Catalogue of Market Initiatives
June, 2008

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Department of Market and Product Development

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1. Introduction

The origins of this catalogue can be found in the "Five-year Market Initiatives Roadmap 2008-2012" published on the CAISO Website on April 15, 2008. Due to the evolving nature of the Road Map Process, the Market Initiatives Roadmap (MIR) team realized that the document that was being compiled was a *collection* of market initiatives rather than a planning guide or *roadmap.* Consequently the focus of this document has changed to represent a catalogue of all market initiatives, whether they are in progress, mandated by FERC or potential candidates for future market releases.

This catalogue incorporates issues and potential initiatives identified by stakeholders in the last series of conference calls and meetings as well as updates to issues that the CAISO has been addressing since the last revision of the Roadmap was published. Some initiatives which were completed since the last version of the Roadmap have been removed.

This catalogue has been reorganized. The first section, "CAISO Spot Market Initiatives" has been organized in a time-sensitive order beginning with Current Market Issues (Section 2.1). The next section is devoted to MRTU Start Up issues (Section 2.2) followed by Future Market Releases (Section 2.3). The first part of Section 2.3 contains market design elements to be implemented in the Markets and Performance Release (MAP, previously known as Market Release 1A) followed by potential enhancements that could be addressed in MAP Release 2 and later. By ordering the initiatives in this way, the initiative numbering has changed. Appendix A contains a reference table which, among other things, provides a cross reference between the old "roadmap" section numbers and the new "catalogue" section number

Additionally each initiative has been identified with a letter code signifying the status of the initiative. These codes are found next to the title of each item. The key to the codes are as follows:

D - Discretionary or "rankable" Items

F - FERC Mandated Items

I - In-Progress/Planned Items

N - Non Discretionary Items

As a convenience these designations are also listed on the footer of each page.

In Appendix A the initiatives are sorted by status. This means that all of the In Progress/Planned items are grouped together, all the FERC mandated items are grouped together and so on.

This is living document which will evolve by extending its horizon further into the future and by incorporating new initiatives as needs are identified and prioritized.

The Market Initiatives Roadmap process has been identified as one of the CAISO Strategic Objectives identified within the CAISO's *Five-year Strategic Plan* [1]Sub-Objective 2.2 Robust

[1] The CAISO Five-Year Strategic Plan is a available at http://www.caiso.com/1fa4/1fa4c0d125c80.pdf

and Transparent Electricity Markets. The specific objective 2.2.B is entitled "Implement value-added market design enhancements as guided by the *Market Initiatives Road Map"*. Many of the initiatives listed below also relate directly to individual strategic objectives. These include the development of robust and transparent electricity markets, the integration of renewable resources and the CAISO's alignment with state and federal priorities are largely achieved through the creation of products and resolution of issues that are catalogued within this *Roadmap.*

Concurrent with this edition of the catalogue, a document entitled the "Report on Ranking of High Priority Market Initiatives 6/4/2008[2]" has been posted on the CAISO website. That paper details the most recent results of the ranking process in preparation for a briefing with stakeholders and ultimately the Board of Governors in July 2008.

Additional information regarding the CAISO Roadmap process can be found on the CAISO website at:

http://www.caiso.com/1fb1/1fb1856366d60.html

1.1 The Ranking Process

The California ISO (CAISO) has ranked the proposed set of discretionary market initiatives previously described in the *5-Year Market Initiatives Roadmap* and now contained in the *Market Initiatives Catalogue* using the formalized two step ranking process that was presented to the CAISO Board of Governors in March 2007. These items are listed in the catalogue with a "(D)".

After completing the first "High Level Ranking" step of the ranking process, on April 23, the CAISO posted to its website the *Preliminary Results of the High Level Prioritization of Market Initiatives* contained in the Market Initiatives Roadmap. This first step of the ranking process involved applying a simplified ranking process of three benefit criteria: Enhancements to Grid Reliability, Improving Market Efficiency, and the level of desire by Stakeholders and two feasibility (cost) criteria: Market Participation Implementation Impact and CAISO Implementation Impact to the candidate market enhancements described in the 5 –Year Market Initiatives Roadmap. After applying the high level criteria, the CAISO designated the proposed market initiatives as high, medium, or low priority initiatives.

On April 30 the CAISO conducted a stakeholder meeting to discuss the preliminary high level results and stakeholders submitted written comments to the CAISO on May 9.

The CAISO revised the preliminary results of the High Level Prioritization based on stakeholder feedback and further internal scoping of the market enhancements. The market enhancements that were determined to be high priority after applying the high level criteria were further evaluated further evaluated in step 2 of the ranking process by applying the more extensive prioritization criteria described in Section 5 below.

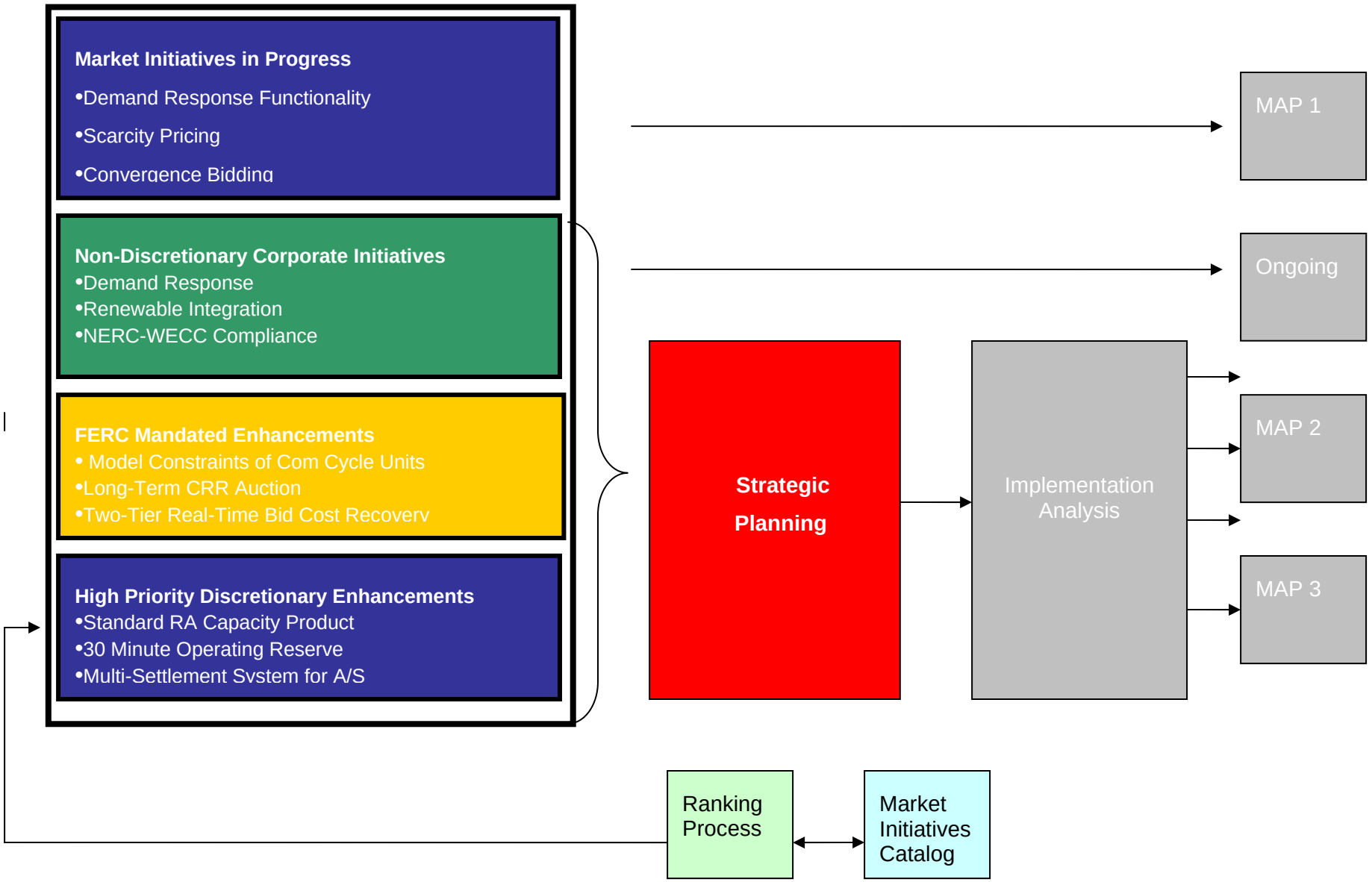
The report includes both the revised results of Step 1, the High Level Prioritization of the Market Initiatives and the results of Step 2 which includes the more extensive ranking of market initiatives that were determined to have high priority.

The CAISO is currently engaged in multiple initiatives which are categorized in Figure A below as Non-Discretionary Corporate Initiatives, Market Enhancements in Progress, FERC Mandated Enhancements, and High Priority Discretionary Enhancements. Thus the role of the ranking process is to identify the high priority discretionary enhancements that the CAISO will need to

[2] The Report on Ranking of High Priority Initiatives is available at:
http://www.caiso.com/1fdc/1fdceb765ff90.pdf

evaluate in combination with all of the other ongoing initiatives to determine how best to achieve the CAISO's strategic plan and vision for operating the grid over the next several years. Several factors will have a significant impact on market and grid operations in the near future including the expanded use of intermittent renewable generation technologies and increased participation of demand response resources in CAISO's markets.

Figure A – Market Initiatives Roadmap Process



2. CAISO Spot Market Initiatives

This section describes topic areas and specific initiatives that relate directly to the operation of the CAISO spot markets. As such these initiatives will typically be led by the CAISO and will be subject to FERC approval.

2.1 Current Market Issues (Pre-MRTU)

This initiative will monitor existing market performance and regulatory policy developments to identify what if any existing market issues need to be resolved prior to the implementation of MRTU. In order to conserve and focus resources to meet the MRTU initiative, Pre-MRTU issues will be evaluated in terms of impact and effort to ensure only those issues that have the most impact and least amount of effort will be considered for resolution. Some market issues that are identified as part of this initiative may be recommended for resolution as part of future releases of MRTU.

2.1.1 Operating Reserve Procurement (I)

This initiative was originally identified to evaluate the pre-MRTU impacts of proposed new WECC operating reserve policy. WECC's process of considering changes to how operating reserve should be calculated with regard to each type of interchange schedule (firm, non-firm, unit-contingent) is ongoing at this time. As this effort progresses, the CAISO will determine its requirements under new standards that may be adopted.

2.2 MRTU Start Up

MRTU Start Up is clearly a project of the highest priority for the CAISO and can be found in the Five-Year Strategic Plan under Sub-Objective 2.2 – Robust and Transparent Electricity Markets. The objective 2.2.A is entitled "Implement the Market Redesign and Technology Upgrade (MRTU) Program".

