



April 27, 2015

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2015 APR 27 P 3: 59

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 2015 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 Company is 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

cc: 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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SERVICE LIST
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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, 2015):

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, 2015):

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

Hawaiian Electric 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 events is provided in Attachment 4. Hawaiian Electric and Hawai'i Electric Light did not have any under frequency load shed events 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 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, 2015):

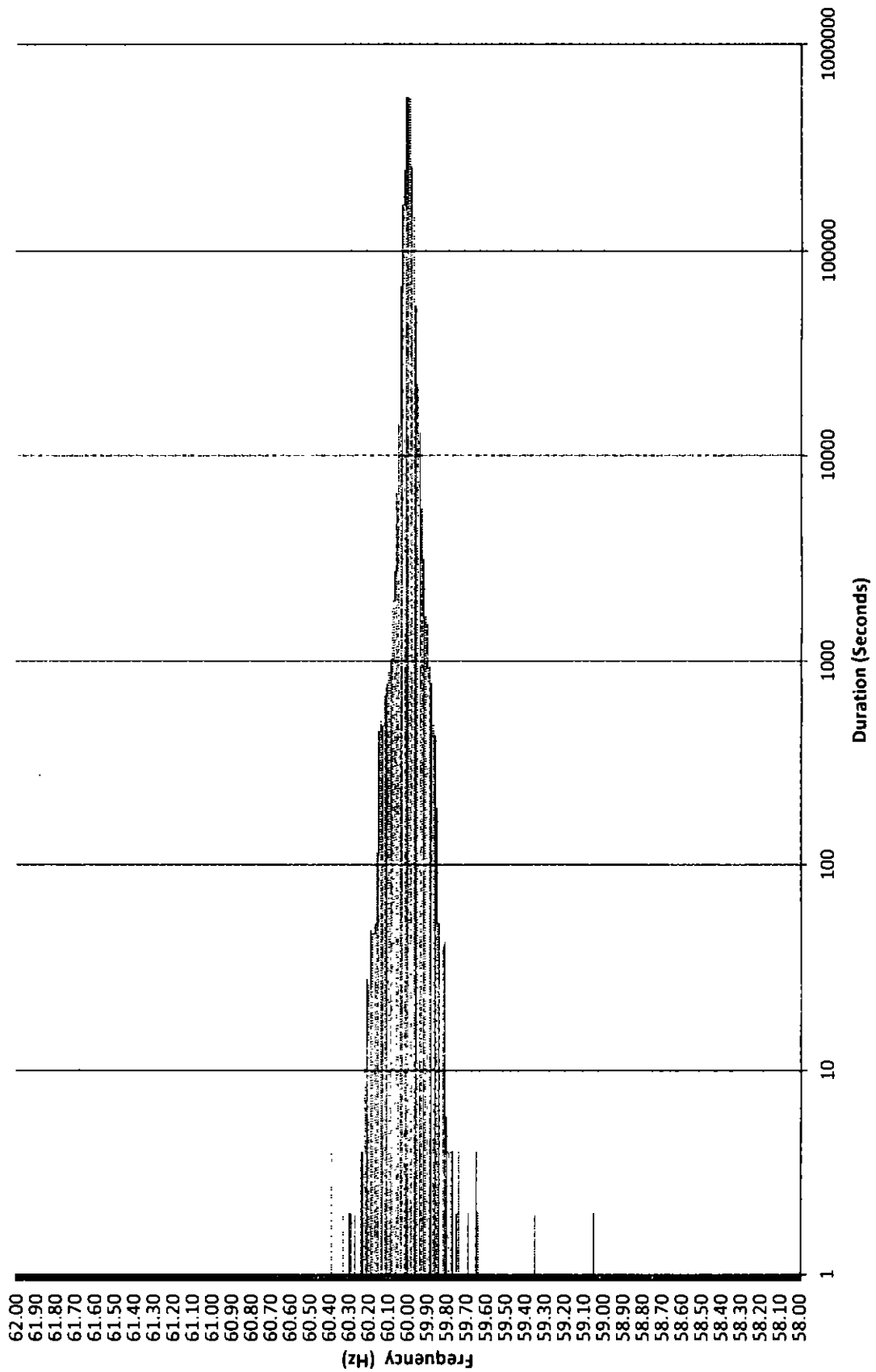
3a) Tabulation of each curtailment event for each resource including the starting date and time, duration, megawatt hours curtailed, peak MW curtailed, and reason for curtailment:

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

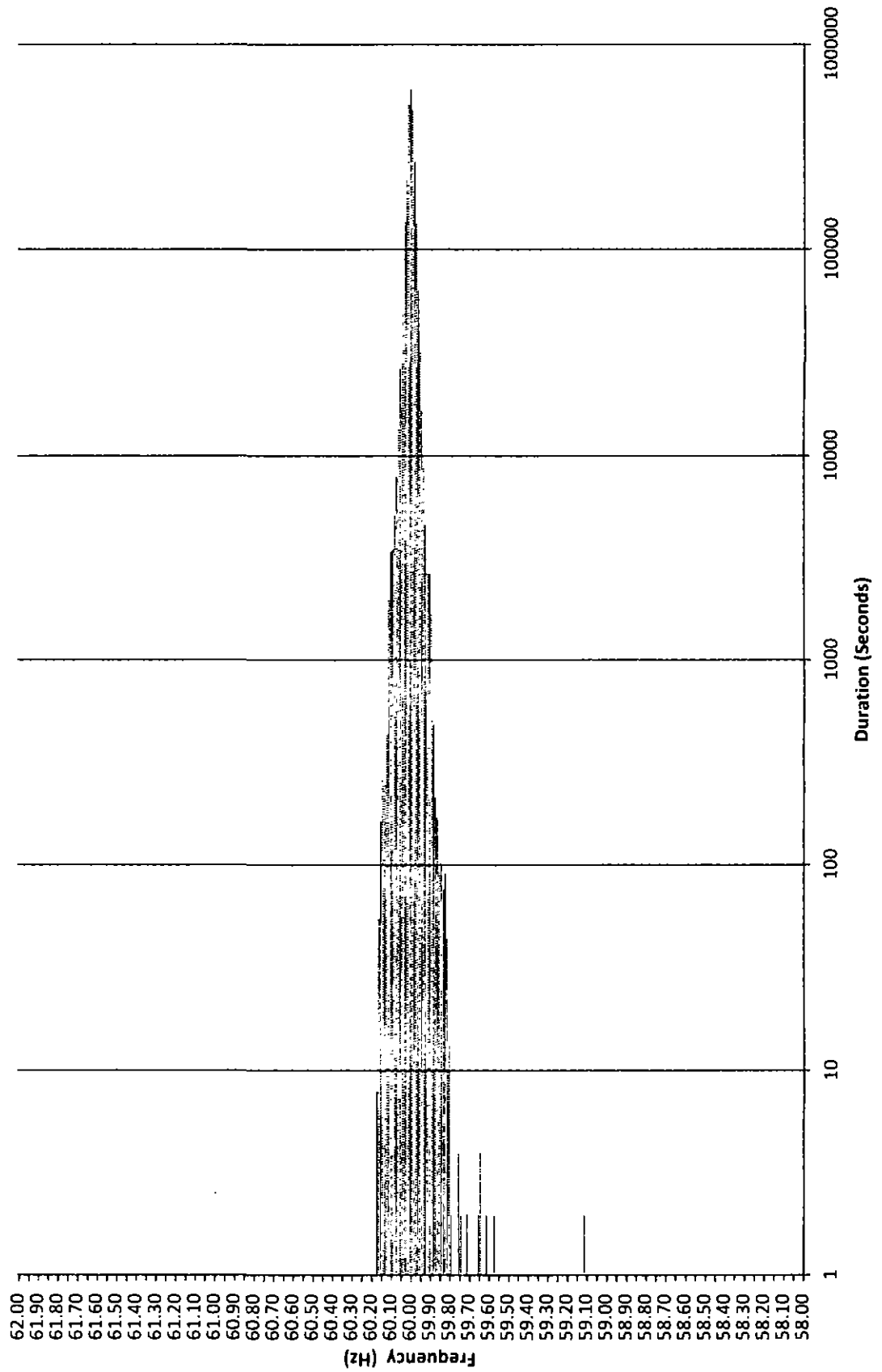
3b) Total MWh of non-dispatchable renewable resources curtailed for the month:

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. Hawai'i Electric Light is not providing an estimate of curtailed MWh, as this information is not provided to Hawai'i Electric Light from the IPP. 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.

