Release Planning / Implementation Workshop – 01/05/10

Teleconference Information

Dial-in Number: (800) 230-1074

International Dial-in: (612) 332-0335

There is no conference ID number.

Web Conference Information

Web Address: https://www.webmeeting.att.com

Meeting Number: 5114682337

Access Code: 9341896

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Agenda – PDR Implementation Workshop

TIME	TOPIC	PRESENTER
9:00 - 10:30	Market Initiatives Update	Janet Morris, Li Zhou
10:30 - 12:00	PDR Walkthrough Activity	Glen Perez, Jill Powers, Meghna Khatri
12:00 - 12:45	Lunch	
12:45 - 2:00	PDR Walkthrough Activity (continued)	Glen Perez, Jill Powers, Meghna Khatri
2:00 - 2:20	Technical Update	Ivan Loh
2:20 - 2:30	Impact of PDR on LMPM	Eric Hildebrandt
2:30 - 2:50	Market Readiness Activities	Tom Cuccia
2:50 - 3:00	Meeting Summary	Tom Cuccia

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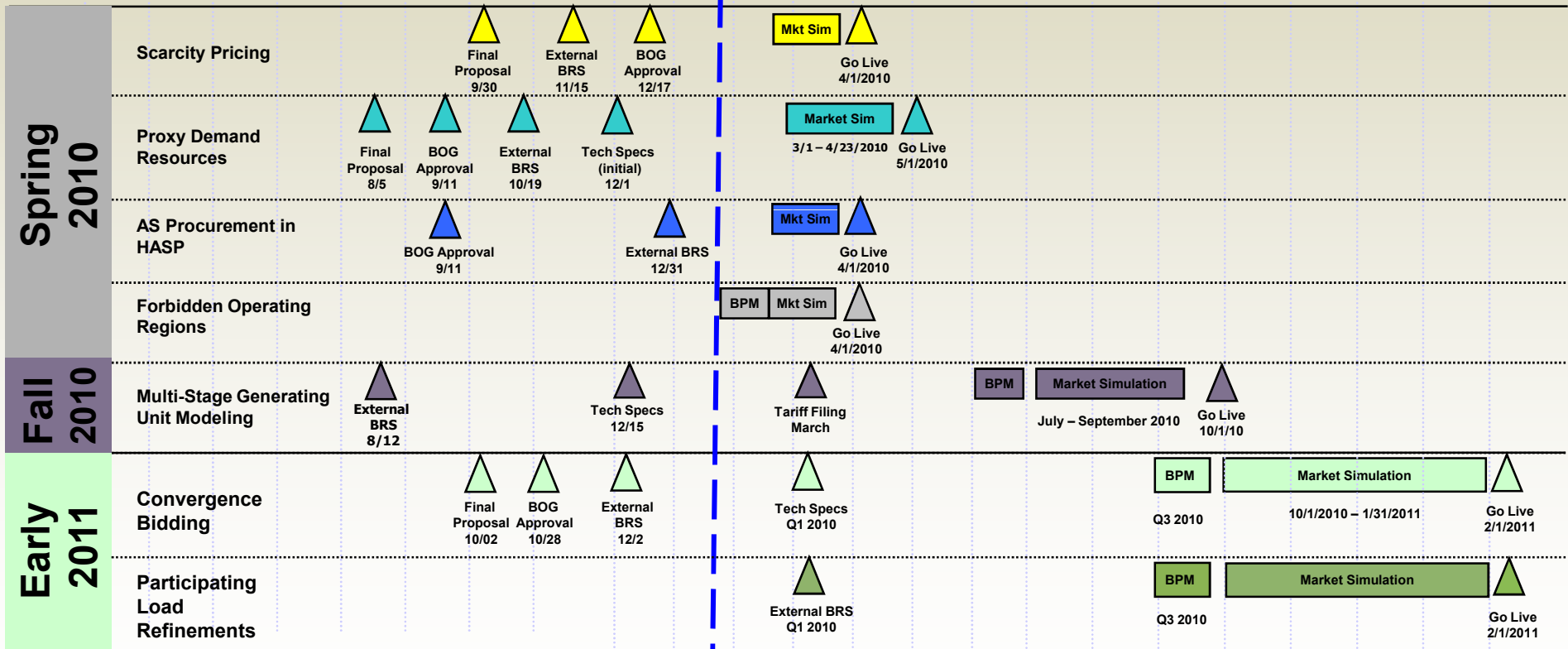Your Link to Power

Market Initiatives Update
Agenda

- Market Initiatives Release Plan

- Spring 2010 Release Project Milestones

- Spring Release Project Update

- Market Simulation (Spring Release)

- Fall 2010 Release Project Update

- Early 2011 Release Milestones

- Policy Initiatives

- 2010 Release Planning Implementation Workshops

Market Initiatives Update
Market Initiatives Release Plan

| | 09 Apr | 09 May | 09 Jun | 09 Jul | 09 Aug | 09 Sep | 09 Oct | 09 Nov | 09 Dec | 10 Jan | 10 Feb | 10 Mar | 10 Apr | 10 May | 10 Jun | 10 Jul | 10 Aug | 10 Sep | 10 Oct | 10 Nov | 10 Dec | 11 Jan | 11 Feb |

Spring 2010

Scarcity Pricing
- Final Proposal 9/30
- External BRS 11/15
- BOG Approval 12/17
- Mkt Sim
- Go Live 4/1/2010

Proxy Demand Resources
- Final Proposal 8/5
- BOG Approval 9/11
- External BRS 10/19
- Tech Specs (initial) 12/1
- Market Sim 3/1 – 4/23/2010
- Go Live 5/1/2010

AS Procurement in HASP
- BOG Approval 9/11
- External BRS 12/31
- Mkt Sim
- Go Live 4/1/2010

Forbidden Operating Regions
- BPM
- Mkt Sim
- Go Live 4/1/2010

Fall 2010

Multi-Stage Generating Unit Modeling
- External BRS 8/12
- Tech Specs 12/15
- Tariff Filing March
- BPM
- Market Simulation July – September 2010
- Go Live 10/1/10

Early 2011

Convergence Bidding
- Final Proposal 10/02
- BOG Approval 10/28
- External BRS 12/2
- Tech Specs Q1 2010
- BPM Q3 2010
- Market Simulation 10/1/2010 – 1/31/2011
- Go Live 2/1/2011

Participating Load Refinements
- External BRS Q1 2010
- BPM Q3 2010
- Market Simulation
- Go Live 2/1/2011

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Market Initiatives Update
Spring 2010 Release Project Milestones

Milestone	Simplified Forbidden Operating Regions	AS Procurement in HASP	Scarcity Pricing	Proxy Demand Resource
Publish Final Draft Proposal	N/A	8/25/2009	October 2009	8/5/2009
CAISO BOG Approval	N/A	Sep 10-11, 2009	Dec 16-17, 2009	Sep 10-11, 2009
Submit FERC Filing	January 2010	January 2010	January 2010	2/15/10
Publish Business Requirements	1/4/2010	12/30/2009	11/5/2009	10/19/2009, revised version 12/30/09
Publish Technical Specifications	Not required	Not required	Not required	12/1/2009
Publish BPM Drafts	1/20/2010	1/20/2010	1/20/2010	February 2010
Begin Market Simulations	3/1/2010	3/1/2010	3/1/2010	3/1/2010 (Registration) *See Details on Slide 14/15*
Go-Live	4/1/2010	4/1/2010	4/1/2010	5/1/2010

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Spring Release Project Update
Spring Release Project Update – Simplified Forbidden Operating Regions (SFOR)

Background

- Forbidden Operating Regions (FOR) are distinct non-overlapping operating regions within which Generating Units cannot operate stably.

- RTD and RTPD will stay outside FOR and if it had to cross one then it will not stop or reverse direction once a FOR is entered.

- FOR was enabled in DAM but disabled in RTM upon going live with this new market, due to performance concerns in RTM.

- The CAISO committed to the Federal Energy Regulatory Commission that a solution to this issue, i.e. providing FOR or a similar feature in the RTM, would be implemented in a reasonable time frame. The Simplified Forbidden Operation Region (SFOR) functionality will meet this requirement.

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Spring Release Project Update – Simplified
Spring Release Project Update – SFOR (continued)

Given the MSG project, why Simplified Forbidden Operating Regions?

- In the interim period, reduce the Exceptional Dispatches which are workarounds for a lack of FOR enforcement in RT.

