



California ISO  
Your Link to Power

# **Market Disruption Report December 16, 2009 to January 15, 2010**

February 16, 2010

ISO Department of Market Services

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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.<sup>1</sup> Pursuant to Section 7.7.15 of the CAISO 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 interprets this to mean that a Market Disruption occurs and the ISO is obligated to report its 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”), Hour-Ahead Scheduling Process (“HASP”), Real-Time Unit Commitment (“RTUC”), or 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.<sup>2</sup>

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

<sup>2</sup> *Id.* at P 29 & n.29.

## **II. Report on Market Disruptions Occurring from December 16, 2009 through January 15, 2010**

The ISO's report on Market Disruptions that occurred during the time period from December 16, 2009 through January 15, 2010, 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 ISO removed Bids (including Self-Schedules) during the time period covered by this report. As shown in Table 1, there were a total of 69 Market Disruptions for the reporting period, all of which occurred in the Hour-Ahead Scheduling Process or Real-Time Market. This reflects an increase of 50 instances compared with the January 2010 report. Table 1 also indicates that the ISO did not remove any Bids (including Self-Schedules) in any of its markets during the reporting period.

Table 1 and Attachment A indicate that there were 37 total instances of real-time unit commitment (RTUC) failures, including 5 hour-ahead scheduling process (HASP) failures. The count of RTUC failures increased by 19 and the count of HASP failures increased by 2 compared since the January 2010 Report. Most of the RTUC failures (including HASP failures) were due to bid transfer issues, Lightweight Directory Access Protocol (LDAP)<sup>3</sup> issue, failed broadcast of the results, software application not running, software application timing out, or databases and applications falling back to Alhambra. The number of real-time dispatch (RTD) failures increased to 32 from 1 such instance reported in the January 2010 Report. Most of the RTD failures can be attributed to LDAP issue, failed broadcast of the results, or databases and applications falling back to

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<sup>3</sup> The Lightweight Directory Access Protocol is an application protocol for querying and modifying directory services running over computer system. A directory is a set of objects with attributes organized in a logical and hierarchical manner similar to a telephone directory.

Alhambra. RTD failures accounted for approximately 46 percent of all of the Market Disruptions during this reporting period.

On December 21, 2009, there was an outage of LDAP server in hour ending 19. This outage caused 3 consecutive RTUC failures (including one HASP failure) and 6 consecutive RTD failures in hour ending 19. The issue was resolved subsequently. On December 28, 2009, the LDAP server experienced outage again in hour ending 11 and this resulted in 2 consecutive RTUC failures and 6 consecutive RTD failures in hour ending 11. There was one RTD failure in interval 10 hour ending 11, which was not related to the above issue. A fix from the vendor has already been deployed into the system to prevent such issue.

On January 13, 2010, the IFM and RTM databases and applications fell back to Alhambra in hour ending 14. It caused a total of 11 Market Disruptions in hours ending 14 and 15, including 8 consecutive RTD failures and 3 consecutive RTUC failures. There were also two other RTUC failures (including one HASP failure) in hour ending 17 and 22 respectively, which were unrelated to the fallback activity.

Since January 1, 2010, the ISO has experienced an increase frequency rate of disruptions to the short-term unit commitment (STUC) process, namely RTUC interval 3. The following were the main contributors to the increased rate of disruptions: 1) modifications to STUC bid replication rules as a result of changes and other associated STUC input data (this includes load pattern changes that contributed to longer STUC run-times to achieve optimal solutions within defined tolerances); 2) modifications made to allow HASP more time if necessary to complete, which has successfully increased the robustness of the HASP process; and 3) increased computing infrastructure maintenance including planned fallbacks and upgrades, which at times impacted the STUC performance. The root causes for the bulk of the issues observed in January have been addressed through recent process and software changes. However, intermittent STUC failures persist and the ISO continues to investigate the STUC process performance and is developing measures to reduce the disruption rate.

**Table 1: Summary of Market Disruption Report**

Type of CAISO Market	Market Disruption or Reportable Events	Removal of Bids (including Self-Schedules)
<b>Day-Ahead</b>		
IFM	0	0
RUC	0	0
<b>Real-Time</b>		
Real-Time Unit Commitment Interval 1	6	0
Real-Time Unit Commitment Interval 2	6	0
Real-Time Unit Commitment Interval 3	20	0
Real-Time Unit Commitment Interval 4	5	0
Real-Time Dispatch	32	0

