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2017 APR 25 P 2:32

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 March 2017 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,

for 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".

SERVICE LIST
(Docket No. 2011-0206)

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(Docket No. 2011-0206)

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(Docket No. 2011-0206)

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SERVICE LIST
(Docket No. 2011-0206)

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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 March 31, 2017):

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 March 31, 2017):

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:

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

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 March 31, 2017):

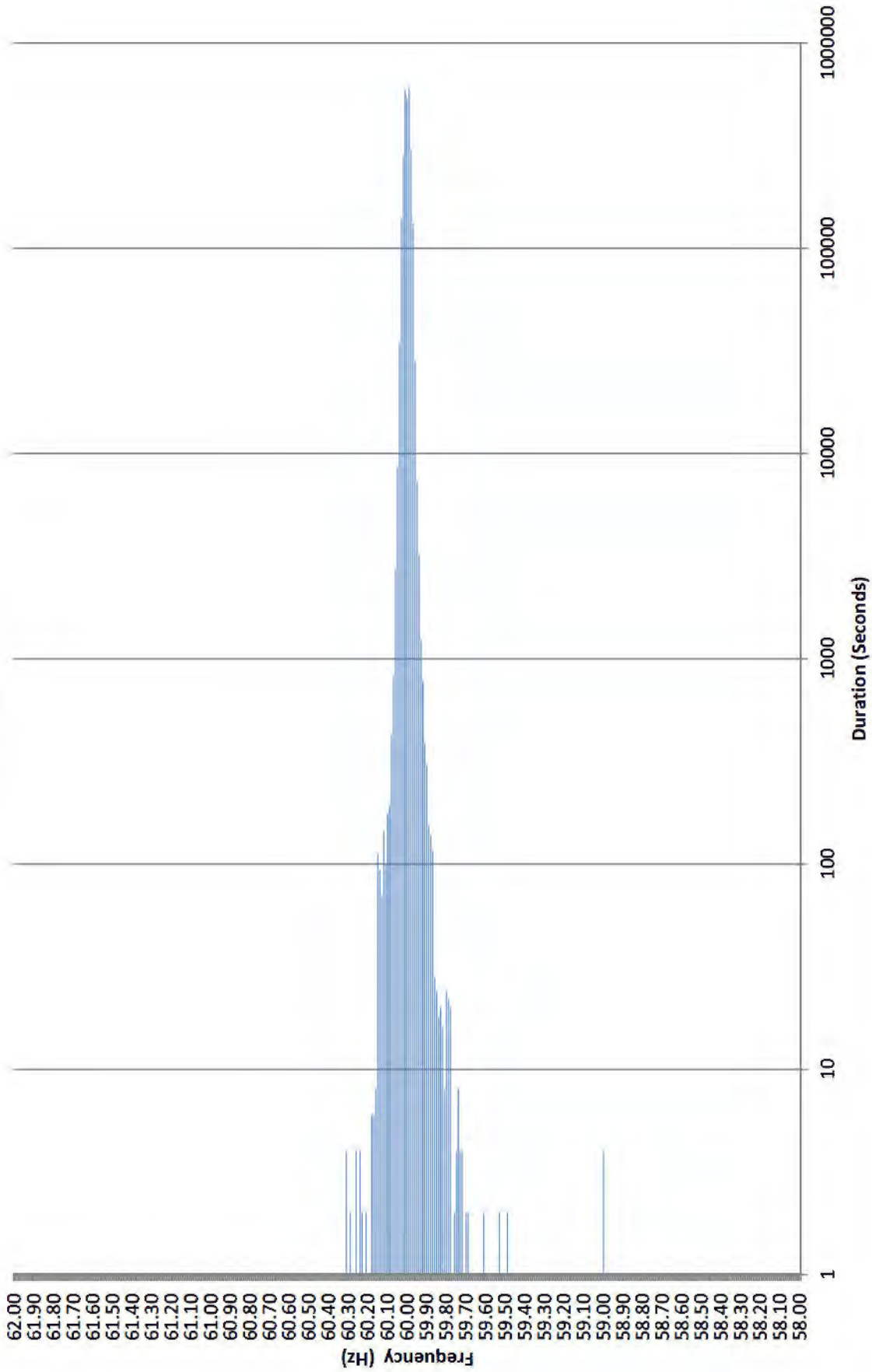
3a) Tabulation of each curtailment event for each resource including the starting date and time, duration, megawatt hours curtailed, peak MW curtailed, and reason for curtailment:

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

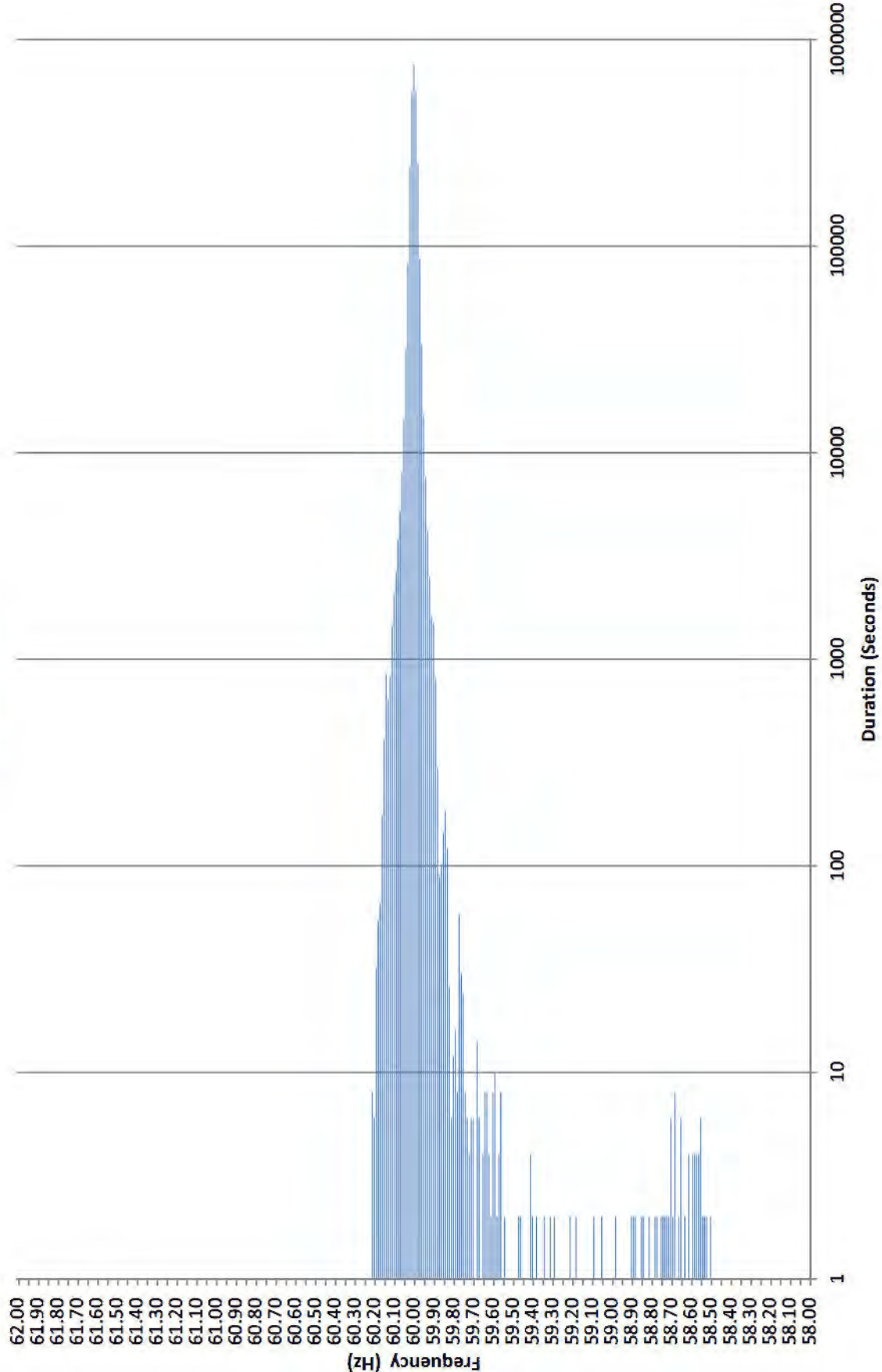
3b) Total MWh of non-dispatchable renewable resources curtailed for the month:

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.