- FERC mandate

- Provide improved functionality in the interim period before MSG is implemented

- FOR is still an option needed after MSG

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Spring Release Project Update – Simplified
Spring Release Project Update – SFOR (continued)

Day-Ahead Characteristics

- No change at all in the current logic of Forbidden Operating Region in DAM

- Dispatch through FOR without stopping or reversing direction

- A/S Procurement:
    - Not allowed for the interval if dispatched within that interval
    - Allowed up to FOR boundaries if not dispatched inside FOR
    - No limitation if FOR crossing time is 20 minutes or less

- Static FORs in Master File

- Up to four (4) FORs allowed

- FOR ramp rates are derived from the range and crossover time specified, and are subject to the 10 to 1 ramp rate limitation.
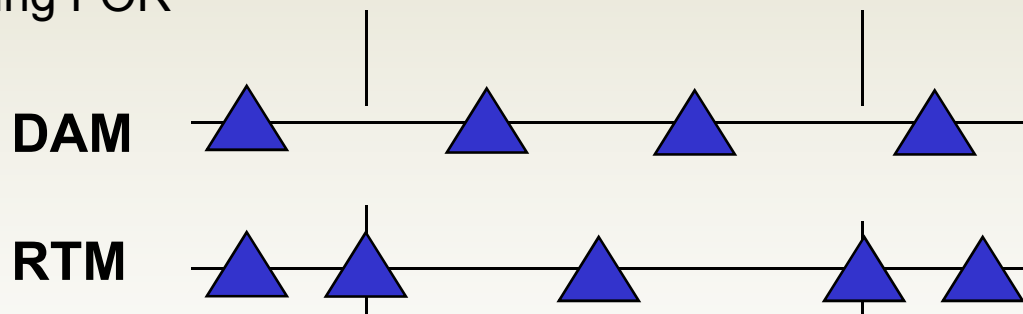
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Spring Release Project Update – Simplified
Spring Release Project Update – SFOR (continued)

Real-Time Characteristics

- Forbidden Operating Region logic in RTM is similar to IFM except for the following:

  - 'Bus stop' functionality might stop at boundary before entering and exiting FOR

  DAM

  RTM

  - A/S procurement rules similar to IFM, except that there are no procurement limits if FOR crossing time is less than 5 minutes.

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Market Initiatives Update
Spring Release Project Update – AS Procurement in HASP

- Tariff language filed with FERC on 12/23/09

- External Business Requirements posted on 12/30/09

  http://www.caiso.com/2401/2401702e12ca0.html

- No external Technical Specifications will be required

- Settlements BPM updates to be posted by 1/20/10

- The following configuration guides will be updated as a result of AS-HASP:

  - CG PC Spin, Non Spin No Pay
  - CG PC Ancillary Services
  - CG CC 6710 Day Ahead Congestion – AS Spinning Reserve Import Settlement
  - CG CC 6720 Day Ahead Congestion - AS Non-Spinning Reserve Import Settlement

Market Initiatives Update
Spring Release Project Update – Scarcity Pricing

- The Scarcity Pricing design was approved by the Board on 12/16/09

- The Tariff was filed with FERC on 12/24/09

- The BPM updates will be entered into the PRR process on 1/20/10

- No Technical Specifications will be required

- When Scarcity is triggered, energy and A/S prices will rise according to the ISO's co-optimization framework

  - Scarcity prices will provide "in the moment" incentives for re-dispatch
  - A Market Notice will be sent to provide broader notice to market participants of the Scarcity event

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Market Initiatives Update
Spring Release Project Update – PDR

- Draft Tariff language posted and reviewed with Participants on 12/2/09

- Draft Implementation Plan reviewed with stakeholders during two 2-hour conference calls

  - Comments received from several participants
  - Most comments will be addressed in the PDR session today

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Market Initiatives Update
Market Simulation – Market Simulation Agenda

- Pre-Simulation Milestones

- Market Simulation Schedule

- Simulation Approaches by Project

- Communication
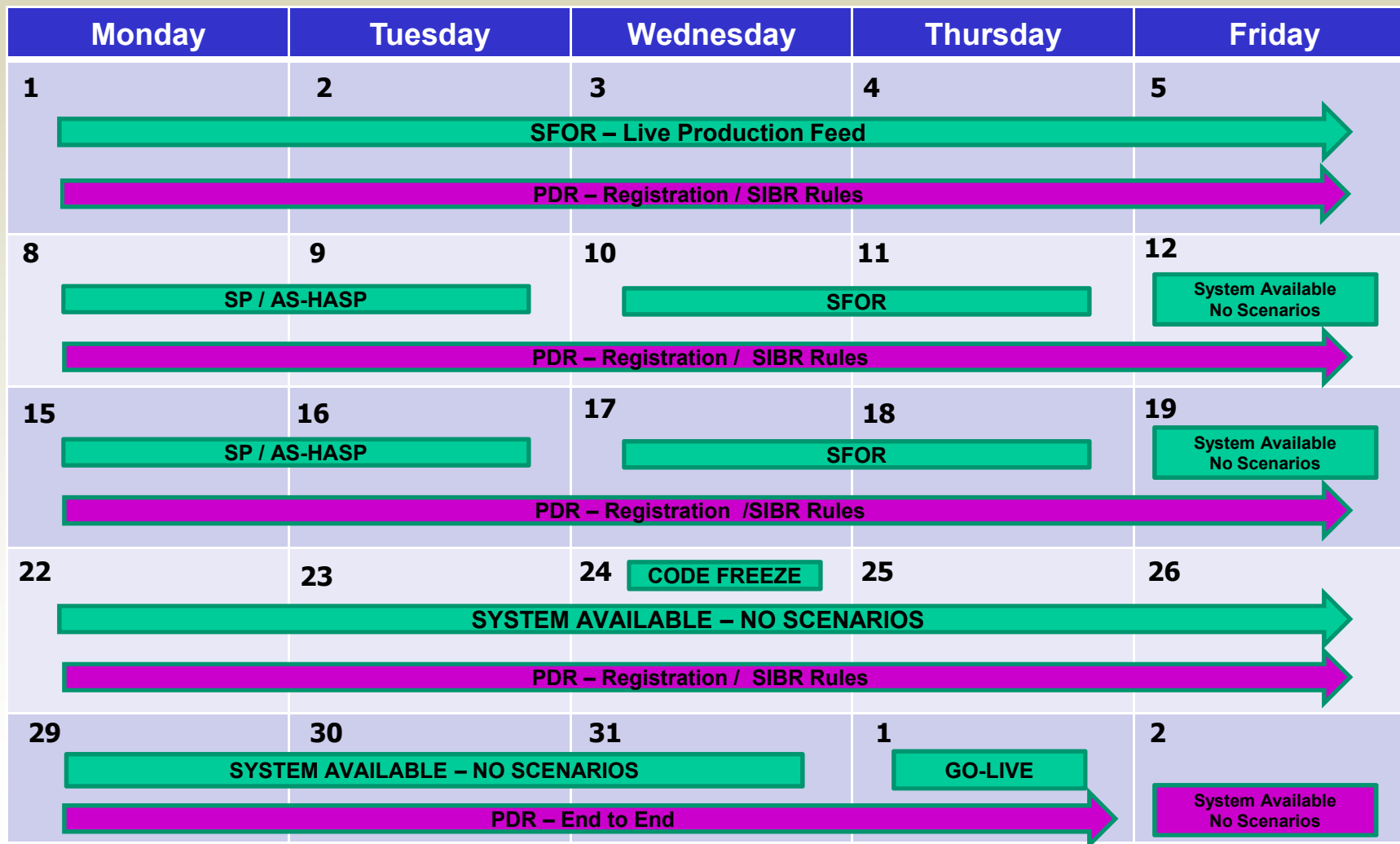
- Support

- Additional Information

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Market Initiatives Update
Spring Release Project Update – Market Simulation (continued)

Pre-Simulation Milestones		
Date	Milestone	Project
1/11/10	Submission of AARFs for user accounts	SFOR, Scarcity Pricing (SP), AS HASP
2/4/10	Request sample Resource IDs by email	PDR
2/18/10	Receive sample Resource IDs / Registrations	PDR
2/22/10	Connectivity Testing (MAP Stage Environment)	SFOR, Scarcity Pricing (SP), AS HASP
3/1/10	Connectivity Testing (DR Environment)	PDR
3/1/10	Rules Testing in SIBR Lite	AS-HASP, PDR
3/1/10	Registration GUI is available for only those who request it	*PDR

*One on one support will be available by appointment

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Market Initiatives Update
Market Simulation Schedule – March 2010

Monday	Tuesday	Wednesday	Thursday	Friday
1	2	3	4	5
		SFOR – Live Production Feed →		
		PDR – Registration / SIBR Rules →		
8	9	10	11	12
SP / AS-HASP		SFOR		System Available No Scenarios
		PDR – Registration / SIBR Rules →		
15	16	17	18	19
SP / AS-HASP		SFOR		System Available No Scenarios
		PDR – Registration /SIBR Rules →		
22	23	24 CODE FREEZE	25	26
		SYSTEM AVAILABLE – NO SCENARIOS →		
		PDR – Registration / SIBR Rules →		
29	30	31	1	2
	SYSTEM AVAILABLE – NO SCENARIOS		GO-LIVE	System Available No Scenarios
	PDR – End to End →			

