	6.249	15.794	Oversupply
1/22/2018 0:11	1:10	KWP2	9.420	16.209	Oversupply
1/22/2018 1:21	0:01	AWE	0.018	12.900	Oversupply
1/22/2018 1:22	1:43	KWP2	26.373	16.205	Oversupply
1/22/2018 1:26	0:01	AWE	0.006	13.300	Oversupply
1/22/2018 1:34	2:18	AWE	7.188	18.900	Oversupply
1/22/2018 3:07	0:53	KWP2	12.784	16.135	Oversupply
1/22/2018 4:05	1:26	KWP2	10.720	16.152	Oversupply
1/22/2018 4:13	0:01	AWE	0.005	14.200	Oversupply
1/22/2018 5:32	0:03	KWP2	0.035	16.130	Oversupply
1/22/2018 5:38	0:04	KWP2	0.045	16.170	Oversupply
1/22/2018 5:47	0:02	KWP2	0.025	15.996	Oversupply
1/22/2018 5:57	0:02	KWP2	0.015	15.982	Oversupply
1/22/2018 9:32	0:04	KWP2	0.038	16.215	Oversupply
1/22/2018 9:38	0:01	KWP2	0.005	16.210	Oversupply
1/22/2018 9:51	0:13	KWP2	0.253	16.217	Oversupply
1/22/2018 10:05	0:03	KWP2	0.020	16.211	Oversupply
1/22/2018 10:33	0:39	KWP2	1.448	16.214	Oversupply
1/22/2018 10:42	2:53	BS250	Data is not available	Data is not available	Oversupply
1/22/2018 11:22	0:01	KWP2	0.008	16.168	Oversupply
1/22/2018 11:26	0:10	KWP2	0.310	16.144	Oversupply
1/22/2018 11:38	0:01	KWP2	0.002	15.838	Oversupply
1/22/2018 12:25	0:14	KWP2	0.549	15.879	Oversupply
1/22/2018 12:40	0:03	KWP2	0.017	16.074	Oversupply
1/22/2018 12:57	0:06	KWP2	0.086	15.946	Oversupply
1/22/2018 13:07	0:02	KWP2	0.017	14.335	Oversupply
1/22/2018 13:13	0:09	KWP2	0.285	16.118	Oversupply
1/22/2018 13:26	0:01	KWP2	0.011	16.165	Oversupply
1/22/2018 22:26	0:01	KWP2	0.006	15.901	Oversupply
1/22/2018 22:33	0:04	KWP2	0.082	16.024	Oversupply
1/22/2018 23:01	0:01	KWP2	0.000	15.978	Oversupply
1/22/2018 23:03	6:40	KWP2	97.329	16.217	Oversupply
1/22/2018 23:56	0:01	AWE	0.001	20.300	Oversupply
1/22/2018 23:59	0:01	AWE	0.005	20.600	Oversupply
1/23/2018 0:12	0:01	AWE	0.012	19.900	Oversupply
1/23/2018 0:14	0:01	AWE	0.001	19.700	Oversupply
1/23/2018 0:16	0:02	AWE	0.017	20.500	Oversupply
1/23/2018 0:22	0:01	AWE	0.006	20.100	Oversupply
1/23/2018 0:25	0:04	AWE	0.057	20.700	Oversupply
1/23/2018 0:32	0:07	AWE	0.148	20.700	Oversupply
1/23/2018 0:41	4:38	AWE	31.446	20.400	Oversupply
1/23/2018 5:22	0:06	AWE	0.042	19.700	Oversupply
1/23/2018 5:29	0:02	AWE	0.021	19.600	Oversupply
1/23/2018 5:32	0:02	AWE	0.010	19.600	Oversupply
1/23/2018 5:35	0:01	AWE	0.006	19.800	Oversupply
1/23/2018 5:37	0:02	AWE	0.021	20.600	Oversupply