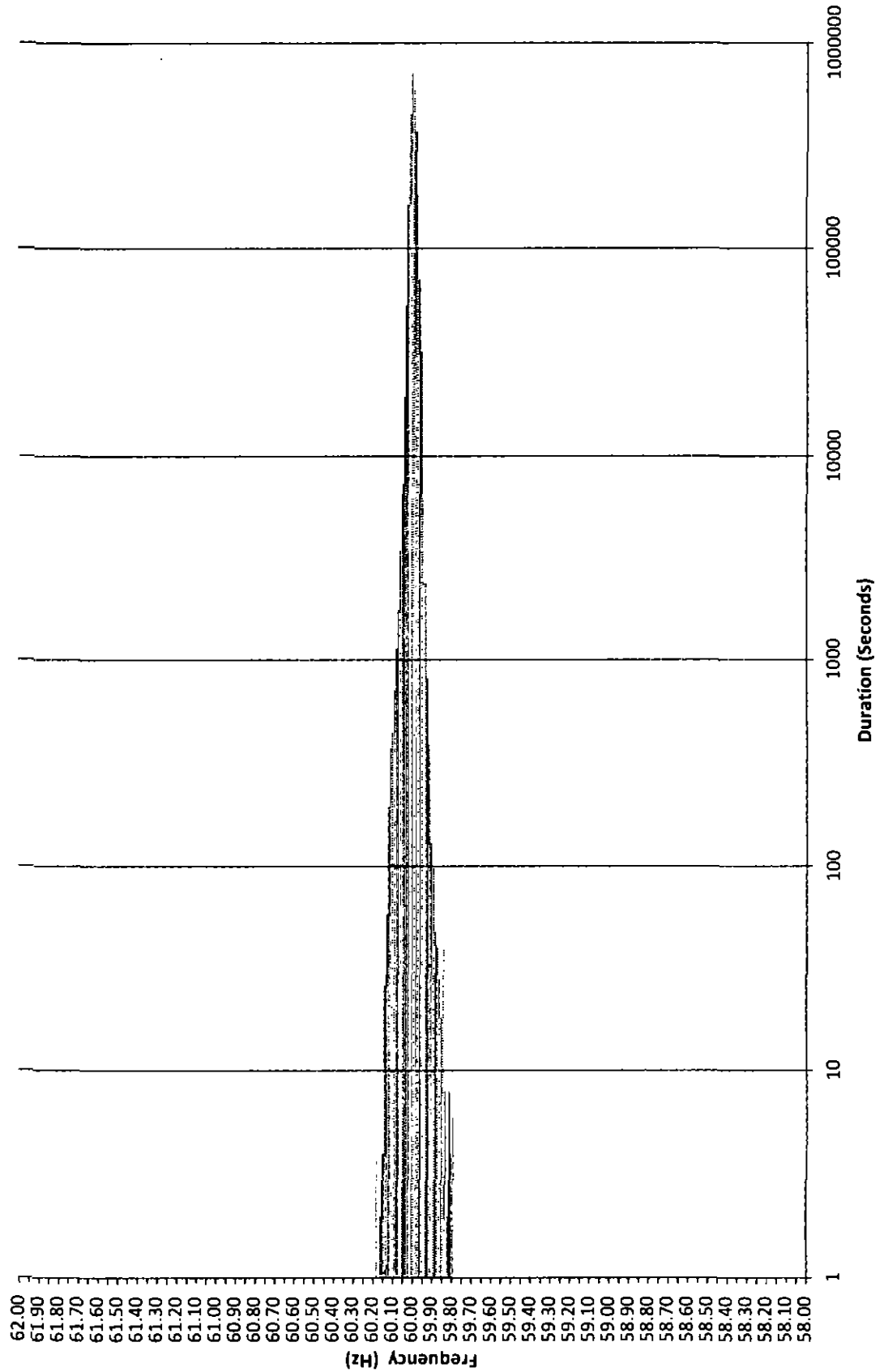
Frequency Distribution Plot - Hawaiian Electric March 2015