SP, AS-HASP, SFOR   **PDR**

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Slide 15

Market Initiatives Update
Market Simulation Schedule – April 2010

Monday	Tuesday	Wednesday	Thursday	Friday
			1 PDR – End to End →	**2** System Available No Scenarios
5	**6**	**7**	**8** PDR – End to End →	**9** System Available No Scenarios
12	**13**	**14**	**15** PDR – End to End →	**16** System Available No Scenarios
19	**20**	**21**	**22** PDR – End to End →	**23** CODE FREEZE / System Available No Scenarios
26	**27**	**28** PDR – System Available (No Scenarios) →	**29**	**30** GO-LIVE (5/1)

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Market Initiatives Update
Spring Release Project Update – Market Simulation Approach - SFOR

- **SFOR Market Scenarios**

  1. Decrease the bid price of all FOR resources to Floor Price cap forcing all FOR resources to go to the hi operating output and through FOR in between
  2. Increase the bid price of all FOR resources to Ceiling price cap forcing them to go through their FOR regions as they go from Hi operating output to their low operating output
  3. Split the resources with FOR into two groups called A and B and force them to go through their FOR
     - Increase the bid price of group A to Ceiling price cap
     - Decrease the bid price of group B to Floor price cap
  4. Repeat Test 3 above but reverse A and B group

  Note: The goal of these tests is to force FOR to be crossed and observe their behavior and the performance of all other units that must balance commodities during FOR crossing

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Market Initiatives Update
Spring Release Project Update – Market Simulation Approach – SP (continued)

- **Scarcity Pricing Market Scenarios (performed in DA, HASP and RTN)**

    1. Trigger Spinning Reserve shortage and Regulation down shortage > 84 MW in the CAISO Expanded System Region

    2. Trigger Non-Spinning Reserve shortage in the SP-26 Sub-Region

    3. Trigger scarcity in all commodities in CAISO Expanded System Region and all active Sub-Regions

- **Daily settlement statements will be published**

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Market Initiatives Update
Spring Release Project Update – Market Simulation Approach – AS HASP

- **AS HASP Market Scenarios**

  1. Verify procurement of AS in HASP for Hourly Pre-Dispatch (HPD) resources and that it is contingent and never used in normal RTD runs
  2. Call a Contingency dispatch in the middle of an hour
  3. Call a Contingency dispatch at the top an hour
  4. Call 2 Contingency dispatches in the same hour
  5. Manual mid-hour CAS change

- **Daily settlement statements will be published**

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Market Initiatives Update
Spring Release Project Update – Market Simulation Approach – PDR

- **PDR Simulations are expected to include the following types of scenarios:**

  - Bid Submissions and Market Clearing Scenarios
    - DA Energy Only
    - DA Energy plus Capacity (A/S & RUC - various combinations)
    - DA and RT (various dispatch scenarios)
    - DA and RT with SLIC Outages
  - Post Market Scenarios
    - Metering and Baseline Calculation Validation
    - Settlements: DA, RT (energy and ancillary services, various conditions)
    - Settlements: No-Pay (various conditions)
  - Daily settlement statements will be published
  - A mini-monthly settlement statement and invoice will be published

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Market Initiatives Update
Spring Release Project Update – Market Simulation (continued)

- **Market Simulation Communication Plan**

  - Market Notices

  - ISO Market Simulation Portal

  - Teleconferences:
    - Mondays at 1pm Pacific, Thursdays at 9am – as needed

  - IMS Tickets – primary source for defect/issue reporting

  - Dedicated Phone Line (Number TBD)

  - SIUG

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Market Initiatives Update
Spring Release Project Update – Market Simulation (continued)

- ## Support

  - IMS

  - Market Simulation Support Center (as with Winter Release 2009)

  - Help Desk: 1-888-889-0450, or (916) 351-2309

  - Market Simulation Teleconferences

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Market Initiatives Update
Spring Release Project Update – Market Simulation (continued)

- **Additional Information**

  - **ISO Transition to New ISP**

    - New IP Addresses have been posted on the portal

    - You may need to make modifications to your Networks/Firewalls etc. in order to access ISO resources

  - Market Simulation – Spring Release 2010 will take place in a different environment from the Winter Release 2009. This will result in different URLs, which will be posted on 1/11/2010

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Market Initiatives Update
Fall 2010 Release Project Update – Multi-Stage Generator (MSG) Milestones

Milestone	Multi-Stage Generator
Publish Final Draft Proposal	5/8/2009 (completed)
CAISO BOG Approval	5/18/2009 (completed)
Submit FERC Filing	March 2010
Publish Business Requirements	8/12/2009 (completed)
Publish Technical Specifications	12/15/2009 through 12/30/2009 (completed)
Publish BPM Drafts	June 2010
Begin Market Simulations	July 2010
Go-Live	10/1/2010

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Market Initiatives Update
Fall 2010 Release Project Update – MSG (continued)

MSG technical specifications are available at
http://www.caiso.com/2078/2078908392d0.html

- Automated Dispatch System (ADS)

- California ISO Market Results Interface (CMRI)

- Master File (MF)

- Scheduling and Logging for ISO California (SLIC)

- Scheduling Infrastructure and Business Rules (SIBR) 3.12 and Release Notes and web service specifications

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Market Initiatives Update
Early 2011 Release Milestones

Milestone	Convergence Bidding	Participating Load Refinements
Publish Final Draft Proposal	10/2/2009	N/A
ISO BOG Approval	Oct 29-30, 2009	N/A
Submit FERC Filing	Q1 2010	TBD
Publish Business Requirements	12/2/2009	Q1 2010
Publish Technical Specifications	Q1 2010	Q2 2010
Publish BPM Drafts	Q3 2010	Q3 2010
Begin Market Simulations	10/4/2010	10/4/2010
Go-Live	2/1/2011	2/1/2011

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Market Initiatives Update
Policy Initiatives

- The following is a list of policy initiatives with active Stakeholder processes that will require implementation efforts:

  - Price Corrections make whole payments
  - Information Release
    - Phase 1 - Transmission Constraint
    - Phase 2 - Convergence Bidding
    - Phase 3 – Price Discovery & Outage Information
  - E-Tagging Timing Requirement
  - Participation of Non-Generator Resources in California ISO Ancillary Services Markets
  - Insertion of Generated Bids for NRS-RA Resources
  - Standard Capacity Product – Phase 2
  - ISO Renewable Energy Transmission Planning Process (RETPP)

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Ex Post Price Correction Make-Whole Payments for Accepted Demand Bids Policy Initiative Recap

- **Policy Initiative Recap**

  Ex post price corrections have led to instances in which demand bids that were cleared in the market are no longer economic when evaluated against the corrected price. This can affect bids for internal ISO demand or exports in the integrated forward market, as well as export demand in the hour-ahead scheduling process. Through a policy initiative, the ISO developed a "make-whole" payment mechanism to compensate market participants for adverse financial impacts in cases when prices are corrected in a way that is not consistent with their accepted demand bids.

- **Presentation sheet for the final approach**

  http://www.caiso.com/248b/248bf10e16eb0.pdf

- **Original Issue Paper and Straw Proposal**

  http://www.caiso.com/2455/2455c0b571d80.pdf

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Ex Post Price Correction Make-Whole Payments for Accepted Demand Bids Policy Initiative Recap

- **Recap of the Policy Initiative**

  make-whole payment = area between bid curve and the corrected price
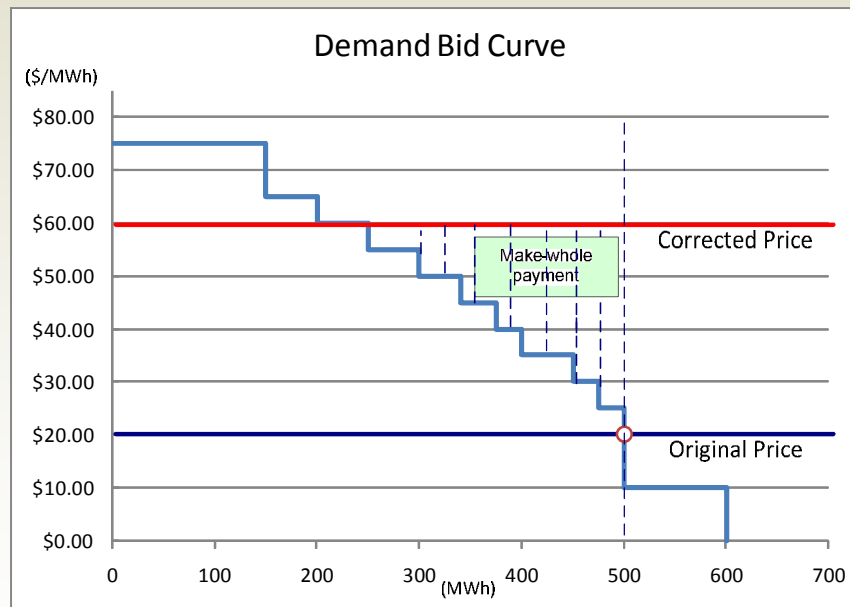
Ex Post Price Correction Make-Whole Payments for Accepted Demand Bids Implementation Proposal

- For the impacted resources (load or export), markets (day-ahead or HASP and corrected trade day/hour, CAISO will calculate "adjusted" resource level LMP prices based on the ex-post LMP and the make whole payment;

  -- When there is no make whole payment, the would-be resource level LMP will be the same as the ex-post LMP

- Settlement will use the "adjusted" resource level LMP to calculate the payment or charge in charge codes 6011 for DA energy and 6051 for HASP energy. There will be no changes to either 6011 or 6051. The make whole payment amount is already incorporated into the LMP prices;

- CMRI will report the "adjusted" resource level LMPs the same way;

- OASIS will report the ex-post Pnode/Apnode LMP the same way;

- In the case of a price-correction affecting an awarded load or export, Market Participants can use the existing reported data to shadow CAISO's calculation of the make whole payment and verify the "adjusted" resource level LMP

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Ex Post Price Correction Make-Whole Payments for Accepted Demand Bids Implementation Proposal

- Following is a step by step illustration of the calculation for would-be resource level LMP. Relevant data sources for the purpose of shadow settlement are also given.