Maui Curtailment Report

Start Date and Time	Duration	IPP Curtailed	Estimated Curtailed MWH	Peak MW Curtailed	Reasons for Curtailment
1/23/2018 5:45	0:38	KWP/II	4.557	16.217	Oversupply
1/23/2018 7:44	8:19	BS250	Data is not available	Data is not available	Oversupply
1/23/2018 9:02	0:02	KWP/II	0.013	16.211	Oversupply
1/23/2018 9:14	0:02	KWP/II	0.031	16.217	Oversupply
1/23/2018 9:17	0:05	KWP/II	0.104	16.217	Oversupply
1/23/2018 9:24	0:01	KWP/II	0.003	16.217	Oversupply
1/23/2018 9:32	0:12	KWP/II	0.331	16.217	Oversupply
1/23/2018 9:45	0:02	KWP/II	0.030	16.217	Oversupply
1/23/2018 9:52	1:32	KWP/II	12.085	16.217	Oversupply
1/23/2018 10:45	0:01	AWE	0.004	20.600	Oversupply
1/23/2018 11:27	2:42	KWP/II	17.791	16.217	Oversupply
1/23/2018 22:10	0:03	KWP/II	0.050	7.683	Oversupply
1/23/2018 23:15	6:03	KWP/II	73.968	14.719	Oversupply
1/24/2018 0:16	0:01	AWE	0.007	20.300	Oversupply
1/24/2018 0:23	0:03	AWE	0.021	20.600	Oversupply
1/24/2018 0:27	0:01	AWE	0.005	19.800	Oversupply
1/24/2018 0:29	0:01	AWE	0.013	19.600	Oversupply
1/24/2018 0:32	3:34	AWE	23.215	20.900	Oversupply
1/24/2018 4:08	0:05	AWE	0.081	20.800	Oversupply
1/24/2018 4:18	0:03	AWE	0.024	20.800	Oversupply
1/24/2018 10:02	0:03	KWP/II	0.030	12.589	Oversupply
1/24/2018 11:41	2:09	KWP/II	21.790	13.188	Oversupply
1/24/2018 12:19	0:09	AWE	0.052	20.600	Oversupply
1/24/2018 12:29	0:02	AWE	0.006	20.100	Oversupply
1/24/2018 12:32	0:05	AWE	0.041	20.600	Oversupply
1/24/2018 12:38	0:03	AWE	0.043	20.200	Oversupply
1/24/2018 12:42	0:27	AWE	0.436	20.600	Oversupply
1/24/2018 13:10	0:28	AWE	1.258	20.600	Oversupply
1/24/2018 13:39	0:04	AWE	0.021	20.800	Oversupply
1/24/2018 13:51	0:53	KWP/II	6.221	13.202	Oversupply
1/24/2018 14:47	0:08	KWP/II	0.282	12.919	Oversupply
1/24/2018 15:02	0:01	KWP/II	0.008	12.644	Oversupply
1/25/2018 10:48	0:01	AWE	0.002	16.100	Oversupply
1/25/2018 11:11	0:03	AWE	0.006	20.500	Oversupply
1/25/2018 11:16	0:04	AWE	0.035	20.500	Oversupply
1/25/2018 11:21	0:01	AWE	0.008	20.000	Oversupply
1/25/2018 11:23	0:05	AWE	0.076	20.200	Oversupply
1/27/2018 12:14	0:01	KWP/II	0.000	0.017	Oversupply
1/28/2018 3:11	0:01	AWE	0.002	0.100	Oversupply
1/28/2018 9:06	0:01	AWE	0.002	0.100	Oversupply
1/28/2018 9:11	0:01	AWE	0.002	0.100	Oversupply
1/28/2018 11:21	0:01	KWP/II	0.013	12.732	Oversupply
1/28/2018 11:25	0:09	KWP/II	0.296	12.390	Oversupply
1/28/2018 12:06	0:02	KWP/II	0.034	11.801	Oversupply
1/28/2018 12:09	0:06	KWP/II	0.128	11.836	Oversupply
1/28/2018 12:26	0:01	KWP/II	0.001	12.167	Oversupply
1/28/2018 12:28	0:01	KWP/II	0.017	11.676	Oversupply
1/28/2018 12:30	0:01	KWP/II	0.001	11.572	Oversupply
1/28/2018 13:20	0:02	KWP/II	0.031	11.864	Oversupply
1/28/2018 13:27	0:01	KWP/II	0.006	10.354	Oversupply
1/28/2018 13:29	0:01	KWP/II	0.006	10.573	Oversupply
1/29/2018 20:43	0:01	KWP/II	0.000	0.001	Oversupply
1/30/2018 0:22	0:01	KWP/II	0.000	0.015	Oversupply
1/30/2018 11:59	0:01	KWP/II	0.011	10.854	Oversupply
1/30/2018 12:01	0:02	KWP/II	0.044	11.796	Oversupply
1/30/2018 12:08	0:05	KWP/II	0.246	12.815	Oversupply
1/30/2018 12:28	0:03	KWP/II	0.052	14.543	Oversupply
1/30/2018 12:32	0:16	KWP/II	0.335	14.590	Oversupply
1/30/2018 12:42	0:54	BS250	Data is not available	Data is not available	Oversupply
1/30/2018 12:49	0:05	KWP/II	0.112	14.994	Oversupply
1/30/2018 12:55	0:03	KWP/II	0.071	14.452	Oversupply
1/30/2018 13:02	0:02	KWP/II	0.008	14.217	Oversupply
1/30/2018 13:06	0:03	KWP/II	0.088	14.661	Oversupply
1/30/2018 13:11	0:04	KWP/II	0.035	14.096	Oversupply
1/30/2018 13:19	0:05	KWP/II	0.088	14.636	Oversupply
Total Estimated Curtailed MWh			1,262.168		