At the July 17-18, 2006, meetings and in written comments submitted afterwards, participants identified the following additional elements for MRTU consideration. At this time, these elements have been resolved for MRTU start up, or their resolution is in progress. The current status is as follows.

2.2.1 Study of Marginal Loss Surplus Allocation to Regional Measured Demand (I)

In the June 2, 2006 Answer to Reply Comments on the MRTU Tariff that was filed on February 9, 2006, the CAISO agreed to study the methodology for allocating the over-collection of marginal losses to measured demand on a regional basis, using available LMP studies. The purpose of this study is to determine a credible range of marginal cost of losses to serve the demand in Northern California (NP15 plus ZP 26) and Southern California (SP15), and a commensurate range of actual cost of losses in each region. A credible range of marginal loss surplus (MLS) rebate rate ($/MWh of Demand) for each of the two regions can then be determined and compared with system-wide marginal loss surplus rebate rate. If the system-wide MLS rebate rate falls outside the credible range of the regional MLS rebate rates beyond an acceptable margin, a process for allocation of MLS based on Regional Measured Demand

may then have to be worked out; in that case the exact methodology for Regional-based MLS allocation to Measured Demand will be carried out through a stakeholder process. A White Paper on the framework for this study is located at:

http://www.caiso.com/1831/1831d9532fd30.pdf

An interim simplified study was performed using 5 months of available LMP data (May through September 2004) with LMP decomposition based on distributed slack. A white paper is located at

http://www.caiso.com/184f/184f8ad86b730.pdf

In the September 21, 2006 MRTU Order, FERC accepted CAISO's system-wide Marginal Loss Surplus allocation method as filed, but PG&E filed for rehearing requesting completion of the Marginal Loss study. In its answer, CAISO agreed to complete the study using 12 months of LMP data (May 2004 through April 2005), and relaxing the shortcuts used in the interim study. The CAISO has completed this study, and the resulting report is available at:

http://www.caiso.com/1bbf/1bbfd56174f50.pdf

The conclusion of the CAISO's study is that no change in its filed allocation method or the MRTU software is needed at the start of MRTU. The CAISO will monitor the actual allocation results using the same study methodology after the start of the MRTU market to determine if a change in its filed method and/or MRTU software might be appropriate based on the actual market results.

Additional documents related to this issue are located at:

http://www.caiso.com/docs/2004/11/19/2004111912470915456.html

2.2.2 Application of Methodology for Competitive Path Assessment (I)

Local Market Power Mitigation (LMPM) and Reliability Requirements Determination (RRD) functions in MRTU require prior designation of competitive and non-competitive paths in the full network model (FNM). A methodology for Competitive Path Assessment (CPA) was developed in the course of a stakeholder process in 2005 and is posted at

http://www.caiso.com/docs/2002/08/23/2002082313580358 58.html

CAISO is conducting the study to assess the merit of the proposed methodology using the current network model. The most recent results have been released in December 2007, and are available at:

http://www.caiso.com/1cb9/1cb98f565d9c0.pdf

Final path designations will be released one month prior to MRTU implementation The CAISO's Department of Market Monitoring will continue to review the results annually.

2.2.3 Station Power Initiative (I)

Station power is the energy used to operate auxiliary equipment and other load that is directly related to the production of energy by a generating unit (e.g., heating and lighting for offices located at the plant). FERC has established a policy that allows a single entity that owns one or more generating units to self-supply station power over a monthly netting period using energy generated on-site or remotely.

In April 2005, the CAISO filed Amendment No. 68 to its Tariff to conform to FERC's station power precedent.

In FERC's June 22, 2005 "Order Conditionally Accepting in Part and Rejecting in Part Amendment No. 68[3]" FERC directed the CAISO to "remove all language about Permitted, Prohibited and Contemporaneous Netting from the Station Power Protocol[4]. When it became apparent that significant changes to established metering would be required, the CAISO filed a request for stay of the requirement that it remove its existing permitted netting program of contemporaneous on-site self-supply for non-Qualifying Facility generators from the ISO Tariff pending FERC's ruling on Southern California Edison Company's (SCE's) rehearing request concerning this issue. FERC granted the CAISO's request in for stay of this aspect of the March 31 Order[5].

The Station Power Protocol was updated and incorporated into the CAISO Tariff for MRTU to allow bidding and settlement for all Station Power Load at the locational LMP. Documents related to the updates to the existing Station Power Protocol for MRTU are posted at:

http://www.caiso.com/1ca6/1ca675ae64fe0.html

2.2.4 Limits on Start-up/Minimum Load Costs (I)

SCE comments on the initial Market Initiatives Roadmap identified that the MRTU Tariff is silent regarding what generators can submit under the election of start-up and minimum load costs. SCE requested clarification that market-based minimum load costs are subject to the bid caps in place for energy, and that the CAISO cap the allowable market-based start-up costs: "Unbounded prices present the risk of an unacceptable outcome in which a single generation dispatch causes irreparable harm to California customers. This issue must be addressed, and again this is a Release 1 issue." (See SCE Comments on Market Initiatives, July 28, 2006, at:

http://www.caiso.com/1845/18459b7a4f300.pdf)

Following discussion with stakeholders, the CAISO provided a final proposal on June 25, 2007, for bid-caps for start-up and minimum load bids under MRTU which was approved by the CAISO Board at the September 6-7 Board Meeting. The CAISO's proposal is available at:

http://www.caiso.com/1c08/1c08b3ec1a150.pdf

The FERC filing is located at:

http://www.caiso.com/1ca2/1ca2bf1846a20.pdf

2.2.5 Tracking and Reallocation of CRRs as Load Migrates (I)

Congestion Revenue Rights (CRRs) are financial instruments that help market participants manage congestion costs associated with use of the CAISO Controlled Grid. CRRs entitle the holder to receive revenues or charges based on the congestion components of the LMPs calculated for each hour in the Integrated Forward Market. Under the MRTU Tariff filed on February 9, 2006, the CAISO regularly allocates CRRs with specified durations to load serving entities that pay for the embedded costs of the CAISO's Controlled Grid; the remaining CRRs are then made available through auctions open to all creditworthy parties.

[3] California Independent System Operator Corporation, 111 FERC ¶ 61,452 (2005) ("Amendment No. 68 Order").
[4] *Id*. at P 41 and 42
[5] California Independent Systems Operator 114 FERC 61,339 (2006) ("Order Granting Motion to Stay")

Section 36.8.5 of this originally filed MRTU Tariff requires a load serving entity that loses customers through load migration to transfer a proportionate share of its allocated seasonal CRRs to the load serving entity that gained the customers. This originally filed MRTU tariff language did not specify the CAISO's role in such transfers beyond maintaining a system for registering CRR transfers, so the CAISO's January 29, 2007 compliance filing to implement Long Term CRRs included a proposal for the CAISO to manage the transfer of CRRs to reflect such load migration. FERC's July 6, 2007 decision on Long Term CRRs adopted that proposal.

On July 19, 2007, the CAISO Board of Governors approved the process for transferring CRRs between LSEs to reflect load migration, and the CAISO's July 20, 2007 compliance filing includes more detailed tariff provisions related to the transfer of CRR due to load migration and the CAISO's tracking of these transfers. This filing is located at:

http://www.caiso.com/1c21/1c21ec8b5eaf0.pdf

The CAISO's CRR team is currently working with a work group of the affected market participants to finalize the methodology for converting data on load transfers into transfers of CRRs between load serving entities.

2.2.6 Generation Resources for Meeting Resource Adequacy Requirements (I)

SCE suggested that a MRTU issue should be the assurance that power from RA units can be dedicated to serve California load during critical periods: "SCE continues to believe this is a crucial issue and deserves immediate attention at the CAISO. Again, at least for the manual work-around, this is a Release 1 issue." (See SCE Comments on Market Initiatives, July 28, 2006, at:

http://www.caiso.com/1845/18459b7a4f300.pdf)

FERC's September 21, 2006, decision on the CAISO's MRTU tariff (e.g., Paragraphs 116 and 117) established that exports that are supported by RA resources should have a lower scheduling priority than LSEs within the CAISO Control Area. FERC's decision also determined that exports that are supported by non-RA capacity should have a scheduling priority equal to LSEs within the CAISO Control Area. The CAISO is implementing these provisions in MRTU.

2.2.7 New Methodology for Pricing and Settlement of Real-time LAP Load Deviations (I)

The filed MRTU Tariff (as filed on February 9, 2006) provided for the settlement of real-time Load Aggregation Point (LAP) load deviations (LAP level uninstructed imbalance energy, "UIE") through a combination of an hourly LAP price (Tier 2 UIE price) and an hourly LAP price adjustment (UIE Adjustment). Over-consumption (real-time LAP load in excess of the day-ahead LAP load schedule) would be charged the sum of the LAP price and the LAP price adjustment and under-consumption (real-time LAP load below the day-ahead LAP schedule) would be paid the difference of the LAP price and the LAP price adjustment (Tariff Section 11.5.2).

Some stakeholders (SCE and NCPA) stated concerns about this approach. Moreover, in the stakeholder discussions related to the design of Convergence Bidding it appeared that having two different real-time LAP prices (depending on over- or under-consumption) would not be compatible with the idea of "price convergence" between day-ahead and real-time markets.

Further scrutiny, primarily based on input from SCE and NCPA revealed that under some (albeit rare) conditions, the two-price methodology as stated in the Tariff might lead to excessive charges to a single Scheduling Coordinator (SC). Accordingly, CAISO has developed a new method for computation and settlement of real-time LAP load deviation. A white paper (http://www.caiso.com/189b/189be9fd64170.pdf) was discussed at the November 13, 2006 MSC meeting and is supported by the MSC. The current white paper is available at:

http://www.caiso.com/1b87/1b87a43319f20.pdf

The CAISO has posted draft tariff language on April 9, 2007, for stakeholder review as part of the CAISO's August 3, 2007, compliance filing. The FERC order is pending.

2.2.8 Interim Measures to Address Day-Ahead Underscheduling (I)

In its September 21, 2006 Order FERC directed the CAISO to develop and file interim measures that mitigate any potential economic incentive for Load Serving Entities ("LSEs") to underschedule in the Day-Ahead Market that may exist prior to implementation of convergence bidding.

This directive was repeated in the April 20 FERC Order Granting in Part and Denying in Part Requests for Clarification and Rehearing ("April 20 Order on Rehearing"). In this subsequent Order, the FERC stated that "these interim measures are not intended to prevent LSEs from taking steps to reduce the costs of serving load. Instead, these interim measures should be designed to prevent uneconomic behavior. More specifically, we expect the interim measures should address the problem of persistent underscheduling in the DAM on occasions when energy prices suggest that it would be economic to buy in the DAM."