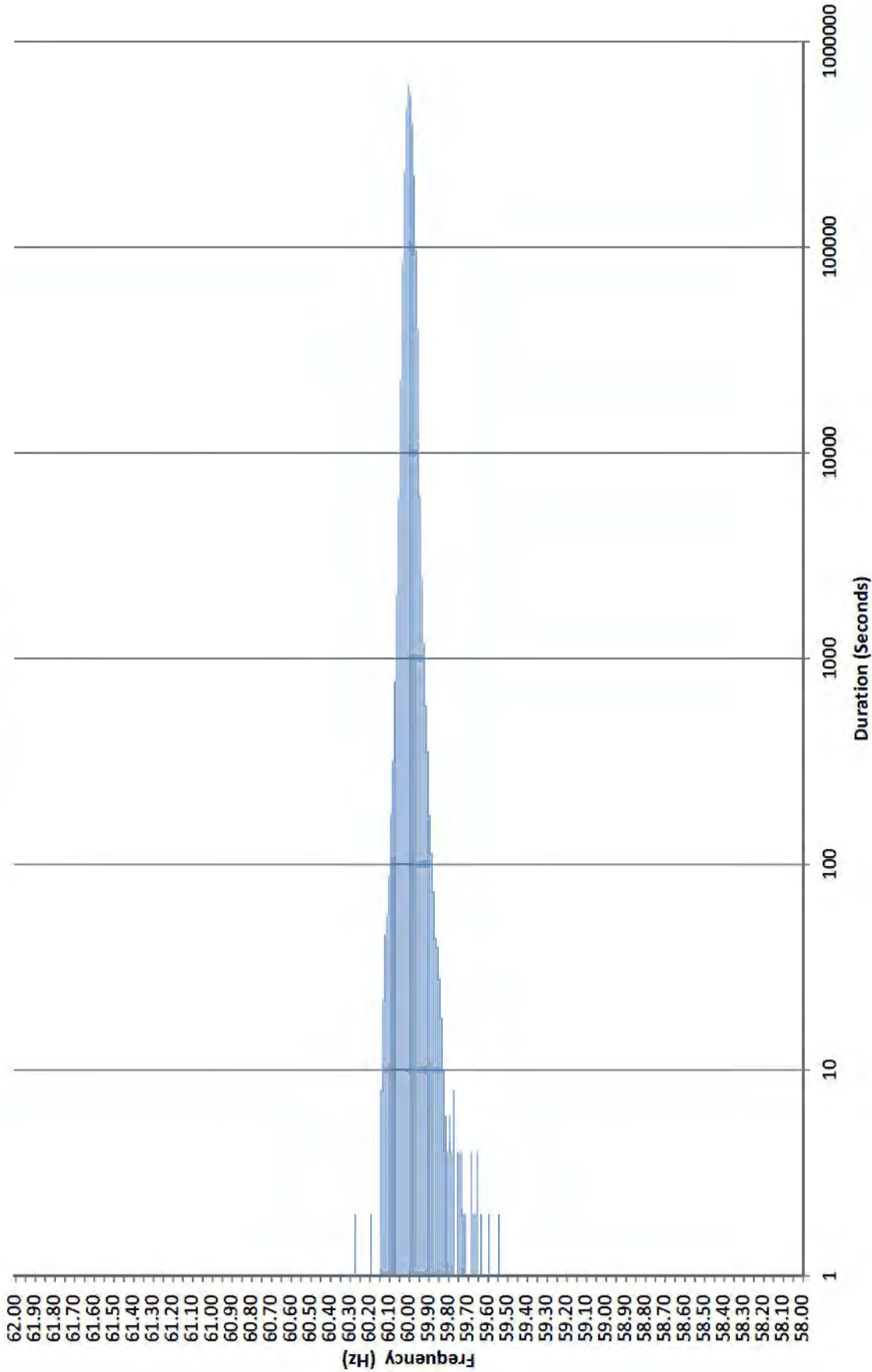
Frequency Distribution Plot - Hawaiian Electric March 2017



**Maui Electric Frequency Distribution Plot - Maui
March 2017**



**Frequency Distribution Plot - Hawai'i Electric Light
March 2017**



Hawaiian Electric Frequency Excursion Statistics March 2017		
Data Rounded to the nearest	<59.95 Hz	>60.05 Hz
Number of Excursions	671	876
Maximum Duration (sec)	534	494
Maximum Deviation (Hz)	59.004	60.309
Total Duration of Excursions (sec)	8888	7404

Maui Electric Frequency Excursion Statistics March 2017		
	<59.95 Hz	>60.05 Hz
Number of Excursions	4169	3887
Maximum Duration (sec)	1670	2568
Maximum Deviation (Hz)	58.4986	60.2079
Total Duration of Excursions (sec)	25900	32220

Hawai'i Electric Light Frequency Excursion Statistics March 2017		
	<59.95 Hz	>60.05 Hz
Number of Excursions	5497	1085
Maximum Duration (sec)	182	136
Maximum Deviation (Hz)	59.545	60.267
Total Duration of Excursions (sec)	30196	5736