- The calculation methodology is different between Load (DAM only) and Export resources. Since there is not expected energy allocation for load resources, the calculation has to rely on the original bid curve and the schedule MW. For export resources, the calculation will rely on existing expected energy and expected energy allocation which makes it quite simpler.

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Ex Post Price Correction Make-Whole Payments for Accepted Demand Bids LMP calculation Steps for Load Resources – Day Ahead Market

- Input Data:

  Applicable Resources / Market / Trade day/hour: For the Load Resources, in Day-ahead within the trade days/ trade hours with an ex-post DA LMP correction;

  (SIBR) Day-ahead Energy Bid Curves for the identified load resources, trade days/hours (hourly);

  (CMRI) Final day-ahead energy schedule MW for identified load resources, trade days/hours (hourly);

  (OASIS) Ex-post Day-ahead LMP including its three components for Apnodes (hourly) – Need a derivation back to the load resource level

- Output Data:

  (CMRI) "Adjusted" Day-ahead resource level LMP with its three components

Ex Post Price Correction Make-Whole Payments for Accepted Demand Bids LMP calculation Steps for Load Resources – Day Ahead Market

- Algorithmic Steps:

- Example,

Bid Curve: (0,100MW),$100; (100,150),$80; (150,200),$60; (200,300), $50

Ex-post PNode LMP: $85/MWH with energy component being 70, congestion component being 13 and loss component being 2.

Final Energy Schedule MW: 180

 NOTE: Ex-post Pnode LMP is the post correction LMP at the relevent Pnode.

Per identified resource and trade day/hour,

Step 1: Identify the bid segments that meet both of the following conditions,

Ex-post PNode LMP price is greater than bid segment price;

Final energy schedule MW is greater than the lower end of the bid segment MW range.

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Ex Post Price Correction Make-Whole Payments for Accepted Demand Bids LMP calculation Steps for Load Resources – Day Ahead Market

In the given example, the resulting bid segments from step 1 are,

(100, 150), $80; (150, 200), $60;

 Continue to Step 2 if any bid segment is found meeting the conditions. Otherwise, exit for this resource and trade day/hour.

Step 2: For each bid segment identified in Step 1, calculate the make whole payment $ amount as it follows,

Make Whole Payment $ = Max(0, (Min(higher end of bid segment, final schedule MW) – lower end of the bid segment) * (Ex-post LMP – bid price))

In the given example, segment (100, 150), $80 meets this condition.

Make Whole Payment $ = (150 – 100) * (85 – 80) = $250

segment (150, 200), $60 also meets this condition.

Make Whole Payment $ = Max(0, (180 – 150) * (85 – 60)) = $750

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Ex Post Price Correction Make-Whole Payment is for Accepted Demand Bids
LMP calculation Steps for Load Resources – Day Ahead Market

Step 3: Sum up all the individual make whole payments from in step 2;

In the given example, the total make whole payment = 250 + 750 = $1000

Step 4: Calculate the "adjusted" resource level LMP price as it follows,

"adjusted" resource level LMP =

((Ex-post LMP * Final Schedule MW) - Make Whole Payment) / Final Schedule MW

In the given example,

"Adjusted" resource level LMP = ((85 * 180) - 1000) / 180 = 79.44444…

Step 5: Adjust the congestion component accordingly to ensure that the three components matches the "adjusted" LMP price from step 4.

In the given example, the "adjusted" resource level LMP will be 79.4444… with energy component being 70, congestion component being 7.4444… and loss component being 2.

Ex Post Price Correction Make-Whole Payments for Accepted Demand Bids LMP calculation Steps for Export Resources – DA or HASP

- Input Data:

  Applicable Resources / Market / Trade day/hour: For the Export Resources, in Day-ahead (DA) or HASP within the trade days/ trade hours with an ex-post DA or HASP LMP correction;

  (CMRI) Expected energy and energy allocation results for the identified export resources and trade days/hours and markets (5-minute interval);

  If identified market is day-ahead, use day-ahead scheduled energy ("DASE");

  If identified market is HASP, use hourly-ahead scheduled energy ("HASE").

  (OASIS) Ex-post DA/HASP LMP including its three components for Pnode – Tie Point (hourly) – Need a derivation back to the export resource level

- Output Data:

  (CMRI) "Adjusted" DA/HASP resource level LMP with its three components

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Ex Post Price Correction Make-Whole Payments for Accepted Demand Bids LMP calculation Steps for Export Resources – DA or HASP

- Algorithmic Steps:

- Example,

  Assuming the identified market is HASP.

  Expect energy: for all the 12 intervals within the identified hour, we have the

  HASE energy amount is -15mwh

  Expected energy allocation: for all the 12 intervals within the identified hour, we have the HASE allocation with bid prices as it follows,

  (-10, $60), (-5, $80)

  Ex-post Pnode HASP LMP: $50/MWH with energy component being 45, congestion component being 4 and loss component being 1.

  NOTE: Ex-post Pnode LMP is the post correction LMP at the relevent Pnode

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Ex Post Price Correction Make-Whole Payments for Accepted Demand Bids LMP calculation Steps for Export Resources – DA or HASP

Per identified resource, market, trade day/hour,

- **Step 1**: Calculate the total bid cost associated with the energy allocation

  Total Bid Cost = (-1) * Sum(energy MWH * bid price for all segments and all 12 intervals)

  In the given example, the resulting bid segments from step 1 are,

  Total bid cost = (-1) * ((-10 * 60) + (-5 * 80)) * 12 = $12000

  Step 2: Calculate the total revenue as it follows,

  Total Revenue = (-1) * Sum(energy MWH * LMP price for all segments and all 12 intervals)

  In the given example, the total revenue = (-1) * (-15 * 50) * 12 = $9000

  Step 3: Calculate the make whole payment amount as it follows,

  Make whole payment = Max(0, Total bid cost – Total Revenue)

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In the given example, the total revenue = Max(0, 12000 – 9000) = 3000

Step 4: Calculate the would-be resource level LMP price

"Adjusted" resource level LMP =

(-1) * (Total Revenue + Make Whole Payment) / Total HASE for that hour
and resource

In the given example,

Would-be resource level LMP = (-1) * (9000 + 3000) / (-15 * 12) =
$66.6666…

Step 5: Adjust the congestion component accordingly to ensure that the
three components match the "Adjusted" LMP price from step 4.

In the given example, the "Adjusted" resource level LMP will be $66.6666…
with energy component being 45, congestion component being $20.6666…
and loss component being $1.

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Ex Post Price Correction Make-Whole Payments for Accepted Demand Bids
Questions and Answers

QUESTIONS???

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PDR Project Update

Glen Perez

Jill Powers

Meghna Khatri

Ivan Loh

Eric Hildebrandt

Tom Cuccia

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PDR Project Update
Agenda

- PDR Walkthrough Activity

    - Registration

    - Post Market Settlement

- PDR Impacted Charge Codes

- BPM Impacts

- Technical Update

- Impact of PDR on LMPM Additional Information

- Market Readiness Activities

- Meeting Summary

Proxy Demand Resource (PDR)
PDR Walkthrough Activity – Registration

- **PDR Resource ID Registration:**

  - A DRP will be assigned a PDR Resource ID for market activities based on the registration process. The assignment will be based on:

    - Underlying end use customers are represented by the same Load Serving Entity (Energy Service Provider)

    - Underlying end use customers must be located in the same SUBLAP (within a DLAP)

  - The use of Registrations will allow for the flexibility to have a seamless change in adding or subtracting the underlying end use customers and not having to create a new PDR Resource ID.

Proxy Demand Resource (PDR)
PDR Walkthrough Activity – Registration (continued)

- Two types of PDR Resource IDs

  - Pre-defined (associated to the SUBLAP)

  - Custom (associated to the SUBLAP with additional information on the location of the load by bus)

- Registrations and PDR Resource IDs relationships

  - For 5/1/10 implementation, Both Pre-defined and Custom Resource IDs will have a 1:1 relationship with a current registration

  - The CAISO is planning to phase in the establishment of business rules which will provide for the capability of a PDR Resource ID to have a 1:many relationship with current registrations.