To develop these interim measures, the CAISO conducted a five-month stakeholder process that considered several proposals, ranging from simple reporting mechanisms to automated penalty structures. The final proposal was approved by the CAISO Board in the September 6-7 Board meeting and enacted the creation of confidential weekly reports by the CAISO, a bright line rule to define persistent underscheduling, and the ability to apply an Interim Scheduling Charge. The charge would be triggered if the CAISO determines that a particular Scheduling Coordinator is persistently underscheduling. Details on the Interim Underscheduling Charge are described in CAISO's compliance filing to FERC dated September 28, 2007 located at the following link:

http://www.caiso.com/1c67/1c67e8176ad20.pdf

Monitoring of the current market's 95% scheduling rule, pursuant to Amendment 72, is discussed in section 2.4.2.

Additional documents related to the development of this proposal are located on the CAISO website at:

http://www.caiso.com/1bf4/1bf48b33187a0.html

2.2.9 Partial RA Units (I)

Comments by RTO Advisors proposed that some generators and LSEs may want to enter arrangements in which some or all of the capacity is designated for meeting RA requirements for a period of time, and then not designated for meeting RA requirements for other periods of time: "The CAISO should study what modifications are required to MRTU to allow these types of arrangements." (See Comments of RTOAdvisors, July 28, 2006 at:

http://www.caiso.com/1845/18459965461b0.pdf)

As the CAISO's MRTU implementation has progressed, this feature has been incorporated into MRTU, as stated in section 6.1.3.2 ("Partial Resource Adequacy Resources") of the BPM for Reliability requirements, at:

http://www.caiso.com/1bfd/1bfde7ef4aae0.doc

2.2.10 Compensation for Exceptional Dispatch (I)

Several generators have contended that an exceptional dispatch capacity payment should reflect an appropriate measure of capacity compensation.

Please see Reliant Energy's comments filed on April 4 2008 at

http://www.caiso.com/1fa3/1fa39bf140a00.pdf

This was added to the catalogue based on comments submitted by a market participant in April 11, 2008 comments

The CAISO completed a stakeholder process on this initiative and posted the Final Proposal for Exceptional Dispatch – Market Power Mitigation and Supplemental Compensation at

http://www.caiso.com/1fc6/1fc6c2a82fc20.pdf

The CAISO Board of Governors approved the policy proposal at the May 2008 Board of Governors Meeting.

2.3 Future Market Releases

The CAISO will have future planned Releases of market software modifications to further refine its market design and to include market features that were proposed for inclusion in the MRTU Tariff but were deferred due to implementation limitations. These releases will include packages of market enhancements that were both mandated by FERC and non mandated items prioritized based upon the defined ranking criteria.

Currently, there are two planned releases for market design enhancements post the initial implementation of MRTU:

- MAP (previously known as Market Release 1A), planned to be launched within12 months of the implementation date of MRTU Start Up. This includes both FERC mandated items the CAISO was directed to implement and non mandated items and was scoped in the Fall of 2007,
- MAP Release 2 planned to be launched within three years of the implementation date of MRTU Start Up will also include both FERC mandated and non-mandated items that will be subject to the formalized ranking process.

The CAISO initiated a stakeholder process in August 2007 to prioritize and rank market initiatives from the 5-Year Market Initiatives Roadmap to determine Market Release 1A scope (renamed to "Markets and Performance" or "MAP"). The CAISO posted a final proposal for Market Release 1A Scope on 10/1/2007 that provides a description of market enhancements planned for Market Release 1A, plans for future CRR enhancements, and lists FERC mandated market enhancements the CAISO has been directed to implement no later than three years after MRTU start-date. The proposed Market Release 1A scope represents the CAISO's best assessment of what should be included in MAP at this time considering enhancements likely to

provide the most benefit to the market and resource constraints. It is expected that there may be unforeseen issues that will need resolution once MRTU begins operation in Start Up that could result in adjustments to the MAP proposed scope. The Straw Proposal for MAP scope is posted at:

http://www.caiso.com/1c6a/1c6ae12a2caa0.pdf

The CAISO will continue the process of ranking and prioritizing market initiatives with stakeholders on an on going basis. The next round of these activities are currently planned to occur during the Spring/Summer of 2008 for MAP Release 2 enhancements.

At this time the following initiatives are identified for post-MRTU implementation.

2.3.1 Markets and Performance (MAP)

The market enhancements described in the following paragraphs are planned for the release of Markets and Performance Initiatives (MAP) Implementation that will occur within 1 year of MRTU start up. The CAISO is currently engaged in stakeholder processes on these market enhancements.

2.3.1.1 Convergence Bidding (I)

Convergence (or virtual) bidding is a mechanism whereby market participants can make financial sales (or purchases) of energy in the Day Ahead market, with the explicit requirement to buy back (or sell back) that energy in the Real Time market, thereby potentially moving the Day Ahead and Real Time prices closer together.

FERC's 9/12/06 MRTU Order (P 430-452) requires the CAISO to implement convergence bidding within 12 months of MRTU FERC's 4/20/07 Order (P 105-119) specifies that the CAISO must file tariff language for the implementation of convergence bidding no later than 60 days prior to the one year anniversary of MRTU startup.

The CAISO is currently engaged with stakeholders to develop the conceptual design for convergence bidding and will continue stakeholder discussions to determine the granularity, cost allocation and other design features for convergence bidding. Related documents and written stakeholder comments are posted at:

http://www.caiso.com/1807/1807996f7020.html

FERC's 9/21/06 MRTU Order also found that the harm of further delaying the substantial benefits of MRTU outweigh the potential benefits that are to be gained by implementing convergence bidding in MRTU, but agreed with commenters that MRTU must include provisions to offset LSEs' incentive to underschedule in the day-ahead market. The Order directs the CAISO to develop and file interim measures, no later than 180 days prior to the effective date of MRTU, to address the potential economic incentive for LSEs to underschedule in the day-ahead market until the successful implementation of convergence bidding has been achieved. Please see section 2.2.8 for a description of the Interim Measures to Address Day-Ahead Underscheduling.

2.3.1.2 Day-Ahead Market Power Mitigation Based on Bid in Demand (I)

In reviewing the CAISO's market design, the consultants LECG suggested the use of bid-in Demand rather than Demand forecast in Pre- Integrated Forward Market (IFM) passes in the Day-Ahead Market. LECG also recommended eliminating use of extreme DEC bids in Pass 2 pre-IFM for schedules selected in the Pass 1, and unrestricting the pool of resources in IFM and

RUC based on unit commitment in Pre-IFM. LECG's comments (February 2005) on these issues is located at:

http://www.caiso.com/docs/2005/02/23/200502231634265701.pdf

FERC's 9/21/06 MRTU Order (P 1089) conditionally accepted the CAISO's proposal to use forecasted Demand in Pre-IFM passes, subject to the CAISO instituting bid-in demand as the basis for applying market power mitigation in the pre-IFM runs no later than MAP Release 2 to reduce the likelihood of over-mitigation of suppliers.

As an outcome of the Convergence Bidding stakeholder process the CAISO is proposing that Market Power Mitigation based on bid in Demand be implemented concurrently with convergence bidding in MAP. Since virtual bids may impact the market power of physical bids they should be considered in the Day-Ahead market power mitigation process even though they would not actually be mitigated like physical bids.

Since the MPM-RRD run will use bid-in demand, it is possible for virtual supply bids to commit less than the minimal RMR generation that is needed to for voltage support in local areas. The CAISO anticipates that, assuming convergence bidding will not likely be introduced until 2009, the reduced number of available RMR units could be committed manually on a daily basis. The CAISO anticipates any manual commitment of needed RMR units would occur after the IFM run, but before RUC is run (giving the RMR units the "market first" opportunity in the day-ahead IFM)

More information can be found in the white paper "Updates on the Design for Convergence Bidding posted on the CAISO website at :

http://www.caiso.com/1c8f/1c8ff39f65a70.pdf

2.3.1.3 Scarcity Pricing (I)

The current MRTU design provides for scarcity pricing for Energy; however, no explicit measures are included for scarcity pricing of Reserves. In MRTU, Reserve prices may exceed the bid cap to the extent of the opportunity cost of Energy. In other words, Reserve prices will generally be limited to the sum of the prevailing bid cap for Reserves plus the prevailing bid cap for Energy. The question that has faced the CAISO is whether (a) this implicit scarcity pricing (double cap) is adequate for scarcity pricing of Reserves, or (b) explicit scarcity pricing for Reserves should be provided.

FERC's 9/21/06 MRTU Order (Paragraphs 1077 to 1079) found that the CAISO's proposal is too narrowly tailored, and that prices should rise to reflect the increased need for reserves and energy, whether or not the shortage arises in conjunction with a generation or transmission outage, in both the day-ahead and real-time markets. While FERC concluded that the CAISO's limited scarcity pricing proposal is a reasonable start for implementation of MRTU, the CAISO should further refine its proposal to include a more broadly-triggered reserve shortage scarcity pricing, and on a more accelerated basis, to ensure that prices are not inappropriately suppressed during periods of genuine scarcity. The Order directs the CAISO to file tariff language for the implementation of an expanded scarcity pricing methodology within 12 months of the effective date of MRTU. Furthermore, the Order directs the CAISO to develop a reserve shortage scarcity pricing mechanism that applies administratively-determined graduated prices to various levels of reserve shortage, to be implemented within 12 months after MRTU start up.

The CAISO started its stakeholder process for development of post-MRTU Scarcity Pricing mechanisms in June 2007. Since then the CAISO has hosted several stakeholder meetings discussing the proposal for Scarcity Pricing design. The proposal has been updated over time based on the feedbacks from stakeholders. The CAISO plans to present the final design of Scarcity Pricing to the CAISO Board of Governors for decision in September 2008. All versions of the proposal and stakeholder written comments can be found at:

http://www.caiso.com/1bef/1bef12b9b420b0.html

2.3.1.4 A/S Sub-Regional Cost Allocation (I)

Under MRTU, the allocation of A/S costs is based on A/S responsibility of individual Scheduling Coordinators. A system-wide user rate is computed for each service across all regions (resources) and markets (Day-Ahead, HASP, and Real-time) for each hour.

Due to sub-regional procurement, the costs of A/S in some A/S sub-regions could be higher than in other sub-regions due to unbalanced distribution of resources and transmission constraints. Stakeholders have been supportive on changing the current system-wide A/S cost allocation mechanism. The CAISO has proposed to discuss this issue with stakeholder together with the Sub-regional Scarcity Pricing.

The CAISO submitted a filing to FERC regarding A/S procurement in the CAISO Sub-Regions on March 20, 2007. FERC has not ruled on the filing yet.

This issue will be addressed as part of the scarcity pricing stakeholder process.

