

November 15, 2016

The Honorable Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

**Re: California Independent System Operator Corporation
Docket Nos. ER06-615-_____ and ER07-1257-_____
Market Disruption Report**

Dear Secretary Bose:

The California Independent System Operator Corporation (CAISO) hereby submits its October/November report covering Market Disruption reportable events under Section 7.7.15 of its Tariff that occurred from October 16, 2016, to November 15, 2016.¹

Please contact the undersigned with any questions.

Respectfully submitted,

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¹ The CAISO submits the Market Disruption report pursuant to *California Independent System Operator Corp.*, 126 FERC ¶ 61,211 (2009), and Section 7.7.15.4 of the CAISO Tariff.



Market Disruption Report October 16, 2016 to November 15, 2016

December 15, 2016

CAISO Market Quality and Renewable Integration

California ISO
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I. Background

A Market Disruption is an action or event that causes a failure of a CAISO Market, related to system operation issues or System Emergencies.¹ Pursuant to Section 7.7.15 of the ISO Tariff, the California Independent System Operator Corporation (ISO or CAISO) can take one or more of a number of specified actions in the event of a Market Disruption, to prevent a Market Disruption, or to minimize the extent of a Market Disruption. The ISO reports Market Disruption occurrence in any of the following circumstances:

- When any of the ISO market processes fail to publish, including the Integrated Forward Market (IFM), Residual Unit Commitment (RUC), the Real-Time Market, which includes the Hour-Ahead Scheduling Process (HASP), Fifteen Minute Market (FMM), and the Real-Time Dispatch (RTD) processes;
- When the ISO manually overrides the closing of the Day-Ahead Market; or
- Any time that the ISO removes Bids from a CAISO Market to prevent a Market Disruption or to minimize the extent of a Market Disruption.

The Market Disruption report contains the following information:

- The frequency and types of actions taken by the ISO pursuant to Section 7.7.15;
- The nature of the Market Disruptions that caused the ISO to take action, or the Market Disruptions that were successfully prevented or minimized by the ISO as a result of taking action, and the ISO's rationale for taking such actions pursuant to Section 7.7.15;
- Information about the Bids (including Self-Schedules) removed pursuant to Section 7.7.15 (*i.e.*, megawatt quantity, point of interconnection, specification of the Day-Ahead versus Real-Time Bid, and Energy or Ancillary Services Bid); and
- The ISO's rationale for its removal of Bids (including Self-Schedules) pursuant to Section 7.7.15.²

¹ These system operation issues or System Emergencies are referred to in Sections 7.6 and 7.7, respectively, of the ISO Tariff. ISO Tariff, Appendix A, definition of Market Disruption. Capitalized terms not otherwise defined herein have the meanings set forth in the ISO Tariff.

² *Id.* at P 29 & n.29.

II. Report on Market Disruptions Occurring from October 16, 2016 through November 15, 2016

The ISO’s report on Market Disruptions that occurred during the time period from October 16, 2016 through November 15, 2016, is provided in Table 1 and Attachment A below. Attachment A includes an entry for each reportable Market Disruption event and each entry also indicates:

- (1) The date of the Market Disruption;
- (2) The hour and Dispatch Interval when the Market Disruption ended;
- (3) The type of CAISO Market in which the Market Disruption occurred; and
- (4) A description of the nature of the Market Disruption, the nature of any actions taken by the ISO, the rationale for such actions, and the Market Disruption prevented or minimized as a result of taking such actions.

For each of the CAISO Markets, Table 1 lists the number of Market Disruptions and the number of times that the CAISO removed Bids (including Self-Schedules) during the time period covered by this report. As shown in Table 1, there were a total of 103 Market Disruptions for the reporting period. Table 1 also indicates that the CAISO did not remove any Bids (including Self-Schedules) in any of its markets during the reporting period.

Table 1: Summary of Market Disruption Report

Type of CAISO Market	Market Disruption or Reportable Events	Removal of Bids (including Self-Schedules)
Day-Ahead		
IFM	0	0
RUC	0	0
Real-Time		
Fifteen Minute Market Interval 1	7	0
Fifteen Minute Market Interval 2	5	0
Fifteen Minute Market Interval 3	3	0
Fifteen Minute Market Interval 4	9	0
Real-Time Dispatch	79	0

Table 1 above shows the market disruptions in the real time market in order to incorporate the FMM binding intervals.

Several of the RTD and FMM instances were caused due to a software patch that caused application problems. The frequency of RTD failures increased from 62 to 79 failures in comparison to the September 2016 Report. RTD failures accounted for approximately 77 percent of all of the Market Disruptions during this reporting period.