Notes:

- Curtailment for Kaheawa Wind Power ("KWP"), Makila Hydroelectric ("MH"), AAAAA Rent-A-Space Maui LTD ("5A"), Bioreal Solar, LLC ("BS"), Auwahi Wind Energy ("AWE"), Kaheawa Wind Power II ("KW/PII") Bioreal Solar 250, LLC ("BS250"), Extra Spaces A ("ESA"), and Extra Spaces B ("ESB") 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 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 KWPII. 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 5A, BS, BS 250, ESA, ESB, or MH.

- Curtailment signals sent to 5A, BS, BS250, ESA, or ESB 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.

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Lanai Curtailment Report

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Start Date and Time	Duration	IPP Curtailed	Estimated MWh Curtailed	Peak MW Curtailed	Reasons for Curtailment
1/17/2018 15:30	0:26	LSR	Data is not available	Data is not available	OVERSUPPLY
1/17/2018 15:58	0:03	LSR	Data is not available	Data is not available	OVERSUPPLY
1/17/2018 16:03	0:09	LSR	Data is not available	Data is not available	OVERSUPPLY
1/17/2018 16:22	0:19	LSR	Data is not available	Data is not available	OVERSUPPLY
1/17/2018 16:42	0:30	LSR	Data is not available	Data is not available	OVERSUPPLY
1/18/2018 7:30	0:03	LSR	Data is not available	Data is not available	OVERSUPPLY
1/18/2018 8:02	6:39	LSR	Data is not available	Data is not available	OVERSUPPLY
1/18/2018 14:42	0:13	LSR	Data is not available	Data is not available	OVERSUPPLY
1/18/2018 14:56	0:45	LSR	Data is not available	Data is not available	OVERSUPPLY
1/18/2018 15:48	0:07	LSR	Data is not available	Data is not available	OVERSUPPLY
1/19/2018 7:50	0:20	LSR	Data is not available	Data is not available	OVERSUPPLY
1/19/2018 8:11	3:30	LSR	Data is not available	Data is not available	OVERSUPPLY
1/19/2018 11:42	1:02	LSR	Data is not available	Data is not available	OVERSUPPLY
1/19/2018 12:46	0:15	LSR	Data is not available	Data is not available	OVERSUPPLY
1/19/2018 13:09	0:37	LSR	Data is not available	Data is not available	OVERSUPPLY
1/19/2018 13:48	0:54	LSR	Data is not available	Data is not available	OVERSUPPLY
1/19/2018 14:44	0:49	LSR	Data is not available	Data is not available	OVERSUPPLY
1/19/2018 15:38	0:01	LSR	Data is not available	Data is not available	OVERSUPPLY
1/19/2018 15:41	0:02	LSR	Data is not available	Data is not available	OVERSUPPLY
1/19/2018 15:51	0:03	LSR	Data is not available	Data is not available	OVERSUPPLY
1/20/2018 8:01	1:02	LSR	Data is not available	Data is not available	OVERSUPPLY
1/20/2018 9:04	0:02	LSR	Data is not available	Data is not available	OVERSUPPLY
1/20/2018 9:58	0:02	LSR	Data is not available	Data is not available	OVERSUPPLY
1/20/2018 10:08	0:26	LSR	Data is not available	Data is not available	OVERSUPPLY
1/20/2018 10:35	0:09	LSR	Data is not available	Data is not available	OVERSUPPLY
1/20/2018 10:45	0:33	LSR	Data is not available	Data is not available	OVERSUPPLY
1/20/2018 11:23	0:12	LSR	Data is not available	Data is not available	OVERSUPPLY
1/20/2018 11:38	0:01	LSR	Data is not available	Data is not available	OVERSUPPLY
1/20/2018 11:48	0:22	LSR	Data is not available	Data is not available	OVERSUPPLY
1/20/2018 12:12	0:06	LSR	Data is not available	Data is not available	OVERSUPPLY
1/20/2018 12:56	0:01	LSR	Data is not available	Data is not available	OVERSUPPLY