2.3.1.5 Dispatchable Demand Response (I)

The CAISO intends to fully support Dispatchable Demand Response ("DDR") in its MRTU software design. Price-responsive demand will be able to participate in the Day-Ahead forward Energy market under MRTU. Such demand resources will be able to submit price-sensitive bids at Load Aggregation Points and then settle any deviations from the final Day-Ahead schedule at the Real-Time Imbalance Energy price for that Load Aggregation Point. In addition, Participating Loads – i.e., Load that participates in the CAISO's Imbalance Energy and Ancillary Services markets as well as pumped storage facilities – are types of DDR resources that are modeled with added functionality in the CAISO's MRTU software. In the MRTU software, Participating Load will be able to participate in the wholesale Energy and Ancillary Services markets with certain limitations based on software functionality. The CAISO is working to address some of these limitations in the MRTU software and intends to develop a more robust and comprehensive integrated solution for the participation of DDR resources post MRTU start up.

A full DDR model will not be incorporated into the MRTU software design. In 2005, LECG identified a design concern related to Participating Load that would have resulted in inequities between prices settled at Load Aggregation Points and those settled at individual nodes if a full DDR model was included in MRTU. Based on this finding, the CAISO recognized the need to get the design, rules and validation for DDR "right" and therefore deferred the full implementation of DDR to occur post MRTU start up. FERC's 9/21/06 MRTU Order (paragraphs 688 and 689) noted that the CAISO had committed to work with market participants to provide additional opportunities for demand response in MAP Release 2, and accordingly, directed the CAISO to work with market participants to present additional opportunities for demand response resources to participate in the CAISO market. FERC's 4/20/07 and 6/25/07 Orders have reiterated FERC's guidance to provide additional opportunities for demand response.

Post MRTU start up, the CAISO's full Dispatchable Demand Response model should consider incorporating the following attributes and functionality:

- A three-part bid consisting of:
  - Load curtailment cost
  - Minimum load reduction cost
  - Load energy bid
- Load curtailment time (time to curtail load)
- Minimum load reduction time (min time after load curtailment)
- Minimum base load time (min time after load restoration)
- Maximum number of daily load curtailments
- Load drop rate
- Load pickup rate
- Maximum Non-spinning reserve capacity (load reduction within 10 minutes)
- Ability for Demand resources to provide additional ancillary services such as spinning reserve and regulation.

The DDR model should also incorporate the following additional features:

- The base load component is a price taker, *i.e.*, it is charged the relevant aggregate LMP as any non-participating load irrespective of dispatch
- When the DDR is dispatched from the base load, it is eligible for recovering its load curtailment cost and its hourly minimum load reduction cost
- When the DDR is dispatched, it is paid its LMP for the load reduction

Finally, RTOAdvisors comments that Electric Service Providers (ESPs) seek assurance that DR programs will count toward meeting Resource Adequacy requirements, and seek to include "any additional issues that arise that would affect RA counting for DR." (See Comments of RTOAdvisors, July 28, 2006 at:

http://www.caiso.com/1845/18459965461b0.pdf)

Note: Recognizing that most of the existing Participating Loads are large hydro pumps, MRTU will support having participating pump load (or other Participating Load that can operate like a pump) participate as DDR using what the CAISO refers to as the "pump/storage" model. While the pump/storage model is able to provide some desired attributes of a DDR resource (*e.g.*, multi-part bids and some inter-temporal constraints), it has limitations including an inability to aggregate loads that share common metering. Therefore, as an alternative to the pump/storage model, the CAISO is also prepared to support Participating Loads using the same Energy Bid structure as non-participating Loads, and to support the eligibility of Participating Loads to provide Non-Spinning Reserve through a manual work-around, provided that metering and the network topology support this arrangement.

The CAISO is currently engaged in a stakeholder process to define the requirements to implement the full Participating Load model. In addition to being part of the CAISO's own Demand Response initiatives as described in section 3.1.3, this is the focus of one of five working groups in a coordinated effort by the CAISO, California Public Utilities Commission, and California Energy Commission. The CAISO's proposal for Dispatchable Demand Response will be presented to the CAISO Board in September 2008. Related documents are posted at:

http://www.caiso.com/1cbb/1cbbc26edb20.html

Due to high stakeholder interest and the determination that Demand Response is an important market component to have in place for the success of Scarcity Pricing (another MAP enhancement), Dispatchable Demand Response will be implemented as part of MAP.

2.3.1.6 Relax DEC Bidding Activity Rules on Final Day-Ahead Resource Schedules (I)

Current bidding activity rules in MRTU disallow Real Time Market energy reduction below the Day-Ahead energy schedule at energy prices that are lower than what was bid in and accepted in the Day-Ahead Market. This DEC Bidding rule was designed to prevent the "DEC" game in situations where transmission derates after the close of the Day Ahead Market require re-dispatch of generation in the Real Time Market.

The CAISO initiated a stakeholder process in early 2008 to re-examine this DEC Bidding rule. The CAISO proposed removing these rules prior to start up of MRTU. The Board of Governors approved this recommendation in May, 2008.

For MAP the CAISO has initially proposed no special limits on DEC bids in the Real Time Market, and if a Scheduling Coordinator does not submit any DEC bids associated with its accepted IFM energy schedule, the SC's economic bids that cleared in the Day Ahead Market would automatically flow into the Real Time Market. This is in contrast to current MRTU functionality, which turns accepted Day-Ahead Bids in to "Self-Schedules" used by the Real Time Market. The intended purpose is to promote a more liquid market for DEC bids in the Real Time Market.

Documents related to this effort are posted at:

http://www.caiso.com/1fb1/1fb184c166370.html

2.3.1.7 Issues Related to Constrained Output Generation (COG) Pricing (I)

The February 2005 LECG report stated that the mechanism proposed for implementation of real-time constrained output generator (COG) pricing could result in the calculation of inappropriately high prices during circumstances in which uneconomic gas turbines are operating as a result of either minimum run time or minimum-down time constraints.

One proposed solution to be considered, which is used in the NYISO markets, is to use the dispatch level of non-COG resources from the previous interval's pricing run as the initial operating point of the non-COG resources in the pricing run for the current interval, rather than using telemetry as basis for the initial operating point of non-COG resources as the MRTU software will do. A significant drawback of this solution is that this change in the pricing run initialization point can result in much greater problems than it solves when non-COG generators are deviating from instructed dispatch levels. Aside from the change to the pricing run initialization change, another potential fix to this issue would be the addition of a run to the Real Time optimization, though such an effort may not be feasible from an implementation standpoint. A post-market Real Time price refinement could possibly achieve the same or at least approximate the outcome of an additional RT optimization run, though this would be onerous to implement and might also be undesirable as it would delay price signals. At this time, and given the small number (10 to 15) and aggregate generating capacity (250 to 350 MW) of COG units in the CAISO control area, the CAISO recommends making no changes to COG pricing under MAP .

The most current Straw Proposal is posted at:

http://www.caiso.com/1f83/1f83e5f2223d0.pdf

2.3.1.8 Competitive Path Assessment Seasonally (I)

FERC's 9/12/06 MRTU Order (Paragraph 1031) directs the CAISO to "develop a competitive assessment study that designates a path as either competitive or non-competitive on a seasonal basis with seasonal designations". "Accordingly, we direct the CAISO to modify the competitive assessments study, as discussed above and to make a compliance filing with the necessary tariff changes to reflect these modifications within 12 months of the effective date of MRTU Release 1".

2.3.2 MAP Release 2 and Beyond

The market enhancements listed below comprise both FERC mandated items that the CAISO has been directed to implement within three years of MRTU start-up and discretionary items that will ranked by the CAISO to determine their priority for implementation for MAP Release 2 or later. For the non mandated enhancements that remain under consideration by the CAISO, there is no definitive schedule at this time for a subsequent release, nor has the CAISO made a firm commitment to implement any specific element in a subsequent release.

2.3.2.1 Simultaneous Residual Unit Commitment (RUC) and IFM (D)

In the current MRTU design Residual Unit Commitment (RUC) is performed after completion of the IFM and does not impact Day-ahead Market Energy, Ancillary Services (AS), and Congestion/CRR pricing and settlement. The issue here is whether to perform IFM and RUC simultaneously, and if so, how.

2.3.2.2 Multi-Hour Block Constraints in RUC (F)

SCE raised a concern that resources may be committed for a time period that is inconsistent with its offer, because RUC does not observe any multi-hour block constraints. "SCE requests that the CAISO revise its software to honor multi-hour block constraints in RUC for MAP Release 2." (See SCE Comments on Market Initiatives, July 28, 2006, at:

http://www.caiso.com/1845/18459b7a4f300.pdf)

FERC's 9/21/06 MRTU Order (P 1280) finds SCE's request reasonable that the CAISO should honor multi-block constraints as a bidding parameter for system resources in the RUC process, and reiterated the finding that the CAISO should examine whether such software changes could be implemented by MRTU start up, or to implement them as soon as feasible. In its application for rehearing, the CAISO pointed out that the purpose of RUC is to procure capacity for potential dispatch in Real-Time, when multi-hour block constraints cannot be enforced, and that the cost of implementing SCE's proposal would be significant. FERC granted the CAISO's request for rehearing, and changed its order to direct the CAISO to implement this feature in MAP Release 2.

2.3.2.3 Rebate of Transmission Loss Over-Collection for Renewable Resources (F)

In Spring 2005 in the context of the MRTU stakeholder process the California Energy Commission (CEC) proposed a method for reducing the impact of LMP-based marginal transmission loss charges on intermittent resources. At the time the CAISO and the stakeholders agreed to defer discussion of this proposal for consideration after MRTU start up. Subsequently, in the 2005 MRTU stakeholder and policy resolution process the CAISO agreed to modify the crediting back of marginal loss surplus revenues and accelerate that process, so the question here is whether special treatment for intermittent resources is still needed, and if

so, how. FERC's 9/21/06 MRTU Order directs the CAISO to address issues related to the integration of intermittent resource issues, including transmission line loss over collection issues, in MAP Release 2.

2.3.2.4 Consideration of a Full Hour-Ahead Settlement Market (D)

This issue is whether to augment the two-settlement market design of MRTU with a third Hour Ahead settlement market, which could be either a substitute for or in addition to the Hour Ahead Scheduling Process (HASP) element of the MRTU design.

2.3.2.5 Dynamic Pivotal Supplier Test for Market Power Mitigation (D)

Local Market Power Mitigation in MRTU is accomplished through prior classification of transmission constraints as "Competitive" or "Non-competitive". The question here is whether this process should (or could) be replaced by "on-the-fly" determination of pivotal suppliers in the market-clearing process.

2.3.2.6 Multi-Settlement System for Ancillary Services (D)

LECG's February 2005 report stated that the lack of a full multi-settlement system for Ancillary Services that optimizes real-time reserves and settles deviations from day-ahead schedules at real-time prices could raise consumer costs when reserves scheduled in the Day Ahead market must generate energy in Real Time as a result of minimum run times, minimum down times or transmission constraints. The MRTU design calls for procurement of AS in the Day Ahead market to meet 100% of forecasted real-time needs, and then procures additional AS incrementally in Real Time only to the extent that they are needed due to changes in system conditions or demand exceeding the Day Ahead forecast. Moreover, unless the Operating Reserves are designated as "Contingency Only", their energy will be dispatched economically, and if as a result the Operating Reserves fall below the North American Electric Reliability Corporation (NERC) and Western Electricity Coordinating Council (WECC) Minimum Operating Reserves Criteria (MORC), CAISO will procure additional Operating Reserves in real-time. The question to be considered is whether to modify the MRTU design to create a multi-settlement AS market as suggested by LECG.