Planned Maintenance occurred on October 18th, October 20th, October 27th, October 31st, and November 10th. On October 18th there were a total of 4 (1 FMM, 3 RTD) disruptions, on October 20th there were a total of 3 (1 FMM, 2 RTD) disruptions, on October 27th there were a total of 3 disruptions (1 FMM, 2 RTD), on October 31st there were a total of 3 disruptions (1 FMM, 2 RTD), and on November 10th there were a total of 4 (1 FMM, 3 RTD) disruptions due to IFM/RTN Patching.

On October 17th there were a total of 17 disruptions (5 FMM, 12 RTD) due to system issues involving outages causing market failures starting in hour 20. On October 25th there were a total of 28 market disruptions (6 FMM, 22 RTD) due to system issues including market failure due to solar generation increasing at a faster rate. On November 7th there were a total of 16 broadcast failures (3 FMM, 13 RTD) due to an application integration issue.

On November 9th there was a contingency dispatch due to loss of solar generation and a total of 14 disruptions (2 FMM, 12 RTD). System issues including the loss of solar generation resulted in blocked market runs and using previous solutions. On November 15th there was a contingency dispatch due to loss of solar generation and a total of 4 disruptions (RTD).

ATTACHMENT A

**California Independent System Operator Corporation
Market Disruption Report
December 15, 2016**

Table 3: Market Disruptions, Nature of Actions Taken by the California ISO, Rationale and/or Market Disruption Prevented or Minimized as a Result of such Actions

Count	Date	Hour	Interval	Market	Nature of Actions, Nature of Market Disruption, Rationale and/or Market Disruption Prevented or Minimized as a Result of such Actions
1	10/17/2016	7	1	FMM	FMM failed due to application time-out. Loss clearing payload and LMP filled from previous good interval.
2	10/17/2016	20	4	FMM	FMM did not run due to application problem. This interval was filled either automatically or interactively. MQS published Pnode clearing and resource awards for this interval.
3	10/17/2016	20	9	RTD	RTD failed due application problem. Loss clearing payload and LMP filled from previous good interval.
4	10/17/2016	20	10	RTD	RTD failed due application problem. Loss clearing payload and LMP filled from previous good interval.
5	10/17/2016	20	11	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
6	10/17/2016	20	12	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
7	10/17/2016	21	1	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.

Count	Date	Hour	Interval	Market	Nature of Actions, Nature of Market Disruption, Rationale and/or Market Disruption Prevented or Minimized as a Result of such Actions
8	10/17/2016	21	1	FMM	FMM did not run due to application problem. This interval was filled either automatically or interactively. MQS published Pnode clearing and resource awards for this interval.
9	10/17/2016	21	2	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
10	10/17/2016	21	2	HASP	HASP did not run due to application problem. This interval was filled either automatically or interactively. MQS published Pnode clearing and resource awards for this interval.
11	10/17/2016	21	3	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
12	10/17/2016	21	3	FMM	FMM did not run due to application problem. This interval was filled either automatically or interactively. MQS published Pnode clearing and resource awards for this interval.
13	10/17/2016	21	4	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
14	10/17/2016	21	4	FMM	FMM did not run due to application problem. This interval was filled either automatically or interactively. MQS published Pnode clearing and resource awards for this interval.
15	10/17/2016	21	5	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
16	10/17/2016	21	6	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
17	10/17/2016	21	7	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.

Count	Date	Hour	Interval	Market	Nature of Actions, Nature of Market Disruption, Rationale and/or Market Disruption Prevented or Minimized as a Result of such Actions
18	10/17/2016	21	8	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
19	10/18/2016	15	4	FMM	FMM was run in manual due to patching. Planned maintenance.
20	10/18/2016	15	7	RTD	RTD was run in manual due to patching. Planned maintenance.
21	10/18/2016	15	8	RTD	RTD was run in manual due to patching. Planned maintenance.
22	10/18/2016	15	9	RTD	RTD was run in manual due to patching. Planned maintenance.
23	10/20/2016	15	4	FMM	FMM was run in manual due to patching. Planned maintenance.
24	10/20/2016	15	7	RTD	RTD was run in manual due to patching. Planned maintenance.
25	10/20/2016	15	8	RTD	RTD was run in manual due to patching. Planned maintenance.
26	10/25/2016	7	9	RTD	RTD failed due application problem. Loss clearing payload and LMP filled from previous good interval.
27	10/25/2016	7	10	RTD	RTD failed due application problem. Loss clearing payload and LMP filled from previous good interval.

