



Market Disruption Report August 16, 2018 to September 15, 2018

October 15, 2018

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.* Pursuant to Section 7.7.6 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 7.7.6;
- 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 7.7.6;
- Information about the Bids (including Self-Schedules) removed pursuant to Section 7.7.6 (*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 7.7.6.†

* Section 7.6 and 7.7 of the ISO Tariff refer to these system operation issues or System Emergencies, respectively. ISO Tariff, Appendix A, definition of Market Disruption. Capitalized terms not otherwise defined herein have the meanings set forth in the ISO Tariff.

† *Id.* at P 29 & n.29.

II. Report on Market Disruptions Occurring from August 16, 2018 through September 15, 2018

The ISO's report on Market Disruptions that occurred from August 16, 2018 through September 15, 2018, is provided in Table 1 and Attachment A below. Attachment A includes an entry for each reportable Market Disruption event and each 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 78 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	3	0
Fifteen Minute Market Interval 2	3	0
Fifteen Minute Market Interval 3	3	0
Fifteen Minute Market Interval 4	5	0
Real-Time Dispatch	64	0

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

The frequency of RTD failures decreased from 69 to 64 in comparison to the August 2018 Report. RTD failures accounted for approximately 82 percent of all of the Market Disruptions during this reporting period.

Planned Maintenance occurred on August 22nd, August 25th, September 12th, and September 13th. On August 25th there were 4 (3 RTD, 1 FMM) disruptions and on September 13th there were 8 (5 RTD, 3 FMM) disruptions due to IFM/RTN patching. On August 22nd (through August 23rd) there were 8 (4 RTD, 4 FMM) disruptions and on September 12th (through September 13th) there were 5 (3 RTD, 2 FMM) disruptions due to database maintenance.

On September 7th there were 34 (RTD) disruptions due to software issues with ADS and SIBR.

On August 25th the CAISO made two resources non-participating in FMM due to market failures. The resources were made non-participating strictly to resolve the FMM issue and not due to bidding concerns.

Market Disruption for Unique Pricing Feature

The ISO implemented a feature to ensure unique pricing under a degenerate condition in November 2015, which was implemented along with other pricing enhancements to improve market efficiency. This feature was effective until August 14, 2018. On this day, the real-time five minute market application failed to produce an optimal dispatch in a reasonable time and the unique pricing feature was disabled to obtain a valid solution. The problem associated with this feature propagated to the day-ahead market on August 21, 2018, and the fifteen-minute market on August 26, 2018. The Table 2 captured below shows status of the unique pricing feature across all the markets between August 14, 2018 until September 20, 2018. This issue was resolved on separate days for each of the markets.

Table 2: Status of Unique Pricing feature across various markets

Date	IFM	RTPD	RTD
8/14/2018	Enabled	Enabled	Enabled
8/15/2018	Enabled	Enabled	Disabled
8/16/2018	Enabled	Enabled	Disabled
8/17/2018	Enabled	Enabled	Disabled
8/18/2018	Enabled	Enabled	Disabled
8/19/2018	Enabled	Enabled	Disabled
8/20/2018	Enabled	Enabled	Disabled
8/21/2018	Enabled	Enabled	Disabled
8/22/2018	Disabled	Enabled	Disabled
8/23/2018	Disabled	Enabled	Disabled
8/24/2018	Disabled	Enabled	Disabled
8/25/2018	Disabled	Enabled	Disabled
8/26/2018	Disabled	Disabled	Disabled
8/27/2018	Disabled	Disabled	Disabled
8/28/2018	Disabled	Disabled	Disabled
8/29/2018	Disabled	Disabled	Disabled
8/30/2018	Disabled	Disabled	Disabled
8/31/2018	Disabled	Enabled	Disabled
9/1/2018	Enabled	Enabled	Disabled
9/2/2018	Enabled	Enabled	Disabled
9/3/2018	Enabled	Enabled	Disabled
9/4/2018	Enabled	Enabled	Disabled
9/5/2018	Enabled	Enabled	Disabled
9/6/2018	Enabled	Enabled	Disabled
9/7/2018	Enabled	Enabled	Disabled
9/8/2018	Enabled	Enabled	Disabled
9/9/2018	Enabled	Enabled	Disabled
9/10/2018	Enabled	Enabled	Disabled

9/11/2018	Enabled	Enabled	Disabled
9/12/2018	Enabled	Enabled	Disabled
9/13/2018	Enabled	Enabled	Disabled
9/14/2018	Enabled	Enabled	Disabled
9/15/2018	Enabled	Enabled	Disabled
9/16/2018	Enabled	Enabled	Disabled
9/17/2018	Enabled	Enabled	Disabled
9/18/2018	Enabled	Enabled	Disabled
9/19/2018	Enabled	Enabled	Disabled
9/20/2018	Enabled	Enabled	Enabled