Hawaiian Electric Curtailment Report March 2017

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
03/01/17 10:48	0.0	8.60	03/01/17 11:02	0	*	Waianae	System constraints
03/03/17 07:05	0.0	0.00	03/03/17 08:05	0	*	KREP	System constraints
03/03/17 18:15	0.0	0.00	03/03/17 18:47	0	*	KREP	System constraints
03/07/17 06:41	0.0	0.00	03/07/17 07:29	0	*	Waianae	System constraints
03/07/17 06:39	0.0	0.00	03/07/17 07:21	0	*	Aloha	System constraints
03/07/17 15:48	0.0	0.00	03/07/17 17:11	0	*	Waianae	System constraints
03/07/17 15:58	0.0	0.00	03/07/17 17:16	0	*	Aloha	System constraints
03/08/17 07:07	0.0	1.10	03/08/17 08:10	0	*	Makai	System constraints
03/08/17 07:09	0.0	2.00	03/08/17 08:13	0	*	KWF	System constraints
03/08/17 15:45	0.0	3.50	03/08/17 16:19	0	*	Makai	System constraints
03/08/17 15:49	0.0	2.80	03/08/17 16:21	0	*	KWF	System constraints
03/09/17 05:30	0.0	0.00	03/09/17 06:15	0	*	Makai	System constraints
03/09/17 05:33	0.0	1.80	03/09/17 06:17	0	*	KWF	System constraints
03/09/17 06:47	0.0	0.00	03/09/17 08:39	0	*	Waianae	System constraints
03/09/17 06:50	0.0	0.00	03/09/17 08:41	0	*	Aloha	System constraints
03/09/17 15:47	0.0	0.80	03/09/17 15:59	0	*	Makai	System constraints
03/09/17 15:49	0.0	0.20	03/09/17 16:01	0	*	KWF	System constraints
03/11/17 20:41	0.0	0.00	03/11/17 20:49	0	*	Aloha	System constraints
03/11/17 20:42	0.0	0.00	03/12/17 09:27	0	*	Waianae	System constraints
03/14/17 06:16	0.0	0.00	03/14/17 07:40	0	*	KREP	System constraints
03/14/17 18:20	0.0	0.00	03/14/17 19:12	0	*	KREP	System constraints
03/16/17 05:48	0.0	0.00	03/16/17 06:16	0	*	KWF	System constraints
03/16/17 05:50	0.0	0.00	03/16/17 06:17	0	*	Makai	System constraints
03/16/17 18:22	0.0	0.00	03/16/17 18:42	0	*	KWF	System constraints
03/16/17 18:25	0.0	0.00	03/16/17 18:45	0	*	Makai	System constraints
03/18/17 07:46	0.0	1.90	03/18/17 17:42	0	*	KWF	System constraints
03/18/17 07:51	0.0	0.00	03/18/17 11:49	0	*	Makai	System constraints
03/18/17 07:51	0.0	0.00	03/18/17 11:51	0	*	Mauka	System constraints
03/18/17 16:17	0.0	1.20	03/18/17 17:39	0	*	Makai	System constraints
03/18/17 16:17	0.0	7.20	03/18/17 17:39	0	*	Mauka	System constraints
03/20/17 05:46	0.0	4.10	03/20/17 06:44	0	*	KWF	System constraints
03/20/17 05:50	0.0	0.00	03/20/17 06:47	0	*	Makai	System constraints
03/20/17 07:07	0.0	0.50	03/20/17 07:55	0	*	KLS2	System constraints
03/20/17 14:32	0.0	14.00	03/20/17 15:43	0	*	KWF	System constraints
03/20/17 14:41	0.0	3.20	03/20/17 15:45	0	*	Makai	System constraints
03/22/17 07:05	0.0	0.00	03/22/17 08:07	0	*	Waianae	System constraints
03/22/17 12:48	0.0	27.50	03/22/17 15:45	0	*	Waianae	System constraints
03/22/17 12:53	0.0	3.30	03/22/17 15:19	0	*	Aloha	System constraints
03/25/17 06:32	0.0	10.00	03/25/17 07:43	0	*	KWF	System constraints
03/25/17 06:38	0.0	0.00	03/25/17 07:45	0	*	Makai	System constraints
03/25/17 16:39	0.0	16.00	03/25/17 17:16	0	*	KWF	System constraints
03/25/17 16:42	0.0	9.00	03/25/17 17:17	0	*	Makai	System constraints
03/28/17 06:21	0.0	7.40	03/28/17 19:34	0	*	KWF	System constraints
03/28/17 06:24	0.0	4.00	03/28/17 19:37	0	*	Makai	System constraints