Count	Date	Hour	Interval	Market	Nature of Actions, Nature of Market Disruption, Rationale and/or Market Disruption Prevented or Minimized as a Result of such Actions
28	10/25/2016	7	11	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
29	10/25/2016	7	12	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
30	10/25/2016	8	1	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
31	10/25/2016	8	1	FMM	FMM did not run due to application problem. This interval was filled either automatically or interactively. MQS published Pnode clearing and resource awards for this interval.
32	10/25/2016	8	2	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
33	10/25/2016	8	2	HASP	HASP did not run due to application problem. This interval was filled either automatically or interactively. MQS published Pnode clearing and resource awards for this interval.
34	10/25/2016	8	3	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
35	10/25/2016	8	3	FMM	FMM did not run due to application problem. This interval was filled either automatically or interactively. MQS published Pnode clearing and resource awards for this interval.
36	10/25/2016	8	4	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
37	10/25/2016	8	4	FMM	FMM did not run due to application problem. This interval was filled either automatically or interactively. MQS published Pnode clearing and resource awards for this interval.

Count	Date	Hour	Interval	Market	Nature of Actions, Nature of Market Disruption, Rationale and/or Market Disruption Prevented or Minimized as a Result of such Actions
38	10/25/2016	8	5	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
39	10/25/2016	8	6	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
40	10/25/2016	8	7	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
41	10/25/2016	8	8	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
42	10/25/2016	8	9	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
43	10/25/2016	8	10	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
44	10/25/2016	8	11	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
45	10/25/2016	8	12	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
46	10/25/2016	9	1	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
47	10/25/2016	9	1	FMM	FMM failed due to application problem. This interval was filled either automatically or interactively. MQS published Pnode clearing and resource awards for this interval.

Count	Date	Hour	Interval	Market	Nature of Actions, Nature of Market Disruption, Rationale and/or Market Disruption Prevented or Minimized as a Result of such Actions
48	10/25/2016	9	2	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
49	10/25/2016	9	2	HASP	HASP did not run due to application problem. This interval was filled either automatically or interactively. MQS published Pnode clearing and resource awards for this interval.
50	10/25/2016	9	3	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
51	10/25/2016	9	4	RTD	RTD results were blocked and previous solution used.
52	10/25/2016	9	5	RTD	RTD results were blocked and previous solution used.
53	10/25/2016	9	6	RTD	RTD results were blocked and previous solution used.
54	10/27/2016	15	4	FMM	FMM was run in manual due to patching. Planned maintenance.
55	10/27/2016	15	7	RTD	RTD was run in manual due to patching. Planned maintenance.
56	10/27/2016	15	8	RTD	RTD was run in manual due to patching. Planned maintenance.
57	10/31/2016	20	4	FMM	FMM was run in manual due to patching. Planned maintenance.

Count	Date	Hour	Interval	Market	Nature of Actions, Nature of Market Disruption, Rationale and/or Market Disruption Prevented or Minimized as a Result of such Actions
58	10/31/2016	20	7	RTD	RTD was run in manual due to patching. Planned maintenance.
59	10/31/2016	20	8	RTD	RTD was run in manual due to patching. Planned maintenance.
60	11/1/2016	23	4	FMM	FMM did not run due to application problem. This interval was filled either automatically or interactively. MQS published Pnode clearing and resource awards for this interval.
61	11/1/2016	23	7	RTD	RTD was run in manual due to patching. Planned maintenance.
62	11/1/2016	24	1	FMM	FMM did not run due to application problem. This interval was filled either automatically or interactively. MQS published Pnode clearing and resource awards for this interval.
63	11/2/2016	21	5	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
64	11/5/2016	1	1	RTD	RTD results were blocked and previous solution used.
65	11/7/2016	10	12	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
66	11/7/2016	11	1	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
67	11/7/2016	11	2	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.

Count	Date	Hour	Interval	Market	Nature of Actions, Nature of Market Disruption, Rationale and/or Market Disruption Prevented or Minimized as a Result of such Actions
68	11/7/2016	11	3	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
69	11/7/2016	11	3	FMM	FMM Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
70	11/7/2016	11	4	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
71	11/7/2016	11	5	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
72	11/7/2016	11	6	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
73	11/7/2016	11	7	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
74	11/7/2016	11	9	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
75	11/7/2016	11	10	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
76	11/7/2016	11	11	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
77	11/7/2016	11	12	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.

Count	Date	Hour	Interval	Market	Nature of Actions, Nature of Market Disruption, Rationale and/or Market Disruption Prevented or Minimized as a Result of such Actions
78	11/7/2016	12	1	FMM	FMM Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
79	11/7/2016	12	2	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
80	11/7/2016	12	2	HASP	HASP did not run due to application problem. This interval was filled either automatically or interactively. MQS published Pnode clearing and resource awards for this interval.
81	11/8/2016	9	2	RTD	RTD results were blocked and previous solution used.
82	11/9/2016	13	9	RTD	RTD failed due application problem. Loss clearing payload and LMP filled from previous good interval.
83	11/9/2016	13	10	RTD	RTD failed due application problem. Loss clearing payload and LMP filled from previous good interval.
84	11/9/2016	14	1	RTD	RTD results were blocked and previous solution used.
85	11/9/2016	14	1	FMM	FMM did not run due to application problem. This interval was filled either automatically or interactively. MQS published Pnode clearing and resource awards for this interval.
86	11/9/2016	14	2	RTD	RTD results were blocked and previous solution used.
87	11/9/2016	14	2	HASP	HASP did not run due to application problem. This interval was filled either automatically or interactively. MQS published Pnode clearing and resource awards for this interval.