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Proxy Demand Resource (PDR)
PDR Walkthrough Activity – Registration (continued)

Benefits for phasing in the business rules for capability of a PDR Resource ID having 1:many relationship with current registrations.

- Ease of auditing GDFs for custom PDRs
- Simplicity of approvals when adding/dropping customers, allowing some Registrations to remain stable while new customers are added to a separate Registration
- Facilitate multi-LSE PDR Resource IDs
- Facilitate multiple baseline types in a single PDR Resource ID

Proxy Demand Resource (PDR)
PDR Walkthrough Activity – Registration (continued)

Example of the use of Registrations for a PDR Resource ID:

- PDR Resource id PGEB_1_PDRC01 has two registrations in the system:

    - Registration 1 has effective dates of 4/1/09 -5/31/09. It contains 10 end use customers.

    - Registration 2 has effective dates 6/1/09-9/30/09. It contains 12 end use customers. The same 10 as Registration 1 plus 2 more end use customers.

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Proxy Demand Resource (PDR)
PDR Walkthrough Activity – Registration (continued)

Demand Response System (DRS) Matrix of Roles and Functions Draft as of 12/23/2009		
Entity	**Context**	**PDR Registrations User Interface (Only)**
DRP	Objects created by the DRP	Create, Update, View, Review, Approve, Cancel
DRP's SC	Objects associated to PDRs managed by the SC	View, Download
UDC	Objects associated with the UDC	Review, Approve, Reject
LSE	Objects associated with the LSE	Review, Approve, Reject
LSE's SC	Objects associated to Load Resources managed by the SC	View, Download
ISO	All Objects	Review, Approve, Reject
Note: Upload, View, Download, Review, Approve, Reject, Cancel features only available via UI.		

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Proxy Demand Resource (PDR)
PDR Walkthrough Activity – Post Market Settlement

Meter Data Submittal Requirements for Registration

- Historic meter data needs to be provided for 45 days prior to the registration effective date so a proper baseline can be calculated.

Example: PDR Resource id PGEB_1_PDRC01

- Registration 1 has effective dates of 4/1/09 -5/31/09
  - Hourly SQMD of PDR underlying load for Trade Dates 2/15/09 through 3/31/09 must be submitted to Reg1
  - Beginning with TD 4/1/09 or prior, follow daily meter data submittal requirements for PDR until TD 5/31/09 to Reg1

- Registration 2 has effective dates 6/1/09-9/30/09
  - Hourly SQMD of PDR underlying load for Trade Dates 4/17/09 through 5/31/09 must be submitted to Reg2
  - Beginning with TD 6/1/09 or prior, follow daily meter data submittal requirements for PDR until TD 9/30/09 to Reg2

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Proxy Demand Resource (PDR)
PDR Walkthrough Activity – Post Market Settlement (continued)

Daily Meter Data Submittal Requirements

- Load SQMD must be submitted into the DRS for the PDR resource id to the effective registration on a daily basis following meter data submittal timelines.

- Daily meter data submittal will be hourly

- ADDITIONALLY, daily meter data submittal Intervals of five (5) minutes is required for all hours in which the PDR is awarded ancillary services (AS), has been dispatched for AS or dispatched for RT imbalance energy

- Submitted via DRS user interface or via API in XSD format

- PDR API documents are located at http://www.caiso.com/23bc/23bc873456980.html

- Location includes a Draft PDR Meter Data XSD and Technical Interface Specifications for PDR Exchange Services with example of payloads

    - **registrationId** used to ensure load data submittal is applied to appropriate registration

    - **intervalLength** allows for submittal of hourly and 5 minute data

    - **measurementType** = LOAD

    - **unit** = MWH

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Proxy Demand Resource (PDR)
PDR Walkthrough Activity – Post Market Settlement (continued)

Daily Meter Data Submittal Requirements (continued)

- Example: PDR Resource id PGEB_1_PDRC01

- Assumptions:

  - PDR receives DA awards trade dates 4/26/09, 4/27/09, 5/1/09

  - PDR receives only one RT imbalance energy dispatch for HE 14 on 5/1/09

- Daily meter data submittals to Demand Response System (DRS)

  - **To Registration 1**

    – Hourly SQMD of PDR underlying load for Trade Dates 4/1/09 -5/31/09

    – Five (5) minute interval meter data TD 5/1/09 for HE 14

  - **To Registration 2**

    – Hourly SQMD of PDR underlying load beginning TD 6/1/09 to 9/30/09

Proxy Demand Resource (PDR)
PDR Walkthrough Activity – Post Market Settlement (continued)

Meter Data Submittal File Format Example (XSD)

- Example: PDR Resource id PGEB_1_PDRC01 (continued)

Assumptions: For trade date 5/1/09 PDR receives DA awards HE3,7,14 and a RT dispatch in HE14

- The following is a "high level" interpretation of the payload structure in order to represent meter data submittal to the Demand Response System (DRS) for this example:

  - **resId**=PGEB_1_PDRC01
  - **registrationId**=REGISTRATION_1
  - **intervalLength**=60
  - **measurementType**=LOAD
    [Provide 24 hours of data for Fri May 01 beginning 01:00:00 to 24:00:00 PDT 2009]
  - **registrationId**=REGISTRATION_1
  - **intervalLength**=5
  - **measurementType**=LOAD
    [Provide 5 minute interval data beginning with Fri May 01 13:00:00 to 13:55:00 PDT 2009]

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Proxy Demand Resource (PDR)
PDR Walkthrough Activity – Post Market Settlement (continued)

Meter Data Retrieval File Format Example (XSD)

- Example: PDR Resource id PGEB_1_PDRC01 (continued)

- The following is a "high level" interpretation of the payload structure in order to represent PDR generation measurement retrieval from the Demand Response System (DRS)

- Assumptions: For trade date 5/1/09 PDR receives DA awards HE3,7,14 and a RT dispatch in HE14

  - **resId**=PGEB_1_PDRC01
  - **registrationId**=REGISTRATION_1
  - **intervalLength**=60
  - **measurementType**=GEN

        [Fri May 01 02:00:00 PDT 2009,0.00000]
        [Fri May 01 06:00:00 PDT 2009,0.00000]
        [Fri May 01 13:00:00 PDT 2009,0.95000]

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Proxy Demand Resource (PDR)
PDR Walkthrough Activity – Post Market Settlement (continued)

Baseline Calculation

Example: PDR Resource id PGEB_1_PDRC01 with following assumptions

- DA awards for Trade Dates 4/26/09 and 4/27/09 HE14

- DA award and RT Dispatch occurs in HE14 for TD 5/1/09

- No other event hours for 5/1/09

- Data used for calculating the Raw Baseline$_{reh}$= (1 / (d) * $\sum_d$ Load$_{rdh}$

Date	Type	Event	HE14
4/15/2009	WD	N	15.00
4/16/2009	WD	N	15.75
4/17/2009	WE	N	10.50
4/18/2009	WE	N	9.50
4/19/2009	WD	N	13.75
4/20/2009	WD	N	14.00
4/21/2009	WD	N	14.75
4/22/2009	WD	N	14.00
4/23/2009	WD	N	13.75
4/24/2009	WE	N	6.00
4/25/2009	WE	N	15.75
4/26/2009	WD	Y	14.80
4/27/2009	WD	Y	15.50
4/28/2009	WD	N	14.00
4/29/2009	WD	N	14.00
4/30/2009	WD	N	13.80

Date	MWH	Selection
4/15/2009	15.00	10
4/16/2009	15.75	9
4/19/2009	13.75	8
4/20/2009	14.00	7
4/21/2009	14.75	6
4/22/2009	14.00	5
4/23/2009	13.75	4
4/28/2009	14.00	3
4/29/2009	14.00	2
4/30/2009	13.80	1
10 Day Avg (Raw Baseline)	14.28	

Selection Criteria	Type=WD
	Event=N
Where	WD = Week Day
	WE = Week End
	Event = Y if DA schedule, RT/AS dispatch, or Outage

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Proxy Demand Resource (PDR)
PDR Walkthrough Activity – Post Market Settlement (continued)

PDR Performance Measurement

- Example: PDR Resource id PGEB_1_PDRC01 (continued)

- Assumptions:
  - DA award and RT Dispatch occurs in HE14 for TD 5/1/09
  - Real time adjustment not applicable since RT dispatch was not during the event hour
  - No other event hours for 5/1/09
  - HE 14 SQMD submitted for PDR Registration 1 underlying load = 11.90 MWH
  - Load Point Adjustment = *Morning Baseline Adjustment* = .90

Raw Baseline		Load Point Adjustment		Baseline		Metered Load		PDR Generation Measurement
14.28	x	0.90	=	12.85	-	11.90	=	0.95 MWH

Proxy Demand Resource (PDR)
PDR Walkthrough Activity – Post Market Settlement (continued)

