California ISO

Market Disruption Report
May 16, 2018 to June 15, 2018

July 15, 2018

CAISO Market Quality and Renewable Integration

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 7.7.6 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.[2]

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[1]   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.

[2]   *Id.* at P 29 & n.29.

II. Report on Market Disruptions Occurring from May 16, 2018 through June 15, 2018

The ISO's report on Market Disruptions that occurred from May 16, 2018 through June 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 120 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	8	0
Fifteen Minute Market Interval 2	5	0
Fifteen Minute Market Interval 3	8	0
Fifteen Minute Market Interval 4	8	0
Real-Time Dispatch	91	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 increased from 39 to 91 in comparison to the May 2018 Report. RTD failures accounted for approximately 75 percent of all of the Market Disruptions during this reporting period.

Planned Maintenance occurred on May 17th, May 24th, and June 12th. On May 17th there were 3 (RTD) disruptions and on June 12th there were 7 (4 RTD, 3 FMM) disruptions due to IFM/RTN patching. On May 24th there were 8 (5 RTD, 3 FMM) disruptions due to database maintenance.

On May 24th there were a total of 56 (44 RTD, 12 FMM) disruptions due to a broadcasting issue that lasted several hours.

On May 16th there were 4 (RTD) disruptions due to a SIBR issue. On May 22nd there were 8 (5 RTD, 3 FMM) disruptions due to a database issue.

Pursuant to CAISO tariff section 29.7 EIM Operations Under Normal and Emergency conditions, section (j) EIM Disruption, The CAISO declared an interruption of the Arizona Public Services Balancing Authority Area (BAA) EIM Entity participation in the Real-Time Market due to a planned outage to its market applications which affected their ability to participate in the EIM. The market interruption for Arizona Public Service started on May 30 hour ending 10 interval 4 for the fifteen-minute market and hour ending 10 interval 10 for the five-minute market. The market interruption ended on May 30 hour ending 13 interval 4 for the fifteen-minute market and in hour ending 13 interval 12 in the five-minute market.

ATTACHMENT A

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	California Independent System Operator Corporation Market Disruption Report July 16, 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	5/16/2018	1	1	FMM	FMM failed due to application time-out. Loss clearing payload and LMP filled from previous good interval.
2	5/16/2018	1	6	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
3	5/16/2018	10	5	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
4	5/16/2018	10	6	RTD	RTD failed due to application time-out. Loss clearing payload and LMP filled from previous good interval.
5	5/16/2018	10	7	RTD	RTD failed due to application time-out. Loss clearing payload and LMP filled from previous good interval.
6	5/16/2018	10	8	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
7	5/17/2018	4	4	RTD	RTD failed due to application time-out. 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	5/17/2018	15	7	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
9	5/17/2018	15	8	RTD	RTD did not run due to patch related system issues. Loss clearing payload and LMP filled from previous good interval.
10	5/17/2018	15	9	RTD	RTD did not run due to patch related system issues. Loss clearing payload and LMP filled from previous good interval.
11	5/18/2018	1	11	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
12	5/19/2018	10	4	RTD	RTD failed due to application time-out. Loss clearing payload and LMP filled from previous good interval.
13	5/20/2018	4	3	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
14	5/20/2018	23	5	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
15	5/21/2018	15	6	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
16	5/22/2018	4	3	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
17	5/22/2018	11	11	RTD	RTD failed due to application time-out. 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	5/22/2018	11	12	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
19	5/22/2018	12	1	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
20	5/22/2018	12	1	FMM	FMM failed due to application time-out. Loss clearing payload and LMP filled from previous good interval.
21	5/22/2018	12	2	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
22	5/22/2018	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.
23	5/22/2018	12	3	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
24	5/22/2018	12	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.
25	5/22/2018	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.
26	5/22/2018	22	4	FMM	FMM failed due to application time-out. Loss clearing payload and LMP filled from previous good interval.
27	5/23/2018	24	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.