1/20/2018 13:00	0:04	LSR	Data is not available	Data is not available	OVERSUPPLY
1/20/2018 13:29	0:18	LSR	Data is not available	Data is not available	OVERSUPPLY
1/20/2018 14:27	0:04	LSR	Data is not available	Data is not available	OVERSUPPLY
1/20/2018 14:33	0:07	LSR	Data is not available	Data is not available	OVERSUPPLY
1/20/2018 14:43	0:01	LSR	Data is not available	Data is not available	OVERSUPPLY
1/20/2018 14:50	0:01	LSR	Data is not available	Data is not available	OVERSUPPLY
1/20/2018 15:01	0:08	LSR	Data is not available	Data is not available	OVERSUPPLY
1/20/2018 15:11	0:02	LSR	Data is not available	Data is not available	OVERSUPPLY
1/20/2018 15:14	0:03	LSR	Data is not available	Data is not available	OVERSUPPLY
1/20/2018 15:20	0:03	LSR	Data is not available	Data is not available	OVERSUPPLY
1/20/2018 15:24	0:03	LSR	Data is not available	Data is not available	OVERSUPPLY
1/20/2018 15:28	0:01	LSR	Data is not available	Data is not available	OVERSUPPLY
1/21/2018 7:29	3:33	LSR	Data is not available	Data is not available	OVERSUPPLY
1/21/2018 11:03	0:12	LSR	Data is not available	Data is not available	OVERSUPPLY
1/21/2018 12:04	0:08	LSR	Data is not available	Data is not available	OVERSUPPLY
1/21/2018 12:24	0:03	LSR	Data is not available	Data is not available	OVERSUPPLY
1/21/2018 12:40	0:06	LSR	Data is not available	Data is not available	OVERSUPPLY
1/21/2018 12:56	0:35	LSR	Data is not available	Data is not available	OVERSUPPLY
1/21/2018 14:18	0:29	LSR	Data is not available	Data is not available	OVERSUPPLY
1/21/2018 15:24	0:35	LSR	Data is not available	Data is not available	OVERSUPPLY
1/22/2018 7:30	9:59	LSR	Data is not available	Data is not available	OVERSUPPLY
1/22/2018 17:31	0:03	LSR	Data is not available	Data is not available	OVERSUPPLY
1/23/2018 8:10	0:16	LSR	Data is not available	Data is not available	OVERSUPPLY
1/23/2018 8:28	0:53	LSR	Data is not available	Data is not available	OVERSUPPLY
1/23/2018 9:23	0:52	LSR	Data is not available	Data is not available	OVERSUPPLY
1/23/2018 10:18	0:02	LSR	Data is not available	Data is not available	OVERSUPPLY
1/23/2018 10:23	0:03	LSR	Data is not available	Data is not available	OVERSUPPLY
1/23/2018 10:27	0:02	LSR	Data is not available	Data is not available	OVERSUPPLY
1/23/2018 11:10	3:42	LSR	Data is not available	Data is not available	OVERSUPPLY
1/23/2018 15:40	0:09	LSR	Data is not available	Data is not available	OVERSUPPLY
1/23/2018 16:09	0:01	LSR	Data is not available	Data is not available	OVERSUPPLY
1/23/2018 16:31	1:02	LSR	Data is not available	Data is not available	OVERSUPPLY
1/23/2018 17:34	0:01	LSR	Data is not available	Data is not available	OVERSUPPLY
1/24/2018 7:44	7:11	LSR	Data is not available	Data is not available	OVERSUPPLY
1/24/2018 15:19	0:08	LSR	Data is not available	Data is not available	OVERSUPPLY
1/24/2018 15:29	0:16	LSR	Data is not available	Data is not available	OVERSUPPLY
1/24/2018 15:47	0:07	LSR	Data is not available	Data is not available	OVERSUPPLY
1/24/2018 15:55	1:04	LSR	Data is not available	Data is not available	OVERSUPPLY
1/24/2018 17:05	0:03	LSR	Data is not available	Data is not available	OVERSUPPLY
1/24/2018 17:21	0:01	LSR	Data is not available	Data is not available	OVERSUPPLY
1/24/2018 17:23	0:08	LSR	Data is not available	Data is not available	OVERSUPPLY
1/25/2018 9:00	3:29	LSR	Data is not available	Data is not available	OVERSUPPLY