## **ATTACHMENT A**

**California Independent System Operator Corporation  
Market Disruption Report  
February 16, 2010**

**Table 1: 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	12/16/2009	21	2	HASP	HASP failed due to bid transfer failure. ISO issued a notice through the Market Notification System instructing resources to follow Day-Ahead Schedules and Awards for interties. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval. Any incremental or decremental Real-Time Energy at the interties beyond the Day-Ahead Schedules that was not dispatched by the ISO is treated as an Operational Adjustment (Tier 2) for Settlement purposes.
2	12/16/2009	21	3	RTUC	RTUC did not run due to bid transfer failure. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval.
3	12/16/2009	22	1	RTUC	Broadcast of RTUC results failed. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval.
4	12/16/2009	22	2	RTUC	Broadcast of RTUC results failed. 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
5	12/16/2009	23	2	HASP	HASP did not run due to bid transfer failure. ISO issued a notice through the Market Notification System instructing resources to follow Day-Ahead Schedules and Awards for interties. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval. Any incremental or decremental Real-Time Energy at the interties beyond the Day-Ahead Schedules that was not dispatched by the ISO is treated as an Operational Adjustment (Tier 2) for Settlement purposes.
6	12/16/2009	24	10	RTD	RTD did not run. Loss clearing payload and LMP filled from last good interval.
7	12/17/2009	1	1	RTD	RTD did not run due to network model DB 45 promotion. Loss clearing payload and LMP filled from next good interval.
8	12/17/2009	1	1	RTUC	RTUC did not run. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval.
9	12/17/2009	1	2	RTD	RTD did not run due to network model DB 45 promotion. Loss clearing payload and LMP filled from next good interval.
10	12/17/2009	24	3	RTUC	RTUC did not run. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval.
11	12/19/2009	1	3	RTUC	RTUC did not run. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval.
12	12/21/2009	6	3	RTUC	RTUC did not run. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval.
13	12/21/2009	19	2	HASP	Broadcast of HASP results failed due to LDAP issue. ISO issued a notice through the Market Notification System instructing resources to follow Day-Ahead Schedules and Awards for interties. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval. Any incremental or decremental Real-Time Energy at the interties beyond the Day-Ahead Schedules that was not dispatched by the ISO is treated as an Operational Adjustment (Tier 2) for Settlement purposes.
14	12/21/2009	19	3	RTD	RTD did not run due to LDAP Issue. Loss clearing payload and LMP filled from last 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
15	12/21/2009	19	3	RTUC	RTUC did not run due to LDAP issue. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval.
16	12/21/2009	19	4	RTD	RTD did not run due to LDAP Issue. Loss clearing payload and LMP filled from last good interval.
17	12/21/2009	19	4	RTUC	RTUC did not run due to LDAP issue. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval.
18	12/21/2009	19	5	RTD	RTD did not run due to LDAP Issue. Loss clearing payload and LMP filled from last good interval.
19	12/21/2009	19	6	RTD	RTD did not run due to LDAP Issue. Loss clearing payload and LMP filled from last good interval.
20	12/21/2009	19	7	RTD	RTD did not run due to LDAP Issue. Loss clearing payload and LMP filled from last good interval.
21	12/21/2009	19	8	RTD	RTD did not run due to LDAP Issue. Loss clearing payload and LMP filled from last good interval.
22	12/22/2009	7	3	RTUC	RTUC did not run due to failure of bids to transfer on time. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval.
23	12/25/2009	24	3	RTUC	RTUC timed out. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval.
24	12/26/2009	3	10	RTD	Broadcast of RTD results failed. Loss clearing payload and LMP filled from last good interval.
25	12/28/2009	11	3	RTUC	RTUC did not run due to LDAP issue. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval.
26	12/28/2009	11	4	RTD	RTD timed out due to LDAP Issue. Loss clearing payload and LMP filled from last good interval.
27	12/28/2009	11	4	RTUC	RTUC did not run due to LDAP issue. 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	12/28/2009	11	5	RTD	RTD did not run due to LDAP Issue. Loss clearing payload and LMP filled from last good interval.
29	12/28/2009	11	6	RTD	RTD did not run due to LDAP Issue. Loss clearing payload and LMP filled from last good interval.
30	12/28/2009	11	7	RTD	RTD did not run due to LDAP Issue. Loss clearing payload and LMP filled from last good interval.
31	12/28/2009	11	8	RTD	RTD did not run due to LDAP Issue. Loss clearing payload and LMP filled from last good interval.
32	12/28/2009	11	9	RTD	RTD did not run due to LDAP Issue. Loss clearing payload and LMP filled from last good interval.
33	12/28/2009	11	10	RTD	Broadcast of RTD results failed. Loss clearing payload and LMP filled from last good interval.
34	1/4/2010	12	3	RTUC	RTUC did not run due to failure of bids to transfer on time. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval.
35	1/4/2010	16	10	RTD	Broadcast of RTD results failed. Loss clearing payload and LMP filled from last good interval.
36	1/4/2010	16	11	RTD	Broadcast of RTD results failed. Loss clearing payload and LMP filled from last good interval.
37	1/4/2010	17	1	RTUC	Broadcast of RTUC results failed. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval.
38	1/4/2010	21	11	RTD	Broadcast of RTD results failed. Loss clearing payload and LMP filled from last good interval.
39	1/4/2010	22	1	RTUC	RTUC timed out. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval.
40	1/5/2010	2	1	RTD	RTD did not run because contingency dispatch was active. Loss clearing payload and LMP filled from next 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
41	1/5/2010	6	3	RTUC	RTUC timed out due to optimal solution infeasibility. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval.
42	1/8/2010	6	3	RTUC	RTUC timed out due to optimal solution infeasibility. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval.
43	1/10/2010	1	4	RTUC	Broadcast of RTUC results failed. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval.
44	1/10/2010	1	8	RTD	Broadcast of RTD results failed. Loss clearing payload and LMP filled from last good interval.
45	1/11/2010	10	4	RTD	RTD failed. Loss clearing payload and LMP filled from last good interval.
46	1/11/2010	10	6	RTD	RTD did not run. Loss clearing payload and LMP filled from last good interval.
47	1/11/2010	17	3	RTUC	RTUC failed due to patch installation issue. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval.
48	1/11/2010	17	4	RTUC	RTUC failed due to patch installation issue. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval.
49	1/11/2010	18	1	RTUC	RTUC failed due to patch installation issue. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval.
50	1/12/2010	6	2	HASP	HASP run took too long to finish and it was aborted. ISO issued a notice through the Market Notification System instructing resources to follow Day-Ahead Schedules and Awards for interties. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval. Any incremental or decremental Real-Time Energy at the interties beyond the Day-Ahead Schedules that was not dispatched by the ISO is treated as an Operational Adjustment (Tier 2) for Settlement purposes.