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	5/23/2018	24	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.
29	5/24/2018	1	1	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
30	5/24/2018	1	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.
31	5/24/2018	1	2	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
32	5/24/2018	1	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.
33	5/24/2018	1	3	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
34	5/24/2018	1	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.
35	5/24/2018	1	4	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
36	5/24/2018	1	5	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
37	5/24/2018	15	4	FMM	FMM failed due to application time-out. 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
38	5/24/2018	15	6	RTD	RTD failed due to application time-out. Loss clearing payload and LMP filled from previous good interval.
39	5/24/2018	15	7	RTD	RTD failed due to application time-out. Loss clearing payload and LMP filled from previous good interval.
40	5/24/2018	15	8	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
41	5/24/2018	15	9	RTD	RTD failed due to application time-out. Loss clearing payload and LMP filled from previous good interval.
42	5/24/2018	15	10	RTD	RTD failed due to application time-out. Loss clearing payload and LMP filled from previous good interval.
43	5/24/2018	15	11	RTD	RTD failed due to application time-out. Loss clearing payload and LMP filled from previous good interval.
44	5/24/2018	15	12	RTD	RTD failed due to application time-out. Loss clearing payload and LMP filled from previous good interval.
45	5/24/2018	16	1	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
46	5/24/2018	16	1	FMM	FMM failed due to application time-out. Loss clearing payload and LMP filled from previous good interval.
47	5/24/2018	16	3	RTD	RTD failed due to application time-out. 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
48	5/24/2018	16	3	FMM	FMM failed due to application time-out. Loss clearing payload and LMP filled from previous good interval.
49	5/24/2018	16	4	RTD	RTD failed due to application time-out. Loss clearing payload and LMP filled from previous good interval.
50	5/24/2018	16	5	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
51	5/24/2018	16	6	RTD	RTD failed due to application time-out. Loss clearing payload and LMP filled from previous good interval.
52	5/24/2018	16	10	RTD	RTD failed due application problem. Loss clearing payload and LMP filled from previous good interval.
53	5/24/2018	16	11	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
54	5/24/2018	16	12	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
55	5/24/2018	17	1	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
56	5/24/2018	17	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.
57	5/24/2018	17	2	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
58	5/24/2018	17	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.
59	5/24/2018	17	3	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
60	5/24/2018	17	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.
61	5/24/2018	17	4	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
62	5/24/2018	17	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.
63	5/24/2018	17	5	RTD	RTD failed due to application time-out. Loss clearing payload and LMP filled from previous good interval.
64	5/24/2018	17	6	RTD	RTD failed due to application time-out. Loss clearing payload and LMP filled from previous good interval.
65	5/24/2018	17	7	RTD	RTD failed due to application time-out. Loss clearing payload and LMP filled from previous good interval.
66	5/24/2018	17	10	RTD	RTD failed due to application time-out. Loss clearing payload and LMP filled from previous good interval.
67	5/24/2018	17	11	RTD	RTD failed due to application time-out. 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	5/24/2018	17	12	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
69	5/24/2018	18	1	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
70	5/24/2018	18	1	FMM	FMM failed due to application time-out. Loss clearing payload and LMP filled from previous good interval.
71	5/24/2018	18	2	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
72	5/24/2018	18	3	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
73	5/24/2018	18	3	FMM	FMM failed due to application time-out. Loss clearing payload and LMP filled from previous good interval.
74	5/24/2018	18	4	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
75	5/24/2018	18	5	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
76	5/24/2018	18	6	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
77	5/24/2018	18	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
78	5/24/2018	18	8	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
79	5/24/2018	18	10	RTD	RTD failed due to application time-out. Loss clearing payload and LMP filled from previous good interval.
80	5/24/2018	18	11	RTD	RTD failed due to application time-out. Loss clearing payload and LMP filled from previous good interval.
81	5/24/2018	18	12	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
82	5/24/2018	19	1	FMM	FMM failed due to application time-out. Loss clearing payload and LMP filled from previous good interval.
83	5/24/2018	19	2	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
84	5/24/2018	19	3	RTD	RTD failed due to application time-out. Loss clearing payload and LMP filled from previous good interval.
85	5/24/2018	19	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.
86	5/24/2018	19	4	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
87	5/24/2018	19	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
88	5/24/2018	19	5	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
89	5/24/2018	19	6	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
90	5/24/2018	19	7	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
91	5/24/2018	19	8	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
92	5/24/2018	19	9	RTD	RTD did not run due to application problem. Loss clearing payload and LMP filled from previous good interval.
93	5/29/2018	17	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.
94	5/29/2018	17	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.
95	5/29/2018	18	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.
96	5/30/2018	14	10	RTD	RTD results were blocked and previous solution used.
97	5/31/2018	15	9	RTD	RTD results were blocked and previous solution used.

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	5/31/2018	15	10	RTD	RTD results were blocked and previous solution used.
99	5/31/2018	15	11	RTD	RTD results were blocked and previous solution used.
100	5/31/2018	15	12	RTD	RTD results were blocked and previous solution used.
101	5/31/2018	16	1	RTD	RTD results were blocked and previous solution used.
102	5/31/2018	16	2	RTD	RTD results were blocked and previous solution used.
103	5/31/2018	16	3	RTD	RTD results were blocked and previous solution used.
104	5/31/2018	16	4	RTD	RTD results were blocked and previous solution used.
105	5/31/2018	16	5	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
106	5/31/2018	16	6	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
107	6/2/2018	2	5	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
108	6/12/2018	12	10	RTD	RTD Broadcast failed. Loss clearing payload and LMP filled from previous good interval.
109	6/12/2018	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.
110	6/12/2018	16	7	RTD	RTD did not run due to patch related system issues. Loss clearing payload and LMP filled from previous good interval.
111	6/12/2018	16	8	RTD	RTD did not run due to patch related system issues. Loss clearing payload and LMP filled from previous good interval.
112	6/12/2018	16	9	RTD	RTD did not run due to patch related system issues. Loss clearing payload and LMP filled from previous good interval.
113	6/12/2018	16	10	RTD	RTD did not run due to patch related system issues. Loss clearing payload and LMP filled from previous good interval.
114	6/12/2018	17	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.
115	6/12/2018	17	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.
116	6/12/2018	17	8	RTD	RTD failed due to application time-out. 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
117	6/12/2018	24	1	RTD	RTD results were blocked and previous solution used.
118	6/13/2018	17	8	RTD	RTD failed due to application time-out. Loss clearing payload and LMP filled from previous good interval.
119	6/13/2018	23	1	RTD	RTD results were blocked and previous solution used.
120	6/15/2018	21	3	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.