**Maui Electric Frequency Distribution Plot - Maui
March 2015**



Frequency Distribution Plot - Hawai'i Electric Light March 2015



Hawaiian Electric Frequency Excursion Statistics March 2015		
Data Rounded to the nearest	<59.95 Hz	>60.05 Hz
Number of Excursions	1922	991
Maximum Duration (sec)	934	2004
Maximum Deviation (Hz)	59.053	60.391
Total Duration of Excursions (sec)	35842	20918

Maui Electric Frequency Excursion Statistics March 2015		
	<59.95 Hz	>60.05 Hz
Number of Excursions	6515	4695
Maximum Duration (sec)	548	936
Maximum Deviation (Hz)	59.1083	60.17
Total Duration of Excursions (sec)	52026	47258

Hawai'i Electric Light Frequency Excursion Statistics March 2015		
	<59.95 Hz	>60.05 Hz
Number of Excursions	3886	1268
Maximum Duration (sec)	224	1320
Maximum Deviation (Hz)	59.789	60.179
Total Duration of Excursions (sec)	26420	11090

Hawaiian Electric Curtailment Report March 2015

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
03/07/15 20:13	0.0	3.90	03/07/15 20:22	0	*	KWF	Maintenance work
03/07/15 21:22	0.0	3.40	03/07/15 21:33	0	*	KWF	Maintenance work
03/10/15 06:54	0.0	0.00	03/10/15 07:55	0	*	KWF	Replacement work
03/10/15 06:54	0.0	0.00	03/10/15 07:55	0	*	Makai	Replacement work
03/10/15 16:55	0.0	1.30	03/10/15 17:21	0	*	KWF	Replacement work
03/10/15 16:56	0.0	3.00	03/10/15 17:21	0	*	Makai	Replacement work
03/14/15 11:27	0.0	0.00	03/15/15 08:48	0	*	KWF	Maintenance work
03/15/15 07:00	0.0	1.80	03/15/15 08:49	0	*	Makai	Maintenance work
03/15/15 07:01	0.0	1.70	03/15/15 08:49	0	*	Mauka	Maintenance work
03/18/15 06:22	0.0	0.00	03/18/15 16:03	0	*	KLS2	Replacement work
03/19/15 10:00	0.0	1.00	03/19/15 10:44	0	*	KREP	Replacement work
03/19/15 14:16	0.0	1.50	03/19/15 14:32	0	*	KREP	Replacement work

KLS2 = Kalaeloa Solar 2 PV Farm

KREP = Kalaeloa Renewable Energy Park

KWF = Kahuku Wind Farm

Makai = Kawaiioa Makai Wind Farm

Mauka = Kawaiioa Mauka Wind Farm

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

* Data has not been provided by IPP.