If the CAISO implements a multi-settlement system issue this would resolve the issue of Ancillary Services substitution described in 2.3.2.7. below.

2.3.2.7 Ancillary Services Substitution (F)

FERC's 9/21/06 Order on MRTU found it reasonable for the CAISO to limit Ancillary Services substitution opportunities to units that are in the appropriate location and whose bids clear in the relevant market, but directs the CAISO (Paragraph 303) to address the possibility of added flexibility for substitution of the source of Ancillary Services in future releases of market design enhancements.

In its 4/20/07 Order, FERC reiterated that for MRTU, the Commission accepts the ancillary service substitution proposal, and that there was no basis for reversing the prior determination and for the CAISO to address this issue in future MAP releases.

2.3.2.8 Consideration of Import Energy in the RUC Process (D)

Early in the 2005 MRTU stakeholder process it was suggested that import energy bids that were not cleared in the IFM could be considered in the RUC optimization by treating such bids in the same manner as the minimum load bids of internal generators that were not committed in the

IFM. The question to consider is whether, in light of the treatment of imports in RUC as filed in the MRTU tariff, any additional provisions for considering imports in RUC are needed or appropriate.

2.3.2.9 Multi-Day Unit Commitment in the IFM (D)

In MRTU, the forward looking time horizon in IFM is one day, taking into account the impact of prior commitment of units with very long start up times. During the MRTU Stakeholder meetings there were requests that the CAISO make commitment decisions in the IFM that look out beyond a single day in order to create a commitment decision that is more efficient and better reflects the impact of startup-up cost for resources that have long start-up times. There are several design issues, including the need for bidding and bid replication rules as well as software performance and solution time requirements that must be discussed and resolved via a stakeholder process before considering modification of the software to accommodate Multi-Day unit commitment in IFM.

As the CAISO completed its design for MRTU, the CAISO found that there is an opportunity to run an optimization process, “Extremely Long-Start Commitment” (ELC), following the Residual Unit Commitment (RUC) process. The RUC process is able to consider unit commitment to meet the CAISO’s forecasted demand for generators with up to 18-hour start-up times, but there is a small number of generators with start-up times exceeding 18 hours. The ELC process gives the CAISO to determine when it should commit these generators, for reliability purposes, by using a 48-hour optimization period. Further details of the ELC process are available in section 6.8 of the BPM for Market Operations, at:

http://www.caiso.com/17e9/17e9d7742f400.html

There may be limitations on the economic optimality that can be achieved by using separate ELC, RUC, and IFM processes, but these may be unavoidable due to assumptions that bids submitted to the Day-Ahead Market will be applicable on the following day.

2.3.2.10 Bid Cost Recovery for Units with Run Times that exceed 24 hours (F)

The issue was raised by SoCal Edison that section 11.8.2.1.1 of the MRTU Tariff is problematic because it does not fully consider units which have run-times that exceed 24 hours. SCE requested that the MRTU Tariff be modified to divide the start-up costs by the total run-time of the unit even if the run-time exceeds 24 hours. Absent this modification uplift charges to market participants could be artificially inflated.

In FERC’s September 21 Order (paragraph 533) the CAISO was directed to “develop and file with the Commission a plan for units facing these types of constraints for implementation no later than MRTU Release 2”.

2.3.2.11 Ramp Rate Enhancements (D)

Operational ramp rates are used for scheduling and dispatch in real time. In order to maintain performance of the software within the required solution timing parameters, the number of operational ramp-rate segments supported in MRTU is limited to 4 (versus 10 segments initially contemplated). Only 5% of the resources with ramp-rates operational ramp-rates defined in the Master-File would have ramp rates with more than 4 segments defined. Some participants have concerns about the reduction in the number of ramp-rate segments. After actual performance is determined, the CAISO can work with its vendor to determine if additional operational ramp-rate segments can be supported.

While a separate Operating Reserve ramp-rate is used for procuring the spinning and non-spinning reserves, the Operational ramp rate is used for all dispatching of a resource. To the extent the operational ramp rate at a given operating level is less than the Operating Reserve ramp-rate, the resource may be subject to AS "No-Pay" charge for reserves that are not actually available based on the lower Operational ramp rate. Modifications to the software would be necessary to more closely align procurement of AS with energy dispatch from AS capacity in real-time.

2.3.2.12 Ancillary Service Self-Provision at the Interties (D)

The MRTU design does not include the self-provision of Ancillary Services from interties. Import AS can only be bid and must compete with import energy bids for the use of New Firm Use (NFU) transmission capacity. This issue explores whether AS self provision from the inter-ties can be expanded as a potential post-MRTU start up feature.

As the CAISO's detailed design of MRTU has progressed, the CAISO is considering the prospect that self-provision of AS can be accommodated for dynamic imports. This prospect may be sufficient for the currently anticipated market needs. This topic may have overlapping issues with the direction in FERC's 9/21/06 Order on MRTU (Paragraph 326) to ensure that all provisions of ancillary services, self-provided or not, are subject to the same regional constraints. To the extent that this topic is considered further, this topic would be combined with section 2.2.17 (Reservation of transmission capacity for Ancillary Service exports) since the underlying issue of reserving capacity is common to both issues.

In an April 20 FERC Order Western raised concern that its Boulder Canyon Project (Project) customers in the CAISO Control Area currently self-provide ancillary services from the Project over the intertie and into the CAISO Control Area and that the September 2006 Order is unclear as to whether these customers can continue to self-provide ancillary services from Western's Control Area to the CAISO Control Area. FERC directed the CAISO to work with Western determine whether the CAISO's work-around is acceptable to Western and to propose any tariff revisions no later than 180 days prior to the implementation of MRTU.

2.3.2.13 Exports of Ancillary Services (F)

Under MRTU there is no formal mechanism or specific process for bidding for exports of AS, or for scheduling on-demand export of AS. The optimization does not reserve transmission capacity for this functionality. In MRTU, a manual workaround will be provided for entities with on-demand obligation; to the extent transmission capacity is available (or must be reserved according to ETC/TOR rights). This issue would explore how to build the reservation of transmission capacity into the optimization so that market participants who might have an obligation to supply Ancillary Service energy in real-time to neighboring control areas can serve this obligation. FERC's 9/21/06 Order on MRTU (Paragraph 355) directs the CAISO to develop software to support exports of ancillary services in the future through stakeholder processes and to propose necessary tariff changes to implement this feature no later than three years after MRTU start up.

2.3.2.14 Ability to Designate A/S Contingency Hourly (D)

In MRTU the designation of "Contingency Only" Ancillary Services is accommodated on a daily basis. This issue would explore provisions for hourly designation of "Contingency Only" AS a potential post-MRTU feature.

2.3.2.15 Multi-Segment Ancillary Service Bidding (D)

In MRTU, Ancillary Services Bids consist of a single Bid segment. In comments leading up to FERC's 9/21/06 Order on MRTU, Powerex requested that multi-segment bidding should be provided for some Ancillary Services. While FERC did not impose this requirement in MRTU Start Up, FERC directed the CAISO (Paragraph 341) to file a report, before making its MAP Release 2 filing, addressing the potential benefits of including this element.

2.3.2.16 Modeling Constraints of Combined Cycle Units (F)

In MRTU different configurations of a combined cycle unit are modeled collectively as a single resource. The idea here is to model each configuration as a separate resource, and incorporate software capability to ensure changes in configuration during different scheduling and commitment cycles in the course of the optimization process respect all relevant technical and inter-temporal constraints. This approach is of interest to different ISOs, and the CAISO will be monitoring the work of other ISOs in implementing enhanced functionality. Recognizing the software constraints the CAISO is faced with, FERC's 9/21/06 MRTU Order (Paragraph 573) directs the CAISO to continue working with software vendors to develop an application that will accurately detail the constraints of combined cycle units, and to file tariff language for implementation of such improvements no later than three years after MRTU start up.

2.3.2.17 Treatment of use-limited resources with limited number of hours or start ups (D)

Use-limited resources accommodated in MRTU are those with Energy (MWh) limitations. This issue would explore how to incorporate software capability to accommodate other types of use limitation, including limitation on the number of hours of usage, or the number of start-ups a resource may be used for, during the scheduling horizon. Such an evaluation would also consider whether alternatives exist for this type of functionality, since the combination of start-up time, minimum run time, and minimum down time will inherently limit the number of start-ups for a resource during a day, and the incurrence of start-up costs can cause the market optimization to minimize the number of start-ups per day.

2.3.2.18 Start Up Energy Considered as Instructed Energy During Dispatch (D)

The current MRTU design will not explicitly recognize the time lapse from unit synchronization to operations at its minimum stable operating unit. Any Start Up Energy, i.e., energy produced during the time interval from synchronization to minimum load, is assumed to be uninstructed deviation. This issue would explore how Start-up Energy might be considered as instructed energy during the dispatch process. Various stakeholders have suggested that some resources may take time to ramp to minimum load, and that better recognition of this start-up ramp would better reflect the imbalance energy needs and reduce uninstructed deviations during resource start-up.

2.3.2.19 Automation of sub-LAP adjustments in step 3 of LAP clearing validation (I)

As explained in the MRTU Tariff and testimonies, the LAP clearing procedure recommended by LECG and incorporated in MRTU, may under some rare conditions result in unintended inefficiencies. A three-step process was suggested to deal with such rare situations. The third step in this process involves "softening" the constraints imposed by fixed LAP Load Distribution Factors (LDFs) and allowing independent adjustment of nodal loads. A manual process in MRTU will accomplish this step. The issue here is to automate this step in the post MRTU

MRTU software. This issue will be addressed as part of the Parameter Tuning effort. The most recent issue paper is posted at:

http://www.caiso.com/1fb1/1fb1b2f7c080.html

The CAISO will present its recommendations for Board approval at the July 2008 Board of Governors meeting.

2.3.2.20 LAP Granularity (F)

FERC's 9/21/06 Order on MRTU found that the CAISO's approach to calculating and settling energy charges for load based upon three LAP zones provides a reasonable and simplified approach for introducing LMP pricing, while minimizing its impact on load. The Order recognized that some areas could experience higher prices under a nodal model, thus making it desirable to soften the distributional impacts of LMP, and also recognized that LMP could create an economic hardship on entities located in load pockets. Accordingly, FERC approved the CAISO's proposal of three major LAP zones as an acceptable starting point. However, the Order directs the CAISO (Paragraph 611) to increase the number of LAP zones within three years after MRTU start up, to provide more accurate price signals and assist participants in the hedging of congestion charges.