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
51	1/12/2010	6	3	RTUC	RTUC did not run because HASP run took too much time. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval.
52	1/13/2010	14	3	RTUC	RTUC failed due to databases and applications falling back to Alhambra. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval.
53	1/13/2010	14	4	RTUC	RTUC failed due to databases and applications falling back to Alhambra. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval.
54	1/13/2010	14	5	RTD	RTD did not run due to databases and applications falling back to Alhambra. Loss clearing payload and LMP filled from last good interval.
55	1/13/2010	14	6	RTD	RTD did not run due to databases and applications falling back to Alhambra. Loss clearing payload and LMP filled from last good interval.
56	1/13/2010	14	7	RTD	RTD did not run due to databases and applications falling back to Alhambra. Loss clearing payload and LMP filled from last good interval.
57	1/13/2010	14	8	RTD	RTD did not run due to databases and applications falling back to Alhambra. Loss clearing payload and LMP filled from last good interval.
58	1/13/2010	14	9	RTD	RTD did not run due to databases and applications falling back to Alhambra. Loss clearing payload and LMP filled from last good interval.
59	1/13/2010	14	11	RTD	Broadcast of RTD results failed due to databases and applications falling back to Alhambra. Loss clearing payload and LMP filled from last good interval.
60	1/13/2010	14	12	RTD	Broadcast of RTD results failed due to databases and applications falling back to Alhambra. Loss clearing payload and LMP filled from last good interval.
61	1/13/2010	15	1	RTD	Broadcast of RTD results failed due to databases and applications falling back to Alhambra. Loss clearing payload and LMP filled from next good interval.
62	1/13/2010	15	1	RTUC	RTUC failed due to databases and applications falling back to Alhambra. 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
63	1/13/2010	17	2	HASP	HASP did not run due to failure of bids to transfer on time. ISO issued a notice through the Market Notification System instructing resources to follow Day-Ahead Schedules and Awards for interties. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval. Any incremental or decremental Real-Time Energy at the interties beyond the Day-Ahead Schedules that was not dispatched by the ISO is treated as an Operational Adjustment (Tier 2) for Settlement purposes.
64	1/13/2010	22	3	RTUC	RTUC did not run. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval.
65	1/14/2010	6	3	RTUC	RTUC timed out due to optimal solution infeasibility. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval.
66	1/15/2010	5	3	RTUC	RTUC timed out due to optimal solution infeasibility. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval.
67	1/15/2010	7	3	RTUC	RTUC timed out due to optimal solution infeasibility. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval.
68	1/15/2010	8	3	RTUC	RTUC timed out due to optimal solution infeasibility. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this interval.
69	1/15/2010	21	3	RTUC	RTUC timed out due to optimal solution infeasibility. This interval was filled either automatically or interactively. MQS published PNode clearing and resource awards for this 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.

Real-Time Unit commitment (RTUC) 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 and Reliability Requirement Determination 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.
Real-Time Unit commitment (RTUC) 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.
Real-Time Unit commitment (RTUC) 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.
Real-Time Unit commitment (RTUC) Interval 4: The fourth of a series of four market runs conducted every Trading Hour. This interval is for the Real-time Unit Commitment 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.