Default Load Adjustment (DLA)

- Example: PDR Resource id PGEB_1_PDRC01 (continued)

- Assumptions:

  - Four PDR resources have event on TD 5/1/09 HE14

Effective Date	Registration	Resource	DRP	DRP's SC	LSE's SC	LSE Load Resource ID	Metered Load	10 day Avg Load	Morning Adjustment	Baseline	PDR Gen
4/1/09 - 5/31/09	Reg1	PGEB_1_PDRC01	DRP1	SC1	SC5	DLAP_PGAE_SC5	11.90	14.28	0.90	12.85	0.95
6/1/09 - 9/30/09	Reg2	PGEB_1_PDRC01	DRP1	SC1	SC5	DLAP_PGAE_SC5	n/a	n/a	n/a	n/a	n/a
5/1/09 - 5/1/2020	Reg5	PRMN_6_PDRC01	DRP2	SC1	SC9	DLAP_PGAE_SC9	9.00	10.80	0.94	10.15	1.15
4/1/09 - 9/1/09	Reg11	AMRG_1_PDRC01	DRP3	SC2	SC5	DLAP_PGAE_SC5	9.00	10.80	1.00	10.80	1.80
3/1/2009-3/1/2020	Reg13	ROSE_6_PDRC01	DRP3	SC3	SC2	DLAP_SCE1_SC2	7.00	8.40	1.02	8.57	1.57

Therefore, a DLA is calculated for 3 separate LSE's for PDR Generation in their DLAP

Default Load Adjustment (DLA)	
DLAP_PGAE_SC5	.95 + 1.80 = 2.75
DLAP_PGAE_SC9	1.15
DLAP_SCE1_SC2	1.57

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Proxy Demand Resource (PDR)
PDR Walkthrough Activity –Post Market Settlement (continued)

Demand Response System (DRS) Matrix of Roles and Functions Draft as of 12/23/2009						
Entity	**Context**	**Data Element**				
		PDR Underlying Load (Hourly/Five minute SQMD)	**Baseline (MWH)**	**PDR Generation Measurement (MWH)**	**Default Load Adjustment (MWH)**	**PDR No Pay Dispatch Performance Meter Before/After in 5 minute intervals (MWH)**
		By Registration IDs	*By Registration IDs*	*By Resource ID & Registration IDs*	*By DLAP resource ID*	*By PDR Resource ID*
		User Interface, API	User Interface (Only)	User Interface, API	User Interface (Only)	User Interface (Only)
DRP	Objects created by the DRP	Retrieve, View, Download	View, Download	Retrieve, View, Download	View, Download	View Download
DRP's SC	Objects associated to PDRs managed by the SC	Submit, Retrieve, View, Upload, Download	View, Download	Retrieve, View, Download	View, Download	View, Download
LSE's SC	Objects associated to Load Resources managed by the SC	Retrieve, View, Download	View, Download	Retrieve, View, Download	View, Download	View, Download
ISO	All Objects	Retrieve, View, Download	View, Download	Retrieve, View, Download	View, Download	View, Download
Note: Upload, View, Download, features only available via UI. Retrieve and Submit features only available via API.						

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Proxy Demand Resource (PDR)
PDR Walkthrough Activity – Post Market Settlement (continued)

Settlement

- Example: PDR Resource id PGEB_1_PDRC01 (continued)
- Assumptions: LSE

Effective Date	Registration	Resource	DRP	DRP's SC	LSE's SC	LSE Load Resource ID	Metered Load	10 day Avg Load	Morning Adjustment	Baseline	PDR Gen
4/1/09 - 5/31/09	Reg1	PGEB_1_PDRC01	DRP1	SC1	SC5	DLAP_PGAE_SC5	11.90	14.28	0.90	12.85	0.95
6/1/09 - 9/30/09	Reg2	PGEB_1_PDRC01	DRP1	SC1	SC5	DLAP_PGAE_SC5	n/a	n/a	n/a	n/a	n/a
5/1/09 - 5/1/2020	Reg5	PRMN_6_PDRC01	DRP2	SC1	SC9	DLAP_PGAE_SC9	9.00	10.80	0.94	10.15	1.15
4/1/09 - 9/1/09	Reg11	AMRG_1_PDRC01	DRP3	SC2	SC5	DLAP_PGAE_SC5	9.00	10.80	1.00	10.80	1.80
3/1/2009-3/1/2020	Reg13	ROSE_6_PDRC01	DRP3	SC3	SC2	DLAP_SCE1_SC2	7.00	8.40	1.02	8.57	1.57

Default Load Adjustment (DLA)	
DLAP_PGAE_SC5	2.75
DLAP_PGAE_SC9	1.15
DLAP_SCE1_SC2	1.57

LSE

LSE's SC	LSE Load Resource ID	DA Schedule	Metered Load	DLA	Adjusted Meter	UIE
SC5	DLAP_PGAE_SC5	120	100	2.75	102.75	-17.25
SC9	DLAP_PGAE_SC9	100	150	1.15	151.15	51.15
SC2	DLAP_SCE1_SC2	110	125	1.57	126.57	16.57

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Proxy Demand Resource (PDR)
PDR Walkthrough Activity – Post Market Settlement (continued)

PDR Settlement Examples

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Effective Date	Registration	Resource	DRP	DRP's SC	LSE's SC	LSE Load Resource	Metered Load	10 day Avg Load	Morning	Baseline	PDR Gen
4/1/09 - 5/31/09	Reg1	PGEB_1_PDRC01	DRP1	SC1	SC5	DLAP_PGAE_SC5	11.90	14.28	0.90	12.85	0.95
6/1/09 - 9/30/09	Reg2	PGEB_1_PDRC01	DRP1	SC1	SC5	DLAP_PGAE_SC5	12.90	15.48	0.91	14.09	1.19
5/1/09 - 5/1/2020	Reg5	PRMN_6_PDRC01	DRP2	SC1	SC9	DLAP_PGAE_SC9	9.00	10.80	0.94	10.15	1.15
4/1/09 - 9/1/09	Reg11	AMRG_1_PDRC01	DRP3	SC2	SC5	DLAP_PGAE_SC5	9.00	10.80	1.00	10.80	1.80
3/1/2009-3/1/2020	Reg13	ROSE_6_PDRC01	DRP3	SC3	SC2	DLAP_SCE1_SC2	7.00	8.40	1.02	8.57	1.57

DLA	
DLAP_PGAE_SC5	2.75
DLAP_PGAE_SC9	1.15
DLAP_SCE1_SC2	1.57

Scenario 1 - Positive Deviation
LSE

LSE's SC	LSE Load Resource ID	DA Schedule	Metered Load	DLA	Adjusted Meter	UIE
SC5	DLAP_PGAE_SC5	120	100	2.75	102.75	17.25
SC9	DLAP_PGAE_SC9	100	150	1.15	151.15	-51.15
SC2	DLAP_SCE1_SC2	110	125	1.57	126.57	-16.57

Settlement interval

LSE's SC	LSE Load Resource ID	Trade_Date	HE	Interval	DA Schedule	Price	Amount	CC
SC5	DLAP_PGAE_SC5	5/1/2009	14	0	120	$ 80.00	$ (9,600.00)	6011

LSE's SC	LSE Load Resource ID	Trade_Date	HE	Interval	DA Schedule	Metered Load	DLA	Adjusted Meter	UIE	Price	Amount	CC
SC5	DLAP_PGAE_SC5	5/1/2009	14	1	20	16.66666667	0.458333333	17.125	2.875	$ 50.00	$ (143.75)	6475
SC5	DLAP_PGAE_SC5	5/1/2009	14	2	20	16.66666667	0.458333333	17.125	2.875	$ 50.00	$ (143.75)	6475
SC5	DLAP_PGAE_SC5	5/1/2009	14	3	20	16.66666667	0.458333333	17.125	2.875	$ 50.00	$ (143.75)	6475
SC5	DLAP_PGAE_SC5	5/1/2009	14	4	20	16.66666667	0.458333333	17.125	2.875	$ 50.00	$ (143.75)	6475
SC5	DLAP_PGAE_SC5	5/1/2009	14	5	20	16.66666667	0.458333333	17.125	2.875	$ 50.00	$ (143.75)	6475
SC5	DLAP_PGAE_SC5	5/1/2009	14	6	20	16.66666667	0.458333333	17.125	2.875	$ 50.00	$ (143.75)	6475
					120	100	2.75	102.75	17.25	$ 50.00	$ (862.50)	

Scenario 2 - Negative Deviation

LSE's SC	LSE Load Resource ID	Trade_Date	HE	Interval	DA Schedule	Price	Amount	CC
SC9	DLAP_PGAE_SC9	5/1/2009	14	0	100	$ 80.00	$ (8,000.00)	6011