FERC's 9/21/06 MRTU Order (Paragraph 614) noted that previous guidance orders had asked the CAISO to consider an eventual move to nodal pricing for load, and directed the CAISO to move to nodal pricing for load in the future.

FERC's 4/20/07 MRTU Order (Paragraphs 314-331) FERC further directed the CAISO to increase the number of LAP zones within three years after MRTU start up.

2.3.2.21 RUC Self-Provision (D)

Because of limited interest by most market participants in RUC self-provision feature as a priority for MRTU, the CAISO did not to include this feature for Start up. However, FERC's 9/21/06 MRTU Order (Paragraph 172) directs the CAISO to continue to work with market participants on this issue, and to provide reasons for the inclusion or exclusion of RUC self-provision no later than three years after MRTU start up.

2.3.2.22 Two-Tier rather than single-tier Real-Time Bid Cost Recovery Allocation (F)

The existing Real-Time BCR cost allocation for MRTU consists of a single tier charge that is allocated to Measured Demand. In the September 21 Order, FERC ordered the CAISO to file tariff language reflecting such an approach. Stakeholders raised concerns regarding the single tier approach and have requested that the CAISO implement a two tier charge similar to Day-Ahead Bid Cost Recovery where the first tier would allocate costs based on cost causation principles.

In the FERC April 20th Order the CAISO was directed to work with stakeholders to develop a proposal for two-tiered allocation of real-time bid cost recovery costs that could be included within three years after MRTU start up.

Throughout the convergence bidding stakeholder process this issue has been raised as a significant issue that a number of stakeholders desire to be resolved concurrently with the implementation of convergence bidding. The issue was also prioritized as high by certain stakeholders during the MAP scoping stakeholder process.

2.3.2.23 Consideration of UFE as part of Metered Demand for Cost Allocation (D)

SWP in its MRTU filing to FERC requested that UFE be allocated load based costs also. In the filing SWP provided concept of "Gross Demand" incorporating metered demand and UFE that would replace Metered Demand for the purpose of cost allocation.
FERC did not disagree with the concept but rejected the case because the issue was raised late. A similar request was made by SWP with respect to WECC/NERC cost allocation, FERC accepted SWP's proposal and ordered CAISO to file compliance with the provision that metered demand and UFE would be allocated WECC/NERC charges.

2.3.2.24 Multiple SCs at a Single Meter (D)

On June 7, 2006, FERC issued an order directing the CAISO to address the current prohibition on the use of multiple Scheduling Coordinators at a single meter. On July 12, 2006 the CAISO posted a White Paper identifying various options for dealing with this issue, primarily addressing generation. The White Paper is located at:

http://www.caiso.com/1832/1832c86e1ade0.pdf

The City of Riverside has commented that full-scale implementation of the capability of multiple SCs in bidding, operation and settlement would be desirable.

SCE suggests the CAISO should consider redirecting its limited staff to focus on other issues such as MRTU implementation.

Pursuant to the CAISO's compliance filing on September 7, 2006, the FERC noted that at that time there was minimal stakeholder interest for pursuing an immediate software solution for the "Multiple SC at a Single Meter" issue.

More recently, discussions concerning the implementation of enhanced demand response following MRTU have identified a potential role for demand response aggregators who would bid price-responsive demand separately from the initial scheduling of load by load serving entities. Before these could be implemented as separate roles, however, a number of issues about the structure of the retail electricity market would need to be resolved, including responsibility for financial settlements of real-time deviations from schedules and dispatches, and for communication between these entities during the scheduling process. The California Public Utilities Commission has identified these foundational policy issues as part of its development of demand response goals, and the CAISO is participating in the formulation of these policies to ensure that they can be readily implemented in the CAISO's markets once they are formulated.

2.3.2.25 Forward Energy Products (D)

The CAISO should consider offering forward energy products, similar to the PX Block Forward. This was added to the catalogue based on comments submitted by a market participant in April 11, 2008 comments.

2.3.2.26 Extend Look Ahead for Real-Time Optimization (D)

The current Real-time market only does a "5 hour look ahead". As a result, during the operation day, the optimization will ignore units that have a start-up time longer than 5-hours unless they are already running or committed. The optimization should have a process of looking forward for the entire day in order to commit units with longer start-up times.

This was added to the catalogue based on comments submitted by a market participant in April 11, 2008 comments.

2.3.2.27 Marginal Loss Hedging Products (D)

Marginal transmission losses can be a significant cost and cost uncertainty for SCs under MRTU. The CAISO should investigate the feasibility of developing mechanisms or product(s) for hedging uncertainties with respect to the magnitude of marginal transmission losses.

This was added to the catalogue based on comments submitted by a market participant in April 11, 2008 comments.

2.3.2.28 Ability to Bid Start Up Costs and Minimum Load Costs (D)

At the start of MRTU SCs do not have the option to bid start-up costs and have the choice of either selecting proxy cost where the start-up cost will be generated based on fuel prices or registered cost where the CAISO will pull a registered value out of the master file for the start-up cost. This enhancement would allow SCs to bid start-up cost.
This issue was added to the catalogue based on comments submitted by a market participant in April 11, 2008 comments.

2.3.2.29 Sequential Physical Trading Capability (D)

Buyers who receive physical Scheduling Coordinator trades from generation suppliers in the Day Ahead Market should have the ability to trade back the energy to sellers or other eligible Scheduling Coordinators in the Hour Ahead Scheduling Process (HASP) or in the Real Time (RT) market. Currently the MRTU Tariff and MRTU market allows for only financial trades back to the HASP/RT markets.
This was added to the catalogue based on comments submitted by a market participant in April 11, 2008 comments

2.3.2.30 Expedited Reporting of SC Bidding (D)

To increase marker transparency, the CAISO should consider modifying reporting rules for energy and ancillary service bids which are at or nea**r** the bidding caps. Repeatedly bidding at or near price caps, e.g., bidding $399.99/MWh when the price cap is $400/MWh, especially if such bids are for only a small fraction of supply, may be a form of hockey stick bidding designed to manipulate market prices and take advantage of temporary supply and demand conditions. Such bidding has been criticized in appellate decisions reviewing oversight of market based rates, and has been the basis for ordering more rapid disclosure of bids when prices hit caps. In the ERCOT system, when prices hit price caps, limits on disclosure, including entities who make such high bids, are removed. Thus, the release of data should be considered as an interrelated mechanism designed along with price caps to shine the sunlight of public scrutiny on sellers who attempt to set the prices at the highest permissible level. According to one report, once ERCOT began reporting suppliers who bid at a $300/MWh price cap level, the number of suppliers bidding at that cap level dropped by more than two-thirds.
This was added to the catalogue based on comments submitted by a market participant in April 11, 2008 comments.

2.3.2.31 Strengthening General Market Power Provisions (N)

The following three issues were raised in stakeholder comments to the *Initial Scoping of Post MRTU Releases* issue paper that is posted on the CAISO website as high priority market enhancements for post MRTU implementation.

- There is currently no Ancillary Service mitigation; CAISO sub-regional procurement creates market power opportunities.

- There is currently no RUC mitigation; CAISO localized procurement creates market power opportunities

- Potential problems such as hockey stick bidding and evading LMPM need to be considered early in MRTU

The Initial Scoping of Post MRTU Releases issue paper is posted on the CAISO website at the following link:

http://www.caiso.com/1c33/1c33cea74b0a0.pdf

2.3.2.32 Market Power Mitigation of Startup and Minimum Load Cost Bids (D)

In response to concerns identified as part of the initial Market Initiatives Roadmap developed in 2006, the CAISO developed bid caps for startup and minimum load bids submitted by generators under the six-month bid-based option for startup and minimum load bids (See Five-year Market Initiatives Roadmap, 2008-2012, REVISED DRAFT – April _15_, 2008, Section 2.1.4, p.12). The proposed caps were designed to be implemented by limiting bids that can be entered in the Master File, so that these caps could be applied as part of MRTU without changes in the actual MRTU market software. However, as part of the process of developing these bid caps, there was widespread support among stakeholders, DMM and the MSC for pursing a more dynamic approach under which startup and minimum load bids submitted under the six month bid-based option would be mitigated to default cost-based levels only when a unit was committed to meet a non-competitive transmission constraint.

The more dynamic approach that was discussed as part of this process would closely mirror how energy bids will be mitigated under MRTU, as well as how startup and minimum load bids submitted under the six month bid-based option are mitigated under PJM's market design. Specifically, if a unit was not committed under the Competitive Constraints Run (CCR) of the MPM procedures, but was committed under the All Constraints Run (ACC), the unit's startup and minimum load bids would be subject to mitigation to default cost-based levels. With this approach, it may still be necessary to retain some very high caps on startup and minimum load bids submitted under the six month bid-based option, since these bids would still be in effective.

2.4 Seams and Regional Issues

This topic area includes initiatives to improve coordination between the CAISO and neighboring control areas, expand markets for import and export of energy and capacity, and support the continuing development of effective energy markets across the western region.

FERC's September 21 Order on MRTU discussed seams issues and directed FERC staff to convene a technical conference in the western region specifically to identify and find solutions for any seams issues alleged to be created or exacerbated by MRTU. The technical conference was scheduled for December 14-15, 2006, in Phoenix. The CAISO participated in this conference. Shortly before this conference, a Seams Issues Subcommittee (SIS) began to meet, and set out an agenda of multiple items for consideration, many of which initially concerned potential impacts of MRTU. Both the technical conference and SIS meetings to date have concluded that while there are several pre-existing issues in which better integration of

regional markets can occur, they do not result from MRTU and are not obstacles to MRTU's implementation. As these issues are addressed in SIS and similar forums, this section will be updated as appropriate.

These issues can be tied to the Five-Year Strategic Plan under Sub-Objective 2.2 Robust and Transparent Electricity Markets under section 2.2.C entitled "Enhance regional coordination and facilitate improvements to regional energy markets (2008-2012)."

2.4.1 Import and Export of Intermittent Resources (N)

Across the western region there are specific locations where intermitted resources such as wind can be operated most productively, but these locations are not necessarily inside the control areas that can fully utilize such generation. Moreover, some areas that may not contain highly productive intermittent resource locations are still subject to renewable portfolio standards. It is necessary, therefore, to develop principles and procedures for importing and exporting the energy from intermittent resources in a manner that reflects the unique operating characteristics of these resources. This activity spans multiple functions of the CAISO and other organizations, including the Renewables Integration discussed in section 3.2, and infrastructure-related initiatives, as well as market initiatives. This activity also includes collaborative work among the western states' and federal agencies' wind sharing initiatives. Because of the variability of intermittent resources, the market-related aspects have overlapping issues with section 2.4.8, "Dynamic Scheduling (Import and Export) for Load and Generation".