Aloha = Aloha Solar PV Farm
KLS2 = Kalaeloa Solar 2 PV Farm
KREP = Kalaeloa Renewable Energy Park
KWF = Kahuku Wind Farm
Makai = Kawaiiloa Makai Wind Farm
Mauka = Kawaiiloa 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 Kawaiiloa 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
3/1/2017 12:55	0:01	KWP	0.001	20.702	Oversupply
3/1/2017 14:02	0:01	BS250	Data is not available	Data is not available	Oversupply
3/1/2017 14:04	0:05	BS250	Data is not available	Data is not available	Oversupply
3/1/2017 14:04	0:04	KWP	0.036	20.080	Oversupply
3/1/2017 14:26	0:06	BS250	Data is not available	Data is not available	Oversupply
3/1/2017 14:27	0:05	KWP	0.064	20.614	Oversupply
3/1/2017 14:37	0:01	BS250	Data is not available	Data is not available	Oversupply
3/1/2017 16:45	0:01	BS250	Data is not available	Data is not available	Oversupply
3/1/2017 16:47	0:02	BS250	Data is not available	Data is not available	Oversupply
3/1/2017 16:48	0:01	KWP	0.032	15.103	Oversupply
3/1/2017 16:50	0:01	BS250	Data is not available	Data is not available	Oversupply
3/1/2017 19:50	0:01	KWP	0.011	15.089	Oversupply
3/1/2017 20:06	0:21	KWP	1.471	19.390	Oversupply
3/2/2017 1:09	0:06	KWP	0.218	19.112	Oversupply
3/2/2017 11:05	0:05	BS250	Data is not available	Data is not available	Oversupply
3/2/2017 11:06	0:11	KWP	0.519	11.810	Oversupply
3/2/2017 11:55	0:01	AWE	0.000	0.007	Oversupply
3/2/2017 12:06	0:01	BS250	Data is not available	Data is not available	Oversupply
3/2/2017 12:17	0:08	BS250	Data is not available	Data is not available	Oversupply
3/2/2017 12:18	0:06	KWP	0.256	10.073	Oversupply
3/2/2017 12:23	0:01	AWE	0.000	0.003	Oversupply
3/2/2017 12:31	0:05	BS250	Data is not available	Data is not available	Oversupply
3/2/2017 12:32	0:03	KWP	0.062	8.480	Oversupply
3/2/2017 12:36	0:11	BS250	Data is not available	Data is not available	Oversupply
3/2/2017 12:41	0:08	KWP	0.265	11.039	Oversupply
3/2/2017 13:34	0:01	BS250	Data is not available	Data is not available	Oversupply
3/2/2017 13:41	0:01	BS250	Data is not available	Data is not available	Oversupply
3/2/2017 23:31	0:01	KWP	0.000	0.010	Oversupply
3/3/2017 9:58	0:01	KWP	0.000	0.001	Oversupply
3/3/2017 12:30	0:01	KWP	0.000	0.001	Oversupply
3/4/2017 11:15	0:05	BS250	Data is not available	Data is not available	Oversupply
3/4/2017 11:16	0:04	KWP	0.070	6.015	Oversupply
3/4/2017 11:21	0:11	BS250	Data is not available	Data is not available	Oversupply
3/4/2017 11:21	0:10	KWP	0.350	8.729	Oversupply
3/4/2017 12:02	0:01	BS250	Data is not available	Data is not available	Oversupply
3/4/2017 12:06	0:09	BS250	Data is not available	Data is not available	Oversupply
3/4/2017 12:07	0:08	KWP	0.242	10.124	Oversupply
3/5/2017 9:36	0:01	KWP	0.000	0.004	Oversupply
3/6/2017 17:57	0:01	KWP	0.000	0.001	Oversupply
3/8/2017 14:11	0:03	KWP	0.073	18.562	Oversupply
3/8/2017 20:33	0:01	KWP	0.000	0.004	Oversupply
3/8/2017 22:43	0:08	KWP	0.146	18.808	Oversupply
3/8/2017 23:06	0:03	KWP	0.058	13.207	Oversupply
3/8/2017 23:12	0:05	KWP	0.128	16.212	Oversupply
3/11/2017 15:27	0:01	KWP	0.000	0.002	Oversupply
3/13/2017 12:34	0:01	AWE	0.000	0.003	Oversupply
3/13/2017 12:37	0:01	AWE	0.000	0.003	Oversupply
3/13/2017 14:22	0:01	KWP	0.000	0.001	Oversupply
3/13/2017 17:25	0:01	KWP	0.000	0.001	Oversupply
3/13/2017 20:48	0:01	KWP	0.000	0.007	Oversupply