Count	Date	Hour	Interval	Market	Nature of Actions, Nature of Market Disruption, Rationale and/or Market Disruption Prevented or Minimized as a Result of such Actions
88	11/9/2016	14	3	RTD	RTD results were blocked and previous solution used.
89	11/9/2016	14	4	RTD	RTD results were blocked and previous solution used.
90	11/9/2016	14	5	RTD	RTD results were blocked and previous solution used.
91	11/9/2016	14	6	RTD	RTD results were blocked and previous solution used.
92	11/9/2016	14	10	RTD	RTD results were blocked and previous solution used.
93	11/9/2016	14	11	RTD	RTD did not run due to RTCD. Loss clearing payload and LMP filled from previous good interval.
94	11/9/2016	14	12	RTD	RTD did not run due to RTCD. Loss clearing payload and LMP filled from previous good interval.
95	11/9/2016	15	1	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
96	11/10/2016	15	4	FMM	FMM was run in manual due to patching. Planned maintenance.
97	11/10/2016	15	7	RTD	RTD was run in manual due to patching. Planned maintenance.

Count	Date	Hour	Interval	Market	Nature of Actions, Nature of Market Disruption, Rationale and/or Market Disruption Prevented or Minimized as a Result of such Actions
98	11/10/2016	15	8	RTD	RTD was run in manual due to patching. Planned maintenance.
99	11/10/2016	15	9	RTD	RTD was run in manual due to patching. Planned maintenance.
100	11/15/2016	14	5	RTD	RTD did not run due to RTCD. Loss clearing payload and LMP filled from previous good interval.
101	11/15/2016	14	6	RTD	RTD did not run due to RTCD. Loss clearing payload and LMP filled from previous good interval.
102	11/15/2016	14	7	RTD	RTD did not run due to RTCD. Loss clearing payload and LMP filled from previous good interval.
103	11/15/2016	15	9	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.

Notes:

Integrated Forward Market (IFM): The Day-Ahead Market run in which the ISO conducts the market for purchases and sales of Energy for all hours of the next Trading Day based on submitted supply and demand bids, and performs the procurement of Ancillary Services.

Residual Unit Commitment (RUC): The Day-Ahead Market run in which the ISO conducts unit commitment of additional resources based on submitted availability bids and the forecast of demand for every hour of the next Trading Day.

Fifteen Minute Market (FMM) Interval 1: The first of a series of four market runs conducted every Trading Hour in advance of the Operating Hour. In this run the ISO conducts the Market Power Mitigation for submitted Bids, which applies to all of the Real-Time Market processes for the given Trading Hour. In this interval the ISO also conducts the procurement of incremental Ancillary Services from internal resources and dynamic external resources.

Fifteen Minute Market (FMM) Interval 2: The second of a series of four market runs conducted every Trading Hour in advance of the Operating Hour during which the ISO conducts the HASP. In the HASP, the ISO conducts the procurement and sale of Energy and Ancillary services from non-dynamic System Resources based on submitted Bids and the CAISO Forecast of CAISO Demand. In this interval the ISO also conducts the

advisory procurement of incremental Ancillary Services from internal resources and dynamic external resources from T to T+60 minutes and procurement for the given Trading Hour.
Fifteen Minute Market (FMM) Interval 3: The third of a series of four market runs conducted every Trading Hour. During this interval the ISO conducts the commitment of internal Short-Start and Fast Start Units for the Time Horizon of T-30 minutes to T+240 minutes. In this interval the ISO also conducts the procurement of incremental Ancillary Services from internal resources and dynamic external resources for the given Trading Hour.
Fifteen Minute Market (FMM) Interval 4: The fourth of a series of four market runs conducted every Trading Hour. This interval is for the Fifteen Minute Market for the T-105 minutes to T+60 minutes time horizon. In this interval the ISO also conducts 15-minute Ancillary Service Awards for non-Hourly System Resources, internal resources and dynamic external resources for the given Trading Hour.
Real-Time Dispatch (RTD): The five minute interval of any given Operating Hour during which the ISO conducts the market for Energy based on submitted bids and the CAISO Forecast of CAISO Demand.

CERTIFICATE OF SERVICE

I certify that I have served the foregoing document upon the parties listed on the official service list in the captioned proceedings, in accordance with the requirements of Rule 2010 of the Commission's Rules of Practice and Procedure (18 C.F.R. § 385.2010).

Dated at Folsom, California this 15th day of December, 2016.

/s/ Grace Clark _____
Grace Clark