2.4.2 Interchange transactions after the Real Time Market (D)

This item will explore ways to allow Scheduling Coordinators to schedule bilateral import and export transactions with the CAISO after the close of the Real Time Market at T-75 minutes, in situations where the needed import and export transmission capacity is available. Although some interchange transactions would not be fully dispatchable, this topic has overlapping issues and would be coordinated with section 2.4.8.

2.4.3 Import and Export of Ancillary Services (D)

This item will consider ways to expand the ability to import and export reserves, and to clearly define the relationship between Energy schedules on interties and the associated ancillary service requirements.

SCE suggests that interruptible imports bidding into the CAISO market should be charged for the additional Operating Reserve. SCE comments that "…prior to allowing non-firm import sales in any future Release, the CAISO must, at a minimum, have systems in place, which charge the non-firm imports for their associated AS." (See SCE Comments on Market Initiatives, July 28, 2006, at:

http://www.caiso.com/1845/18459b7a4f300.pdf)

Additional aspects of this issue are raised by a requirement in the MRTU design that was stated in FERC's 9/21/2006 decision to conditionally approve the MRTU tariff. This requirement is that export schedules that are not supported by RA resources should have equal scheduling priority as Demand within the CAISO control area, and the CAISO has implemented this requirement in MRTU. In doing so, the CAISO has recognized additional issues, including whether the requirement for the non-RA resources to bid into the CAISO market should extend past the Day-Ahead market, and whether there should also be an obligation to offer ancillary service bids.

Alternatively, a scheduling option for a "unit contingent" exports could resolve questions about ancillary service requirements for these high-priority exports.

The CAISO will provide a preliminary issue paper to further define these issues.

2.4.4 Improve Tagging Procedures and Functionality (D)

This item will consider methods to better integrate and streamline the process of producing market schedules and tagging such schedules. By eliminating duplicate information that exists in market schedules and tags it may be possible to streamline the control area check-out process and eliminate market schedule and tagging inconsistencies that can have reliability impacts. By using tag information such as the physical source and physical sink it may be possible to expand upon the benefits of the Full Network Model by modeling the flow effects of the interchange schedules.

The CAISO has already acted to request information in tags that identifies the physical source and sink, through Operating Procedure S-313, "NERC Tagging Requirements", at:

http://www.caiso.com/docs/2002/04/26/200204261503156164.pdf

However, improved support of regional congestion management would result from further standardization in WECC of identifying physical sources, and from integration of the tagging process within the CAISO's market processes instead of relying on tags as confirmations of market schedules. This would be coordinated with the effort described in section 2.4.5, "Exchange of Day-Ahead Scheduling Information".

2.4.5 Exchange of Day Ahead Scheduling Information (D)

The CAISO will work with other control areas in the west to establish day-ahead exchange of scheduling information, to allow coordinated day-ahead congestion management and to reduce the magnitude of unscheduled loop flows in real time by capturing a major portion of such flows in the day-ahead process. The CAISO is an active participant in the WECC Seams Issues Subcommittee (SIS). Pending the development through SIS of a process for coordinated Day-Ahead congestion management, the CAISO is pursuing improvements in its coordination with individual neighboring control areas, through the Interconnected Control Area Operating Agreements that the CAISO has with most of these areas. These commitments are stated in the CAISO's January 16, 2007, "Post-Technical Conference Comments on Seams Issues of the California Independent System Operator Corporation", which are available at:

http://www.caiso.com/1b69/1b69af1156ac0.pdf

The CAISO has added transmission facilities in neighboring control areas to the CAISO's network model in cases where the CAISO has determined through optimal power flow studies that doing so increases the accuracy of congestion management within the CAISO control area, and has also developed software functionality in MRTU for modeling embedded and adjacent control areas for which adequate information is available to the CAISO to support these models. The CAISO will be issuing white papers describing these features.

Finally, it is notable that the recently adopted NERC standard TOP-005-1, "Operational Reliability Information", establishes requirements for Balancing Authorities and Transmission Operators to provide to other Balancing Authorities and Transmission Operators with immediate responsibility for operational reliability, the operating data that are necessary to allow them to perform operational reliability assessments and to coordinate reliable operations. As this information exchange, the CAISO expects that it will facilitate improvements to the CAISO's congestion management. This standard is at:

ftp://www.nerc.com/pub/sys/all_updl/standards/rs/TOP-005-1.pdf

Pending development of WECC-wide mechanisms for coordinating information exchange and congestion management, the CAISO is implementing currently-feasible mechanisms for integrating the most critical Balancing Authority Areas into the CAISO's markets. Details of this process are available at:

http://www.caiso.com/1f50/1f50ae5b32340.html

2.4.6 Dynamic / Pseudo Tie Imports (D)

Increasingly, dynamic scheduling and pseudo-tie scheduling arrangements are being proposed and implemented. As different versions of these arrangements are proposed, the impact to the market design is evaluated and recommendations made regarding the implementation of such arrangements. In addition, as the new arrangements are implemented, monitoring is performed to ensure the dynamic and pseudo-tie scheduling arrangements are operating as expected. This topic will be discussed further under section 2.4.8. This issue has been addressed for generators but not for load. If market participants have interest in pursuing this issue further it will be added to the roadmap for consideration and ranking in the future.

2.4.7 Maximizing Intertie Transfer Capability (D)

BPA identifies this issue as a way to enhance reliability, market competitiveness, and system efficiency: "Highest priority should be coordination of ATC calculations, outages, and curtailments to maintain transfer capability. Creating opportunities for secondary marketing of unused capacity is another priority, including using any available intertie rights (not just PTO rights) to reach CAISO markets and participants."

BPA's comments are located at:

http://www.caiso.com/1845/184597e041d00.htm

The CAISO will continue to participate in standard setting activities with NERC and is required to comply with NERC standard once they are developed. This initiative is not considered discretionary and will not be included in the ranking process.

2.4.8 Dynamic Scheduling (Import and Export) for Load and Generation (N, I)

NCPA's comments suggest this market initiative issue for consideration. (See NCPA Comments, July 28, 2006 at:

http://www.caiso.com/1845/18459bee52990.pdf)

A dynamic intertie schedule is one that can be dispatched by the CAISO on the same 5-minute intervals that apply to generation within the CAISO control area, or that have specific arrangements between control areas for other forms of sub-hourly dispatch. In contrast, traditional intertie schedules are hourly schedules, which change between hours using established ramping schedules that are common throughout WECC. As noted in sections 2.4.1, 2.4.2, and 2.4.6, as well as in this section 2.4.8, topics have arisen that involve changes in intertie schedules at intervals that are more frequent than traditional hourly interchange schedules.

In the April 2004 filing of Amendment 59, footnote #7, the CAISO offered the potential for a pilot program. A pilot program provides practical experience and aids in the development of formal policy, standards and Tariff provisions, if deemed appropriate. MRTU supports dynamic imports, as documented in the BPM for Market Operations. MRTU also supports "pseudo ties" for both import and export; this is a variation in which a specific resource, that is located within one control area, is established through contracts as being part of another control area for purposes of control area operations.

The CAISO and SMUD have included provisions in the Interconnection Control Area Operating Agreement (ICAOA), that allows a dynamic scheduling export pilot program. The Sutter power plant, which is connected to the Western Area Power Administration's transmission system in the SMUD control area, is operated as a "pseudo-tie" such that Sutter is considered to be part of the CAISO control area and uses transmission service through the Western transmission system. Similarly, the New Melones power plant, which is connected to the PG&E transmission system within the CAISO control area, is operated as a "pseudo-tie" such that it is considered to be part of the SMUD control area and uses ETC rights through the PG&E transmission system.

Dynamic exports are less common. If a market participant identifies a specific need to create a dynamic export from the CAISO control area, the CAISO will work with that market participant to determine the best arrangement to meet the identified needs.

This development of an agreement for Dynamic Resource Specific System Resources to participate in the CAISO markets is in progress. The documents specific to this effort are posted at:

http://www.caiso.com/1fac/1facad3d35ee0.html

2.4.9 Normalization of Standards of the Sale of RA Transmission and Generation Across Interties (N)

This issue was raised as a high priority item in stakeholder comments to the DRAFT Initial Scoping of Market Enhancements for MRTU. There are a variety of issues that complicate the import of RA, energy and ancillary services from the Northwest and other adjacent control areas. Some of these issues are the timing of transaction (T-20 vs. T-75), variations in the treatment of firm energy, and the withholding of unused transmission. These problems are the backdrop for the more obvious problems around the import of intermittent resources, the exchange of scheduling Information and intertie transfer capability. This issue involves the CAISO taking several steps toward normalizing transactions between control areas. First, a regional definition for characteristics of standard transactions and terms should be sought. Second MRTU design should accommodate those regionally defined transactions. Finally, a general agreement enabling the long term access to and reservation of transmission in the regional context (i.e. across ties) should be found.

2.4.10 Integrated Balancing Authority Areas (IBAA) (I)

Early in the MRTU design process the CAISO recognized the need to incorporate in its Full Network Model (FNM) the details of certain neighboring Balancing Authority Areas (BAAs). The important BAAs to model in the FNM are those in which the power flows on their systems have large impacts on power flows within the CAISO Controlled Grid. The CAISO determined that in order to accurately and reliably manage congestion on the CAISO Controlled Grid under MRTU, the CAISO had to accurately model and capture the power flow or network effects of these BAAs in the CAISO's MRTU market systems, specifically, to integrate detailed models of these BAAs into the FNM for MRTU. The CAISO originally referred to the BAAs whose systems

would be modeled in the FNM as Embedded Control Areas and Adjacent Control Areas, but now refers to them as Integrated Balancing Authority Areas or IBAAs.

For the startup of the MRTU markets the CAISO will be modeling two IBAAs in the FNM: the Sacramento Municipal Utility District (SMUD) IBAA, and the Turlock Irrigation District TID) IBAA. These two BAAs were identified as the highest priority for IBAA modeling, but they are not the only neighboring BAAs that need to be incorporated in the FNM to accomplish the fundamental MRTU design objective of accurate Day Ahead and Real Time congestion management. The CAISO therefore intends to continue the IBAA effort to achieve these important enhancements to the FNM.

2.5 Reliability Products

The focus of this initiative is to determine how the CAISO can meet its needs for reliability products and services in the most efficient manner, utilizing market mechanisms where effective. In the course of this assessment the CAISO will also consider whether new products or services should be defined to meet reliability needs that are not fully met by existing products. The following products have been identified to date.

2.5.1 Voltage Support Procurement (D)

This issue involves the development of a methodology for competitive procurement of Voltage Support services.

The CAISO presented papers on both Voltage Support and Black Start during a stakeholder conference call on June 29, 2006, which are available at:

http://www.caiso.com/181c/181ca4c9731f0.html

These papers concluded that there is a wide variety of procurement and cost allocation methods among markets around the world, and that further studies could consider a range of future options.

2.5.2 Black Start Procurement (D)

This issue involves the development of a competitive procurement methodology for Black Start services.