3/14/2017 2:14	0:05	BS250	Data is not available	Data is not available	Oversupply
3/15/2017 1:27	0:01	KWP	0.000	0.005	Oversupply
3/16/2017 2:37	0:01	AWE	0.000	0.003	Oversupply
3/16/2017 2:53	0:01	AWE	0.000	0.003	Oversupply
3/16/2017 8:45	0:01	AWE	0.000	0.013	Oversupply
3/16/2017 16:58	0:01	AWE	0.000	0.010	Oversupply
3/17/2017 10:30	0:01	KWP	0.000	0.001	Oversupply
3/18/2017 11:13	0:03	KWP	0.036	6.323	Oversupply
3/18/2017 11:17	0:03	KWP	0.013	6.565	Oversupply
3/18/2017 11:23	0:01	KWP	0.012	5.351	Oversupply
3/18/2017 13:21	0:01	KWP	0.000	0.001	Oversupply
3/18/2017 21:22	0:01	KWP	0.000	0.021	Oversupply
3/18/2017 9:20	0:01	AWE	0.000	0.007	Oversupply
3/19/2017 9:26	0:01	AWE	0.000	0.020	Oversupply
3/19/2017 9:33	0:01	AWE	0.000	0.003	Oversupply
3/19/2017 9:35	0:01	AWE	0.000	0.013	Oversupply
3/19/2017 10:52	0:19	BS250	Data is not available	Data is not available	Oversupply
3/19/2017 10:52	0:04	KWP	0.105	13.272	Oversupply
3/19/2017 10:57	0:01	KWP	0.014	13.018	Oversupply
3/19/2017 10:59	0:11	KWP	0.275	13.419	Oversupply
3/19/2017 11:15	0:01	BS250	Data is not available	Data is not available	Oversupply
3/19/2017 11:15	0:01	KWP	0.015	10.967	Oversupply
3/19/2017 13:55	0:18	BS250	Data is not available	Data is not available	Oversupply
3/19/2017 13:55	0:18	KWP	0.378	12.569	Oversupply
3/19/2017 14:18	0:02	BS250	Data is not available	Data is not available	Oversupply
3/19/2017 14:21	0:07	BS250	Data is not available	Data is not available	Oversupply
3/19/2017 14:21	0:01	KWP	0.025	11.266	Oversupply
3/19/2017 14:23	0:02	KWP	0.036	11.720	Oversupply
3/19/2017 14:27	0:01	KWP	0.014	11.628	Oversupply
3/19/2017 17:01	0:01	KWP	0.000	0.001	Oversupply
3/19/2017 21:36	0:02	KWP	0.080	14.518	Oversupply
3/19/2017 23:21	0:01	AWE	0.000	0.020	Oversupply
3/20/2017 0:37	4:40	KWP	38.002	19.211	Oversupply
3/20/2017 9:07	0:04	BS250	Data is not available	Data is not available	Oversupply
3/20/2017 9:24	0:02	BS250	Data is not available	Data is not available	Oversupply
3/20/2017 9:27	0:02	BS250	Data is not available	Data is not available	Oversupply
3/20/2017 9:30	0:15	BS250	Data is not available	Data is not available	Oversupply
3/20/2017 9:30	0:05	KWP	0.049	19.204	Oversupply
3/20/2017 9:42	0:03	KWP	0.007	19.172	Oversupply
3/20/2017 9:47	3:08	KWP	23.890	19.209	Oversupply
3/20/2017 13:28	0:02	BS250	Data is not available	Data is not available	Oversupply
3/20/2017 13:28	0:02	KWP	0.040	16.868	Oversupply
3/20/2017 13:31	0:02	BS250	Data is not available	Data is not available	Oversupply
3/20/2017 13:31	0:01	KWP	0.006	17.219	Oversupply
3/20/2017 14:10	0:04	BS250	Data is not available	Data is not available	Oversupply
3/20/2017 14:28	0:07	BS250	Data is not available	Data is not available	Oversupply
3/20/2017 14:28	0:08	KWP	0.115	18.763	Oversupply
3/20/2017 14:38	0:03	BS250	Data is not available	Data is not available	Oversupply
3/20/2017 14:38	0:03	KWP	0.038	18.905	Oversupply
3/20/2017 14:42	0:02	BS250	Data is not available	Data is not available	Oversupply
3/20/2017 14:42	0:01	KWP	0.002	19.055	Oversupply
3/20/2017 16:22	0:03	BS250	Data is not available	Data is not available	Oversupply
3/20/2017 16:23	0:01	KWP	0.019	8.564	Oversupply
3/20/2017 16:54	0:11	BS250	Data is not available	Data is not available	Oversupply
3/20/2017 16:54	0:02	KWP	0.017	1.915	Oversupply
3/20/2017 16:55	0:03	AWE	0.078	18.277	Oversupply