RSWG Maui Curtailment Report March 2015



Start Date and Time	Duration	IPP Curtailed	Estimated Curtailed MWh	Peak MW Curtailed	Reasons for Curtailment
3/30/2015 1:10	0:30	KWPP	0.858	28.220	AGC MAVG - calculated
3/30/2015 1:43	0:14	KWPP	0.838	28.228	AGC MAVG - calculated
3/30/2015 1:58	0:15	KWPP	0.780	28.307	AGC MAVG - calculated
3/30/2015 2:58	0:13	KWPP	0.507	27.503	AGC MAVG - calculated
3/30/2015 3:13	0:23	KWPP	0.842	27.519	AGC MAVG - calculated
3/30/2015 3:41	0:01	KWPP	0.001	27.845	AGC MAVG - calculated
3/30/2015 3:46	0:02	KWPP	0.019	27.027	AGC MAVG - calculated
3/30/2015 3:48	0:01	KWPP	0.011	27.407	AGC MAVG - calculated
3/30/2015 3:54	0:56	KWPP	2.533	28.226	AGC MAVG - calculated and Good Engineering and Operating Practices
3/30/2015 4:54	0:01	KWPP	0.011	27.788	AGC MAVG - calculated and Good Engineering and Operating Practices
3/30/2015 4:56	0:02	KWPP	0.007	28.043	AGC MAVG - calculated and Good Engineering and Operating Practices
3/30/2015 6:16	0:01	KWPII	0.115	18.959	AGC MAVG - calculated and Good Engineering and Operating Practices
3/30/2015 6:20	0:34	KWPII	5.983	19.211	AGC MAVG - calculated and Good Engineering and Operating Practices
3/30/2015 6:55	0:12	KWPII	0.302	18.211	AGC MAVG - calculated and Good Engineering and Operating Practices
3/30/2015 7:10	2:11	KWPII	16.985	20.610	AGC MAVG - calculated and Good Engineering and Operating Practices
3/30/2015 9:22	0:30	KWPII	1.781	20.564	AGC MAVG - calculated and Good Engineering and Operating Practices
3/30/2015 9:56	0:05	KWPII	0.243	18.765	AGC MAVG - calculated and Good Engineering and Operating Practices
3/30/2015 10:02	0:06	KWPII	0.117	18.068	AGC MAVG - calculated and Good Engineering and Operating Practices
3/30/2015 10:09	0:58	KWPII	6.607	20.014	AGC MAVG - calculated and Good Engineering and Operating Practices
3/30/2015 11:09	0:51	KWPII	6.365	20.360	AGC MAVG - calculated and Good Engineering and Operating Practices
3/30/2015 11:32	0:05	AWE	0.013	21.000	AGC MAVG - calculated and Good Engineering and Operating Practices
3/30/2015 11:40	0:12	AWE	0.079	21.000	AGC MAVG - calculated and Good Engineering and Operating Practices
3/30/2015 12:01	0:16	KWPII	2.106	17.707	AGC MAVG - calculated and Good Engineering and Operating Practices
3/30/2015 12:18	0:02	KWPII	0.023	14.617	AGC MAVG - calculated and Good Engineering and Operating Practices
3/30/2015 12:28	0:03	KWPII	0.129	17.513	AGC MAVG - calculated and Good Engineering and Operating Practices
3/30/2015 12:46	0:06	KWPII	0.401	18.826	AGC MAVG - calculated and Good Engineering and Operating Practices
3/30/2015 13:07	0:06	KWPII	0.147	13.567	AGC MAVG - calculated
3/31/2015 2:40	0:04	AWE	0.009	20.993	AGC MAVG - calculated and Good Engineering and Operating Practices
3/31/2015 2:50	0:06	AWE	0.114	21.000	AGC MAVG - calculated and Good Engineering and Operating Practices
3/31/2015 3:06	0:06	AWE	0.143	21.000	AGC MAVG - calculated and Good Engineering and Operating Practices
3/31/2015 3:18	0:04	AWE	0.153	21.000	AGC MAVG - calculated and Good Engineering and Operating Practices
3/31/2015 3:24	1:00	AWE	5.576	21.000	AGC MAVG - calculated and Good Engineering and Operating Practices
3/31/2015 9:07	0:01	AWE	0.024	20.780	AGC MAVG - calculated and Operating Conditions on Company's System
3/31/2015 12:00	0:06	KWPII	0.166	6.058	AGC MAVG - calculated and Operating Conditions on Company's System
3/31/2015 12:07	0:01	KWPII	0.014	4.580	AGC MAVG - calculated and Operating Conditions on Company's System
3/31/2015 12:11	0:03	KWPII	0.037	4.701	AGC MAVG - calculated and Operating Conditions on Company's System
3/31/2015 23:25	0:06	AWE	0.124	21.000	AGC MAVG - calculated

Notes

- Curtailment for Kaneohe Wind Power ("KWPP"), Makalei Hydroelectric ("MH"), AAAAA Rent-A-Soles Maui LTD ("SA"), Boreal Solar, LLC ("BS"), Auwahi Wind Energy ("AWE") and Kaneohe Wind Power II ("KWPII") 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") regarding 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, KWPP, 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 SA, BS, or MH.
- Curtailment signals sent to SA or BS during nighttime hours are not recorded as curtailment events because no energy generation is possible during that time.