LSE's SC	LSE Load Resource ID	Trade_Date	HE	Interval	DA Schedule	Metered Load	DLA	Adjusted Meter	UIE	Price	Amount	CC
SC9	DLAP_PGAE_SC9	5/1/2009	14	1	16.66666667	25	0.191666667	25.19166667	-8.525	$ 50.00	$ 426.25	6475
SC9	DLAP_PGAE_SC9	5/1/2009	14	2	16.66666667	25	0.191666667	25.19166667	-8.525	$ 50.00	$ 426.25	6475
SC9	DLAP_PGAE_SC9	5/1/2009	14	3	16.66666667	25	0.191666667	25.19166667	-8.525	$ 50.00	$ 426.25	6475
SC9	DLAP_PGAE_SC9	5/1/2009	14	4	16.66666667	25	0.191666667	25.19166667	-8.525	$ 50.00	$ 426.25	6475
SC9	DLAP_PGAE_SC9	5/1/2009	14	5	16.66666667	25	0.191666667	25.19166667	-8.525	$ 50.00	$ 426.25	6475
SC9	DLAP_PGAE_SC9	5/1/2009	14	6	16.66666667	25	0.191666667	25.19166667	-8.525	$ 50.00	$ 426.25	6475
					100	150	1.15	151.15	-51.15	$ 50.00	$ 2,557.50	

PDR

PDR's SC	PDR Resource ID	Trade_Date	HE	Interval	Cleared PDR in DA	Price	Amount	CC
SC1	PGEB_1_PDRC01	5/1/2009	14	0	3	80	$ (240.00)	6011

PDR's SC	PDR Resource ID	Trade_Date	HE	Interval	RT Dispatch	Price	Amount	CC
SC1	PGEB_1_PDRC01	5/1/2009	14	1	0.16667	55	$ (9.17)	6470
SC1	PGEB_1_PDRC01	5/1/2009	14	2	0.16667	55	$ (9.17)	6470
SC1	PGEB_1_PDRC01	5/1/2009	14	3	0.16667	55	$ (9.17)	6470
SC1	PGEB_1_PDRC01	5/1/2009	14	4	0.16667	55	$ (9.17)	6470
SC1	PGEB_1_PDRC01	5/1/2009	14	5	0.16667	55	$ (9.17)	6470
SC1	PGEB_1_PDRC01	5/1/2009	14	6	0.16667	55	$ (9.17)	6470
					1	55	$ (55.00)	

PDR's SC	PDR Resource ID	Trade_Date	HE	Interval	UIE	Price	Amount	CC
SC1	PGEB_1_PDRC01	5/1/2009	14	1	0.50833	50	$ 25.42	6475
SC1	PGEB_1_PDRC01	5/1/2009	14	2	0.50833	50	$ 25.42	6475
SC1	PGEB_1_PDRC01	5/1/2009	14	3	0.50833	50	$ 25.42	6475
SC1	PGEB_1_PDRC01	5/1/2009	14	4	0.50833	50	$ 25.42	6475
SC1	PGEB_1_PDRC01	5/1/2009	14	5	0.50833	50	$ 25.42	6475
SC1	PGEB_1_PDRC01	5/1/2009	14	6	0.50833	50	$ 25.42	6475
					3.05	50	$ 152.50	

UIE = DA+RT-PDR Gen
UIE = 3+1-.95 = 3.05

Proxy Demand Resource (PDR)
PDR Walkthrough Activity – Post Market Settlement (continued)

- **PDR Settlement Example: PGEB_1_PDRCO1**

PDR Settlement	PGEB_1_PDRC01							
CHARGE CODE	**DESCRIPTION**	**CAISO Formula (simplied for use in example)**	**BQ**	**PRICE**	**STLMT_AMT**	**CHARGE GRANULARITY**	**MRTU TARIFF SEC.**	**CAISO BPM for Settlements and Billing: Attachment E Parent Group/Configuration Guide Name/Charge Code**
			MW	$	$			
CC 6011	Day Ahead Energy, Congestion & Loss Stlmt	Net Hourly DA Energy Amount =(-1)* (IFM award * DA LMP)	3	80	(240.00)	Hourly	11.2	DA Energy-Congestion-Losses Day Ahead Energy, Congestion, Loss Statement CC 6011
CC 6470	Real Time Instructed Imbalance Energy Settlement	RealTimeInstructedImbalanceEnergySettlementAmount = (-1) * IIE Qantity * SettlementIntervalRealTimeLMP	1	55	(55.00)	10min	11.5.1	Real Time Instructed Imbalance Energy Settlement CC 6470
CC 6475	Real Time Uninstructed Imbalance Energy Settlement	RealTimeUninstructedImbalanceEnergySettlementAmount = (-1)*((UIE1 QTY * ResourceSpecificTier1UIEPrice + UIE2 QTY * DispatchIntervalLMP))	3.05	50	152.50	10min	11.5.2	Real Time Uninstructed Imbalance Energy Settlement CC 6475

Proxy Demand Resource (PDR)
PDR Walkthrough Activity – Post Market Settlement (continued)

- LSE Settlement Example: DLAP_PGAE_SC5

LSE Settlement	DLAP_PGAE_SC5							
CHARGE CODE	DESCRIPTION	CAISO Formula (simplied for use in example)	BQ	PRICE	STLMT_AMT	CHARGE GRANULARITY	MRTU TARIFF SEC.	CAISO BPM for Settlements and Billing: Attachment E Parent Group/Configuration Guide Name/Charge Code
			MW	$	$			
CC 6011	Day Ahead Energy, Congestion & Loss Stlmt	Net Hourly DA Energy Amount =(-1)* (IFM award * DA LMP)	120	80	(9,600.00)	Hourly	11.2	DA Energy-Congestion-Losses Day Ahead Energy, Congestion, Loss Statement CC 6011
CC 6475	Real Time Uninstructed Imbalance Energy Settlement	RealTimeUninstructedImbalanceEnergySettlementAmount = (-1)*((MeterLoad + DLA) - DA schedule * HourlyRealTimeLAPPrice))	-17.3	50	(862.50)	10min	11.5.2	Real Time Uninstructed Imbalance Energy Settlement CC 6475

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Proxy Demand Resource (PDR)
PDR Walkthrough Activity – Post Market Settlement (continued)

- **LSE Settlement Example: DLAP_PGAE_SC9**

LSE Settlement	DLAP_PGAE_SC9							

CHARGE CODE	DESCRIPTION	CAISO Formula (simplied for use in example)	BQ MW	PRICE $	STLMT_AMT $	CHARGE GRANULARITY	MRTU TARIFF SEC.	CAISO BPM for Settlements and Billing: Attachment E Parent Group/Configuration Guide Name/Charge Code
CC 6011	Day Ahead Energy, Congestion & Loss Stlmt	Net Hourly DA Energy Amount =(-1)* (IFM award * DA LMP)	100	80	(8,000.00)	Hourly	11.2	DA Energy-Congestion-Losses Day Ahead Energy, Congestion, Loss Statement CC 6011
CC 6475	Real Time Uninstructed Imbalance Energy Settlement	RealTimeUninstructedImbalanceEnergySettlementAmount = (-1)*((MeterLoad + DLA) - DA schedule * HourlyRealTimeLAPPrice))	51.15	50	2,557.50	10min	11.5.2	Real Time Uninstructed Imbalance Energy Settlement CC 6475

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Proxy Demand Resource (PDR)
Market Settlement – Settlements Impacted by PDR

- An Adjusted Meter quantity will be created

- A Default Load Adjustment (DLA) value will be added to the submitted LSE load meter, impacting

    - The Real-Time Energy Pre-Calc will be modified

    - CG CC 6806 Day Ahead Residual Unit Commitment (RUC) Tier 1 Allocation will be modified

- The table on the next slide shows the LSE related settlements that are impacted by adding the DLA

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Proxy Demand Resource (PDR)
Market Settlement – LSE Settlements Impacted by PDR

- The following charges will include the DLA value – but there are no changes to the underlying config guides

Charge Code Number	Charge Code Name	Billable Quantity
721	Intermittent Resources Net Deviation Allocation	Net Negative Uninstructed Deviations
752	Monthly Participating Intermittent Resources Export Energy /	Net Negative Uninstructed Deviations
1407	MSS Positive Deviation Penalty	Positive Deviation Qty
1487	Emergency Energy Exchange Program Neutrality Adjustment	Net negative uninstructed Energy
2407	MSS Negative Deviation Penalty	Negative Deviation Qty
4506	Energy Transmission Services - Net Uninstructed Deviations	Absolute value of Net Uninstructed Deviations
4536	Market Usage - Uninstructed Energy	absolute value of each Scheduling Coordinator's Net uninstructed deviations by Settlement Interval. The Billing Determinant for Market Usage Uninstructed Energy will be the absolute value of net portfolio deviations by Settlement Interval.
6475	Real Time Uninstructed Imbalance Energy Settlement	Stlmt Int RT UIE1 + RT UIE2
6486	Real Time Excess Cost for Instructed Energy Allocation	Min (0, UnitRealTimeUIE + AvailableUndispatchedBidQuantity)
6678	Real Time Bid Cost Recovery Allocation	Proportional to BA's Measured Demand Net Negative UIE for load following MSS.
6806	Day Ahead Residual Unit Commitment (RUC) Tier 1 Allocation	Net Negative Demand Deviations