Maui Curtailment Report

Start Date and Time	Duration	IPP Curtailed	Estimated Curtailed MWH	Peak MW Curtailed	Reasons for Curtailment
3/20/2017 16:50	0:06	AWE	0.174	18.570	Oversupply
3/20/2017 16:50	0:05	KWP11	0.041	3.323	Oversupply
3/21/2017 0:10	0:01	KWP11	0.008	17.529	Oversupply
3/21/2017 1:07	4:07	KWP11	29.706	17.714	Oversupply
3/21/2017 2:55	0:01	AWE	0.000	0.003	Oversupply
3/21/2017 5:22	1:37	KWP11	8.805	17.714	Oversupply
3/21/2017 9:26	0:05	BS250	Data is not available	Data is not available	Oversupply
3/21/2017 9:27	0:02	KWP11	0.016	11.256	Oversupply
3/21/2017 9:32	0:01	BS250	Data is not available	Data is not available	Oversupply
3/21/2017 9:32	0:01	KWP11	0.013	9.989	Oversupply
3/21/2017 9:34	0:08	BS250	Data is not available	Data is not available	Oversupply
3/22/2017 0:04	0:03	KWP11	0.064	17.700	Oversupply
3/22/2017 0:31	1:36	KWP11	21.567	19.178	Oversupply
3/22/2017 2:12	1:16	KWP11	15.182	19.156	Oversupply
3/22/2017 2:58	0:15	AWE	0.502	17.807	Oversupply
3/22/2017 3:29	2:21	KWP11	22.577	19.054	Oversupply
3/22/2017 7:59	0:05	BS250	Data is not available	Data is not available	Oversupply
3/22/2017 7:59	0:06	AWE	0.239	20.953	Oversupply
3/22/2017 23:53	0:02	BS250	Data is not available	Data is not available	Oversupply
3/24/2017 11:46	0:02	BS250	Data is not available	Data is not available	Oversupply
3/24/2017 11:47	0:01	AWE	0.002	17.380	Oversupply
3/24/2017 11:49	0:09	BS250	Data is not available	Data is not available	Oversupply
3/24/2017 11:49	0:09	AWE	0.336	16.770	Oversupply
3/25/2017 5:08	1:58	KWP11	20.827	20.859	Oversupply
3/25/2017 7:37	0:14	KWP11	1.003	19.395	Oversupply
3/25/2017 8:12	1:38	KWP11	14.696	20.869	Oversupply
3/25/2017 14:25	1:51	KWP11	12.003	20.667	Oversupply
3/25/2017 20:37	0:50	KWP11	3.473	20.512	Oversupply
3/28/2017 0:05	0:32	KWP11	8.711	20.676	Oversupply
3/28/2017 0:39	0:21	KWP11	4.330	20.649	Oversupply
3/28/2017 1:40	1:39	KWP11	23.966	20.708	Oversupply
3/28/2017 3:52	2:25	KWP11	31.408	20.708	Oversupply
3/28/2017 7:38	0:13	KWP11	0.794	20.708	Oversupply
3/28/2017 7:57	0:23	KWP11	1.498	20.708	Oversupply
3/28/2017 11:38	0:15	KWP11	0.653	10.405	Oversupply
3/28/2017 11:57	0:12	KWP11	0.359	7.108	Oversupply
3/28/2017 12:11	2:46	KWP11	47.006	20.382	Oversupply
3/28/2017 12:15	2:11	AWE	18.857	21.000	Oversupply
3/28/2017 12:28	0:08	KWP	0.201	17.024	Oversupply
3/28/2017 14:59	1:15	KWP11	15.682	20.542	Oversupply
3/28/2017 10:00	0:23	KWP	6.363	17.024	Oversupply
3/28/2017 10:23	0:02	BS250	Data is not available	Data is not available	Oversupply
3/28/2017 10:23	0:01	AWE	0.020	18.593	Oversupply
3/28/2017 10:28	0:01	BS250	Data is not available	Data is not available	Oversupply
3/28/2017 3:00	1:16	KWP11	11.911	18.807	Oversupply
3/30/2017 13:10	0:01	KWP11	0.001	3.793	Oversupply
3/30/2017 14:23	0:11	KWP11	0.889	17.818	Oversupply
3/30/2017 14:36	0:03	KWP11	0.075	14.971	Oversupply
3/30/2017 22:20	0:08	BS250	Data is not available	Data is not available	Oversupply
3/30/2017 22:20	0:04	KWP11	0.045	14.415	Oversupply
3/30/2017 22:26	0:02	KWP11	0.042	13.735	Oversupply
3/31/2017 4:55	0:13	KWP11	0.568	12.009	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 ("KWP11"), 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 KWP11. 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 HPUIC Docket No. 2013-0141 Decoupling for HECO companies metrics.