Lanai Curtailment Report March 2015

Start Date/Time	Stop Date/Time	Duration (h:mm)	IPP Curtailed	Estimated MWh Curtailed	Peak MW Curtailed	Reasons for Curtailment
3/19/2015 17:49	3/19/2015 17:54	0:06	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/21/2015 8:58	3/21/2015 8:58	0:01	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/21/2015 9:02	3/21/2015 9:05	0:04	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/21/2015 9:09	3/21/2015 9:13	0:05	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/21/2015 9:15	3/21/2015 10:12	0:58	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/21/2015 11:37	3/21/2015 11:42	0:06	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/21/2015 12:03	3/21/2015 12:13	0:11	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/21/2015 17:03	3/21/2015 17:09	0:07	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/21/2015 17:28	3/21/2015 17:53	0:28	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/22/2015 7:27	3/22/2015 7:38	0:10	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/23/2015 18:26	3/23/2015 18:26	0:01	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/23/2015 18:34	3/23/2015 17:24	0:51	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/23/2015 17:34	3/23/2015 17:39	0:06	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/24/2015 18:50	3/24/2015 17:53	1:04	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/24/2015 17:55	3/24/2015 17:55	0:01	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/25/2015 15:27	3/25/2015 15:58	0:30	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/26/2015 9:22	3/26/2015 9:23	0:02	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/26/2015 9:33	3/26/2015 9:37	0:05	LSR	Data is not available	Data is not available	Testing
3/26/2015 9:39	3/26/2015 9:42	0:04	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/26/2015 9:44	3/26/2015 9:49	0:06	LSR	Data is not available	Data is not available	Testing
3/26/2015 9:51	3/26/2015 9:51	0:01	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/26/2015 9:53	3/26/2015 9:55	0:03	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/26/2015 10:00	3/26/2015 10:00	0:01	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/26/2015 10:06	3/26/2015 10:08	0:03	LSR	Data is not available	Data is not available	Testing
3/26/2015 10:11	3/26/2015 10:11	0:01	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/26/2015 10:14	3/26/2015 10:18	0:05	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/26/2015 10:20	3/26/2015 10:24	0:05	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/26/2015 10:32	3/26/2015 10:32	0:01	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/26/2015 10:35	3/26/2015 10:35	0:01	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/26/2015 7:34	3/26/2015 8:27	0:54	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/26/2015 8:30	3/26/2015 8:33	0:04	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/26/2015 8:44	3/26/2015 9:42	0:59	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/26/2015 9:44	3/26/2015 9:58	0:15	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/26/2015 10:01	3/26/2015 10:03	0:03	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/26/2015 10:06	3/26/2015 10:06	0:01	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/26/2015 10:08	3/26/2015 10:09	0:02	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/26/2015 10:25	3/26/2015 10:25	0:01	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/26/2015 10:34	3/26/2015 10:34	0:01	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/26/2015 11:20	3/26/2015 11:33	0:14	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/26/2015 12:11	3/26/2015 12:11	0:01	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/26/2015 13:02	3/26/2015 13:04	0:03	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/26/2015 13:07	3/26/2015 13:07	0:01	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/26/2015 13:11	3/26/2015 13:14	0:04	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/29/2015 12:08	3/29/2015 12:12	0:05	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/29/2015 13:45	3/29/2015 13:45	0:01	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/29/2015 13:52	3/29/2015 13:52	0:01	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/29/2015 14:11	3/29/2015 14:13	0:03	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices
3/29/2015 14:41	3/29/2015 14:41	0:01	LSR	Data is not available	Data is not available	Good Engineering and Operating Practices

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.

Hawai'i Electric Light Company Curtailment Report March 2015

Start Date/Time	MW output prior to start of curtailment	End Date/Time	MW output after curtailment released	Reason for Curtailment
03/03/15 00:22	18.8 MW	03/03/15 01:00	18.8 MW	Tawhiri curtailed - generation unit maintenance at Keahole.
03/05/15 01:49	17.5 MW	03/05/15 04:33	18.2 MW	Tawhiri Group B curtailed for excess energy.
03/14/15 04:45	17.2 MW	03/14/15 05:16	16.2 MW	Tawhiri Group B curtailed for excess energy.
03/26/15 21:33	17.8 MW	03/27/15 06:08	15.9 MW	High wind curtailment to 10MW at Tawhiri's request.

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 Waituku may take longer to return to scheduled or full available output levels.