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Lanai Curtailment Report

January 2018

Start Date and Time	Duration	IPP Curtailed	Estimated MWh Curtailed	Peak MW Curtailed	Reasons for Curtailment
1/25/2018 12:33	3:49	LSR	Data is not available	Data is not available	OVERSUPPLY
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Lanai Curtailment Report

January 2018

Start Date and Time	Duration	IPP Curtailed	Estimated MWh Curtailed	Peak MW Curtailed	Reasons for Curtailment
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Lanai Curtailment Report

January 2018

Start Date and Time	Duration	IPP Curtailed	Estimated MWh Curtailed	Peak MW Curtailed	Reasons for Curtailment
1/31/2018 16:22	0:01	LSR	Data is not available	Data is not available	OVERSUPPLY
1/31/2018 16:24	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 January 2018

Start Date/Time	MW Output Prior to Start of Curtailment	End Date/Time	MW Output After Curtailment Released ¹	IPP	Reason for Curtailment
01/06/18 06:16	18.7 MW	01/06/18 12:53	16.0 MW	Pakini Nui Windfarm	Facility requested
01/12/18 08:43	17.7 MW	01/12/18 09:14	10.1 MW	Pakini Nui Windfarm	System constraint
01/12/18 09:45	17.8 MW	01/12/18 10:01	15.9 MW	Pakini Nui Windfarm	System constraint
01/18/18 17:01	4.6 MW	01/19/18 08:22	4.5 MW	Pakini Nui Windfarm	Facility requested
01/19/18 10:28	13.4 MW	01/20/18 06:32	11.8 MW	Pakini Nui Windfarm	Facility requested
01/23/18 07:12	17.2 MW	01/23/18 09:59	12.0 MW	Pakini Nui Windfarm	Facility requested
01/24/18 09:33	17.9 MW	01/24/18 15:22	17.9 MW	Pakini Nui Windfarm	Facility requested

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.

SERVICE LIST
(Docket No. 2011-0206)

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