Lanai Curtailment Report

March 2017

Start Date and Time	Duration	IPP Curtailed	Estimated MWh Curtailed	Peak MW Curtailed	Reasons for Curtailment
3/23/2017 7:12	0:07	LSR	Data is not available	Data is not available	Oversupply
3/23/2017 7:47	0:59	LSR	Data is not available	Data is not available	Oversupply
3/23/2017 8:50	0:04	LSR	Data is not available	Data is not available	Oversupply
3/23/2017 9:01	0:06	LSR	Data is not available	Data is not available	Oversupply
3/23/2017 9:10	1:49	LSR	Data is not available	Data is not available	Oversupply
3/23/2017 11:03	1:07	LSR	Data is not available	Data is not available	Oversupply
3/23/2017 12:26	0:12	LSR	Data is not available	Data is not available	Oversupply
3/23/2017 12:42	0:30	LSR	Data is not available	Data is not available	Oversupply
3/23/2017 13:13	0:36	LSR	Data is not available	Data is not available	Oversupply
3/23/2017 14:16	0:14	LSR	Data is not available	Data is not available	Oversupply
3/23/2017 15:30	0:01	LSR	Data is not available	Data is not available	Oversupply
3/24/2017 17:18	0:01	LSR	Data is not available	Data is not available	Oversupply
3/29/2017 6:42	1:59	LSR	Data is not available	Data is not available	Oversupply
3/29/2017 8:42	0:05	LSR	Data is not available	Data is not available	Oversupply
3/29/2017 9:40	0:04	LSR	Data is not available	Data is not available	Oversupply
3/29/2017 9:50	0:07	LSR	Data is not available	Data is not available	Oversupply
3/29/2017 9:58	0:06	LSR	Data is not available	Data is not available	Oversupply
3/29/2017 10:14	0:01	LSR	Data is not available	Data is not available	Oversupply
3/29/2017 10:22	0:02	LSR	Data is not available	Data is not available	Oversupply
3/29/2017 10:29	0:04	LSR	Data is not available	Data is not available	Oversupply
3/29/2017 10:34	0:01	LSR	Data is not available	Data is not available	Oversupply
3/29/2017 10:39	0:22	LSR	Data is not available	Data is not available	Oversupply
3/29/2017 11:05	0:30	LSR	Data is not available	Data is not available	Oversupply
3/29/2017 12:13	0:33	LSR	Data is not available	Data is not available	Oversupply
3/29/2017 12:47	0:06	LSR	Data is not available	Data is not available	Oversupply
3/31/2017 13:33	0:03	LSR	Data is not available	Data is not available	Oversupply
3/31/2017 13:37	0:01	LSR	Data is not available	Data is not available	Oversupply
3/31/2017 13:40	0:07	LSR	Data is not available	Data is not available	Oversupply
3/31/2017 13:49	0:09	LSR	Data is not available	Data is not available	Oversupply
3/31/2017 14:00	0:03	LSR	Data is not available	Data is not available	Oversupply
3/31/2017 14:07	0:03	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 HECD companies metrics.

Hawai'i Electric Light Company Curtailment Report March 2017

Start Date/Time	MW Output Prior to Start of Curtailment	End Date/Time	MW Output After Curtailment Released ¹	IPP	Reason for Curtailment
03/08/17 08:18	0.3 MW	03/08/17 16:06	0.1 MW	TGUH11	System constraint
03/08/17 14:42	6.1 MW	03/08/17 14:43	5.8 MW	Tawhiri	System constraint

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.