ATTACHMENT A

**California Independent System Operator Corporation
Market Disruption Report
October 15, 2018**

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	8/17/2018	1	1	RTD	RTD results were blocked and previous solution used.
2	8/22/2018	10	4	RTD	RTD results were blocked and previous solution used.
3	8/22/2018	10	5	RTD	RTD results were blocked and previous solution used.
4	8/22/2018	13	1	RTD	RTD results were blocked and previous solution used.
5	8/22/2018	13	2	RTD	RTD results were blocked and previous solution used.
6	8/22/2018	21	4	RTD	RTD results were blocked and previous solution used.
7	8/22/2018	24	3	FMM	FMM did not run due to database maintenance. 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
8	8/22/2018	24	4	FMM	FMM did not run due to database maintenance. This interval was filled either automatically or interactively. MQS published Pnode clearing and resource awards for this interval.
9	8/22/2018	24	11	RTD	RTD did not run due to database maintenance. Loss clearing payload and LMP filled from previous good interval.
10	8/22/2018	24	12	RTD	RTD did not run due to database maintenance. Loss clearing payload and LMP filled from previous good interval.
11	8/23/2018	1	1	RTD	RTD did not run due to database maintenance. Loss clearing payload and LMP filled from previous good interval.
12	8/23/2018	1	1	FMM	FMM did not run due to database maintenance. This interval was filled either automatically or interactively. MQS published Pnode clearing and resource awards for this interval.
13	8/23/2018	1	2	RTD	RTD did not run due to database maintenance. Loss clearing payload and LMP filled from previous good interval.
14	8/23/2018	1	2	HASP	HASP did not run due to database maintenance. This interval was filled either automatically or interactively. MQS published Pnode clearing and resource awards for this interval.
15	8/25/2018	11	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.
16	8/25/2018	12	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.

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
17	8/25/2018	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.
18	8/25/2018	16	4	FMM	FMM did not run due to patch related system issues. This interval was filled either automatically or interactively. MQS published Pnode clearing and resource awards for this interval.
19	8/25/2018	16	7	RTD	RTD did not run due to patch related system issues. Loss clearing payload and LMP filled from previous good interval.
20	8/25/2018	16	8	RTD	RTD did not run due to patch related system issues. Loss clearing payload and LMP filled from previous good interval.
21	8/25/2018	16	9	RTD	RTD did not run due to patch related system issues. Loss clearing payload and LMP filled from previous good interval.
22	8/25/2018	17	1	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
23	9/6/2018	4	8	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
24	9/6/2018	4	9	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
25	9/6/2018	4	10	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
26	9/6/2018	18	10	RTD	RTD results were blocked and previous solution used.
27	9/7/2018	9	10	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
28	9/7/2018	9	11	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
29	9/7/2018	9	12	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
30	9/7/2018	10	1	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
31	9/7/2018	10	2	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
32	9/7/2018	10	3	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
33	9/7/2018	10	4	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
34	9/7/2018	10	5	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
35	9/7/2018	10	6	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
36	9/7/2018	10	7	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
37	9/7/2018	10	8	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
38	9/7/2018	10	9	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
39	9/7/2018	10	10	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
40	9/7/2018	10	11	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
41	9/7/2018	10	12	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
42	9/7/2018	11	1	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
43	9/7/2018	11	2	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
44	9/7/2018	11	3	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
45	9/7/2018	11	4	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
46	9/7/2018	11	5	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
47	9/7/2018	11	6	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
48	9/7/2018	11	7	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
49	9/7/2018	11	8	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
50	9/7/2018	11	9	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
51	9/7/2018	11	10	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
52	9/7/2018	11	11	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
53	9/7/2018	11	12	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
54	9/7/2018	12	1	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
55	9/7/2018	12	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
56	9/7/2018	12	3	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
57	9/7/2018	12	4	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
58	9/7/2018	12	5	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
59	9/7/2018	12	6	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
60	9/7/2018	12	7	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
61	9/9/2018	13	1	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
62	9/10/2018	19	10	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
63	9/12/2018	1	1	RTD	RTD results were blocked and previous solution used.
64	9/12/2018	24	3	FMM	FMM did not run due to database maintenance. This interval was filled either automatically or interactively. MQS published Pnode clearing and resource awards for this interval.
65	9/12/2018	24	4	FMM	FMM did not run due to database maintenance. 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
66	9/12/2018	24	11	RTD	RTD did not run due to database maintenance. Loss clearing payload and LMP filled from previous good interval.
67	9/12/2018	24	12	RTD	RTD did not run due to database maintenance. Loss clearing payload and LMP filled from previous good interval.
68	9/13/2018	1	1	RTD	RTD did not run due to database maintenance. Loss clearing payload and LMP filled from previous good interval.
69	9/13/2018	2	1	DSTUC	DSTUC 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.
70	9/13/2018	14	4	FMM	FMM did not run due to patch related system issues. This interval was filled either automatically or interactively. MQS published Pnode clearing and resource awards for this interval.
71	9/13/2018	14	7	RTD	RTD did not run due to patch related system issues. Loss clearing payload and LMP filled from previous good interval.
72	9/13/2018	14	8	RTD	RTD did not run due to patch related system issues. Loss clearing payload and LMP filled from previous good interval.
73	9/13/2018	14	9	RTD	RTD did not run due to patch related system issues. Loss clearing payload and LMP filled from previous good interval.
74	9/13/2018	14	10	RTD	RTD did not run due to patch related system issues. 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
75	9/13/2018	14	11	RTD	RTD did not run due to patch related system issues. Loss clearing payload and LMP filled from previous good interval.
76	9/13/2018	15	1	FMM	FMM did not run due to patch related system issues. This interval was filled either automatically or interactively. MQS published Pnode clearing and resource awards for this interval.
77	9/13/2018	15	2	HASP	HASP did not run due to patch related system issues. This interval was filled either automatically or interactively. MQS published Pnode clearing and resource awards for this interval.
78	9/14/2018	16	1	RTD	RTD results were blocked and previous solution used.

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.