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Proxy Demand Resource (PDR)
Market Settlement – Settlements Impacted by DRP

- The tables on the following slides present charge codes applicable to PDR in their function as a generator

- Changes to the following Pre-Calcs are required to implement PDR related generation functionality

  - CG PC MSS Netting
  - CG PC Spin and Non Spin No Pay Quantity
  - CG PC RUC No Pay Quantity

- No changes to equations for individual configuration guides related to the above No Pay

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Proxy Demand Resource (PDR)
Market Settlement – Charge Codes Applicable to DRP

- The following charges are applicable to DRPs as generators – no changes to the configuration guides

Charge Code Number	MRTU Charge Code Name	Billable Quantity
721	Intermittent Resources Net Deviation Allocation	Net Negative Uninstructed Deviations
752	Monthly Participating Intermittent Resources Export Energy Allocation	Net Negative Uninstructed Deviations
1487	Emergency Energy Exchange Program Neutrality Adjustment	Net negative uninstructed Energy
2999	Default Invoice Interest Payment	SC's share of total unpaid creditors for the Bill Period
3999	Default Invoice Interest Charge	Default Invoice Interest
4506	Energy Transmission Services - Net Uninstructed Deviations	Absolute value of Net Uninstructed Deviations
4511	Forward Scheduling - Non Inter-SC trade Schedules	All final hour schedules of load, export, Gen, Import, Awarded AS, and Awrded RUC
4534	Market Usage - Awarded AS	Absolute value of SC's purchases and sales of AS in all markets (IFM, HASP, RTM)

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Proxy Demand Resource (PDR)
Market Settlement – Charge Codes Applicable to DRP (continued)

- The following charges are applicable to DRPs as generators – no changes to the configuration guides

Charge Code Number	MRTU Charge Code Name	Billable Quantity
4535	Market Usage - Instructed Energy	Absolute value of SC's of Instructed Imbalance Energy by resource. The total Instructed Imbalance Energy quantity (MWh) is the sum of Standard Ramping Energy, HASP Scheduled Energy, Optimal Energy, Real-Time Minimum Load Energy, Regulation Energy, Ramping Energy Deviation, Derate Energy, Real-Time Self-Schedule Energy, Residual Imbalance Energy, and Exceptional Dispatch Energy, Real-Time Pumping Energy, and Operational Adjustments for the Day-Ahead and Real-Time.
4536	Market Usage - Uninstructed Energy	absolute value of each Scheduling Coordinator's Net uninstructed deviations by Settlement Interval. The Billing Determinant for Market Usage Uninstructed ergy will be the absolute value of net portfolio deviations by Settlement Interval.
4537	Market Usage - Forward Energy	The net Energy purchases and sales in the Day Ahead Market (DAM). This charge will settle based on the net energy for each Scheduling Coordinator by Trading Hour.

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Proxy Demand Resource (PDR)
Market Settlement – Charge Codes Applicable to DRP (continued)

■ The following charges are applicable to DRPs as generators – no changes to the configuration guides

Charge Code Number	MRTU Charge Code Name	Billable Quantity
4546	Energy Transmission Services/Market Usage - PIRP deviations	Absolute value of net uninstructed deviations
4575	SMCR -Settlements, Metering, and Client Relations	Assessed if there is any settlement charge activity within the month
5999	FERC Mandated Interest on Re-Runs	Net Amount of the original Invoice and the Re-run Invoice
6011	Day Ahead Energy, Congestion, Loss Settlement	Day-Ahead Energy schedule, including contract self-schedules; Congestion hedge for balanced contract quantity
6090	Ancillary Service Upward Neutrality Allocation	Prorata Postive Net Upward AS Obligation
6200	Day Ahead Non-Spinning Reserve Capacity Settlement	Awarded Non-Spinning reserve capacity in the Day Ahead market
6224	No Pay Non-Spinning Reserve Settlement	No Pay quantity
6270	Real Time Non-Spinning Reserve Capacity Settlement	Awarded Non-Spinning reserve capacity in the Real-Time market
6301	Day Ahead Inter-SC Trades Settlement (exclude PHY)	DA Inter-Sc Trade Qty
6351	HASP Inter-SC Trades Settlement (exclude PHY)	HASP Inter-ScTrade Qty

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Proxy Demand Resource (PDR)
Market Settlement – Charge Codes Applicable to DRP (continued)

- The following charges are applicable to DRPs as generators – no changes to the configuration guides

Charge Code Number	MRTU Charge Code Name	Billable Quantity
6470	Real Time Instructed Imbalance Energy Settlement	IIE QTY
6475	Real Time Uninstructed Imbalance Energy Settlement	Stlmt Int RT UIE1 + RT UIE2
6486	Real Time Excess Cost for Instructed Energy Allocation	Min (0, UnitRealTimeUIE + AvailableUndispatchedBidQuantity)
6620	Bid Cost Recovery Settlement	Max(0, Sum of IFM Net Amt + Sum of RUC Net Amt + Sum of RTM Net Amt)*(-1)
6636	IFM Bid Cost Recovery Tier 1 Allocation	Proportional IFM Load Uplift Obligation
6800	Day Ahead Residual Unit Commitment (RUC) Availability Settlement	RUC Award
6824	No Pay Residual Unit Commitment (RUC) Settlement	Amt of unavailable capacity

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Proxy Demand Resource (PDR)
BPM Update

- **Business Practice Manual Impacts**

Ref#	BPM	Expected Impact
		PDR
1	Managing Full Network Model	Medium
2	Congestion Revenue Rights	None
3	Market Instruments	Low
4	Outage Management	Low
5	Reliability Requirement	None
6	Market Operations	Low
7	Compliance Monitoring	Low
8	Metering	Medium
9	Scheduling Coordinator Certification & Termination	Low
10	Rules of Conduct Administration	None
11	BPM Change Management	None
12	Definitions & Acronyms	Low
13	Settlements & Billing	Medium
14	Credit Management	None
15	Candidate CRR Holder	None
16	Transmission Planning Process	None

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Proxy Demand Resource (PDR)
Market Settlement – BPM Impacts

- The following is the list of BPMs that will be potentially updated based on Settlement Configuration Guide updates:

  - CG PC Real Time Energy Quantity
  - CG PC MSS Netting
  - CG CC 6806 Day Ahead Residual Unit Commitment (RUC) Tier 1 Allocation
  - CG PC Spin and Non Spin No Pay Quantity
  - CG PC RUC No Pay Quantity

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Proxy Demand Resource (PDR)
Technical Update

- APIs available with the DR System:

    - Participants uploading meter data to CAISO

    - Participants downloading meter data from CAISO

    - Participants downloading performance results from CAISO

- DR System will be accessible via the CAISO portal

- Final version of the PDR technical specifications will be posted on 1/15/2010 - draft is currently available

- DR System Security update

    - On 3/1 full access will be granted to all DR System users participating in the PDR market simulation

    - We will introduce AARF changes, submittal and role based access to the PDR System at some point during the simulation

    - If you haven't provided your list of users for participation in market simulation, please do so by 1/25/2010

- Additional questions? If you have other technical questions, please submit them to PDR@caiso.com

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Proxy Demand Resource (PDR)
Impact of PDR on LMPM

- Comments received from 3 participants:

    - Energy Connect /Rosero Consulting oppose proposed options
    - PG&E and SCE favor Option 3 (exclude PDR bids from AC and CC runs)

- DMM recommends Option 3 as best short term option for avoiding market inefficiency and undermining of LMPM procedures.

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Proxy Demand Resource (PDR)
Market Readiness Activities – Market Simulation Outreach Efforts

- 12/21/09: Outreach began to obtain "Points of Contact"

- 12/22/09: PDR Mailbox established - PDR@caiso.com

- 01/08/10: Market Notice w/ User Access Template (UAT)

- 01/25/10: UAT Submittal Deadline to PDR@caiso.com

- 02/08/10: Resource Assignments sent to Participants

- 02/15/10: User Certificates sent to Participants

- 03/01/10: Market Registration Begins

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Proxy Demand Resource (PDR)
Market Readiness Activities – Training

- Classes tentatively scheduled in February, March and April – dates will be announced in future Market Notices

- Training topics will outline:
  - Registration Process
    - DR System
    - ISO Resource Data Template
  - Market Rules
  - Energy and AS Bid submission in DAM and RTM
  - Post-Market Results
  - Meter Data Submission and Timeline
  - Changes to existing charge codes
  - Settlement Implications
  - Compliance

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Proxy Demand Resource (PDR)
Market Readiness Activities – Updates to CAISO Website

- **Revised PDR Website**

  - "Demand Response – Proxy Demand Resource (PDR) Policy"

  - Two new headings:

    - PDR Implementation

    - PDR Tariff Modifications

  - PDR Website can be found by the following link:
    http://www.caiso.com/23bc/23bc873456980.html