The CAISO presented papers on both Voltage Support and Black Start during a stakeholder conference call on June 29, 2006, which are available at:

http://www.caiso.com/181c/181ca4c9731f0.html

These papers concluded that there is a wide variety of procurement and cost allocation methods among markets around the world, and that further studies could consider a range of future options.

2.5.3 Frequency Responsive Reserve (FRR) (N)

Recently the WECC Compliance Monitoring and Operating Practices Subcommittee (“CMOPS”) proposed the definition of a new Ancillary Service, Frequency Responsive Reserve (“FRR”), which will have one-minute response capability. It has been estimated that 3200 MW of this reserve will be needed in the west, of which 750-800 MW will be needed within the CAISO Control Area. If approved ultimately by WECC, the CAISO will need to determine the most effective way to procure this service and develop the appropriate procurement mechanism. At

the June 2007 WECC Board of Directors meeting, the Board adopted a proposal by the WECC Operations Committee for a regional criterion to provide for Western Interconnection-wide field testing of the FRR concepts, whose intent is data collection and data analysis, and which expires in September 2009 unless it is extended by the Operating Committee.

As this effort progresses, the CAISO will determine its requirements under this standard.

Ancillary Services from Participating Load addressed in section 3.1.3, Demand Response.

2.5.4 Operating Reserve Market Refinements (N)

Potential changes in operating reserve requirements combined with changes in the resource mix used to meet CAISO load (i.e., increase in intermittent renewable resources), have resulted in the need for a comprehensive review of the operating reserve markets and products offered by the CAISO. This review would include each of the items discussed in section 2.5 as well as any gaps that are identified for the reliable operation of future system configurations.

2.5.4.1 30 Minute Operating Reserve (D)

During the stakeholder process of various Market Initiatives (CPUC Capacity Market Proceeding, Scarcity Pricing) stakeholders have raised the potential benefits of a new Ancillary Services Product to address 30 minute reliability contingencies. Under the current market ancillary services market structure, potential contingencies that could be covered by a 30 minute product are addressed using 10 minute ancillary services products which could result in the CAISO needing to procure Ancillary Services on a sub-regional basis in higher amounts than would otherwise be necessary to meet WECC operating reserve requirements. Additionally, if the CAISO is unable to procure enough reserves through the market, exceptional dispatch would be used. An alternative that has been suggested is to develop a new 30 minute AS product."

2.5.4.2 Products Needed to Support Renewable Integration (D)

The significant increase in intermittent renewable resources in the CAISO control area may require new products to enable the CAISO to reliably operate the transmission grid. The CAISO is currently analyzing the operation requirements for the effective integration of renewable resources into the CAISO control area. Once these requirements have been identified, the CAISO will review what potential market design and product offering changes are necessary to maintain reliable system operations.

2.6 Grid Management Charge (GMC) & Financial Issues

2.6.1 Payment Acceleration (I)

SCE and RTO Advisors suggest the on-going effort to reduce the amount of time for settlement reconciliation should be included as a market initiative issue.

“SCE has not seen a CAISO process to actually implement payment acceleration assuming an MRTU implementation of November 2007. If payment acceleration is still expected to be implemented six months after Release 1, the CAISO must refocus attention on this issue.” (See SCE Comments on Market Initiatives, July 28, 2006, at:

http://www.caiso.com/1845/18459b7a4f300.pdf)

"This is not a Post Release 1 issue, but should be included in the category, "Current Market Initiatives (pre-MRTU). We urge the CAISO to add this to the list of active Market Initiatives and to discuss progress on this effort at future meetings." (See Comments of RTOAdvisors, July 28, 2006, at:

http://www.caiso.com/1845/18459965461b0.pdf)

Powerex submitted the following comments on April 11, 2008 for consideration to be added to the scope of the payment acceleration project "The length of the CAISO's payment cycle far exceeds that of all other ISO's which all have either monthly or weekly payment cycles. CAISO should work towards a weekly payment cycle as a MAP initiative but start MRTU Go-Live with a monthly payment cycle."

Payment acceleration is included in the Five-Year Strategic Plan under Objective 1.0 – Excellence in Grid and Market Operations, under sub-objective 1.0.D entitled "Institute actions to achieve an efficient cash clearing timeframe." It will not be implemented in at MRTU Start Up but is scheduled to be implemented six months later.

2.6.2 GMC Under MRTU (I)

On July 26, 2006 the CAISO filed with FERC a request to extend the current GMC settlement until the earlier of MRTU implementation or December 31, 2007 with one change to eliminate a single rate applied to the Modesto Irrigation District. No protests were filed. On September 6, 2006, FERC approved the CAISO request by letter order.

Since September 2006, the CAISO has been working with stakeholders on the GMC rate structure under MRTU. Stakeholders and the CAISO have agreed on a set of GMC rate structure elements that will allow SaMC programming to begin, while providing a structure by which analysis of impacts can be performed over the coming months. The GMC rate structure under MRTU will be discussed at the October 2007 CAISO Board of Governor's Meeting and will be filed with FERC by October 31 2007.

2.6.3 Default Charge-Back Mechanism (I)

The current CAISO tariff has a charge-back mechanism that mutualies market participant credit defaults amongst only those market participants considered to be creditors. All other ISO's mutualise credit defaults against all market participants based on the absolute volume or notional value of a market participant's purchase and sale transactions over the billing cycle. The CAISO should update their tariff to mutualise credit defaults amongst all market participants.

CAISO Finance will begin a stakeholder process this summer to address this issue.

This was added to the catalogue based on comments submitted by a market participant in April 11, 2008 comments.

2.6.4 Maximum Unsecured Credit Limits (I)

Most other ISO's have maximum unsecured credit limits that are significantly lower than those of the CAISO. The CAISO should reduce the maximum unsecured credit limits available to market participants.

By improving the CAISO's payment and credit processes, the CAISO will bring their payment and credit processes closer to industry best practices with respect to payment practices and

credit risk management, thereby minimizing the credit risk associated with member participation in the CAISO markets.

CAISO Finance will begin a stakeholder process this summer to address this issue.

This was added to the catalogue based on comments submitted by a market participant in April 11, 2008 comments.

2.7 Congestion Revenue Rights

This section describes enhancements to the CAISO's rules and systems related to Congestion Revenue Rights (CRRs), including both short-term (i.e., one-year Seasonal and Monthly) CRRs as well as Long Term CRRs. CRRs are both allocated to load serving entities and auctioned to all market participants, and the MRTU Tariff establishes several distinctions in the CRR release process for CRR Year One compared to subsequent years. With MRTU start-up delayed until later in 2008, the CAISO conducted a stakeholder process regarding the CRR Year 2 enhancements. This initiative was approved by the Board of Governors and filed with FERC in May, 2008. Documents related to this initiative are located at:

http://www.caiso.com/1b8c/1b8cdf25138a0.html

The CRR Year 2 annual release process (for seasonal CRRs effective in 2009) is expected to begin in summer 2008. .

2.7.1 Credit Requirements For CRR Holders (I)

With the introduction of obligation CRRs in the CAISO markets, market participants may obtain negatively valued CRRs which would have financial obligations in the Day Ahead Market. To minimize the risk to all market participants of a payment default by the negatively valued CRR holder, the CAISO conducted a stakeholder process leading to the CAISO's June 22, 2007 filing to FERC. The August 28, 2007 FERC Order approving this credit policy is located at:

http://www.caiso.com/1c48/1c48f26264e90.doc

The CAISO's credit requirement policies for CRRs are described in the Business Practice Manual on Credit Management.

This initiative was approved by the Board of Governors and filed with FERC in May, 2008.

2.7.2 Increased MW Granularity of CRR Tracking (I)

The CAISO's software systems were originally designed to track CRR MW quantities at a level of 0.1 MW. Recent changes to some of the CRR rules – particularly the rules for CRR transfers to reflect load migration and for disaggregating CRR nominations sourced at Trading Hubs in the allocation process – have created a need for finer granularity in the CRR tracking system. The CAISO currently is developing a configurable threshold for MW granularity so that CRRs smaller than 0.1 MW could be released. During the spring of 2008 the CAISO will review and determine with stakeholders the value of MW granularity for CRRs to be released in the CRR Year 2 release process, which is expected to begin during the summer of 2008.

Documents and stakeholder comments related to this stakeholder process on various CRR issues, including the determination of MW granularity for CRRs, are located at:

http://www.caiso.com/1b8c/1b8cdf25138a0.html

. This initiative was approved by the Board of Governors and filed with FERC in May, 2008

2.7.3 Economic methodology to determine if a transmission outage needs to be scheduled 30-days prior to the outage month (I)

Currently the ISO Outage BPM requires that all transmission outages must be scheduled with the CAISO at least 30-days prior to the month in which they are planned to occur unless they fall under one of the three exemption criteria. However, the tariff currently indicates that only outages that have a significant economic impact need to be scheduled 30-days prior to the month. The CAISO needs to develop a process that performs an economic analysis to determine if a specific outage must be schedule 30-days in advance. Such a process should consider the resulting flows and costs associated with an outage and would exempt outages below a certain cost threshold from the 30-day scheduling rule. It is important for the CAISO to develop an outage reporting schedule (minimum of one month's notice) that is adequate to support congestion revenue rights and for informing market participants as to when significant transmission outages may occur.

This was added to the catalogue based on comments submitted by two market participant in April 11, 2008 comments.

The CAISO has committed to assess the effectiveness of 30-day rule exemptions policy for ensuring CRR revenue adequacy.

2.7.4 Long Term CRR Auction (F)

The CAISO's January 29, 2007 compliance filing on Long Term CRRs noted that several parties wanted the CAISO to implement an auction process for Long Term CRRs, which the CAISO agreed to consider for a future release. FERC's July 6, 2007 Order on CRRs encourages the CAISO to initiate the stakeholder process and file tariff language to implement an auction for residual Long Term CRRs in MRTU Release 2. The current ranking process has demonstrated that this item is considered high priority due to its expected market efficiency benefits and the high level of stakeholder desire for it.

In identifying this item as high priority, the CAISO notes that it would be logical to combine it with two other CRR-related items which individually were not ranked high in the current process: (1) multi-period optimization algorithm for Long Term CRRs (section 2.8.4 of the April 15 version of the Roadmap), and (2) flexible term lengths of Long Term CRRs (section 2.8.7). In addition it would also be logical to include a third item with these other items, namely, sale of CRRs in the CRR auctions (section 2.8.3, provided below). In the current ranking process, however, that item ranked high by itself and therefore is retained in the present document as a separate item that could be implemented independently of a Long Term CRR auction. If the CAISO and the stakeholders decide to move forward with a Long Term CRR auction, then the ability to sell CRRs in the auctions would be included in the scope of that effort.

The multi-period optimization algorithm, for which the April 15th Roadmap discussion is provided below, was already recognized by the CAISO as an important CRR enhancement to enable the Long Term CRR release process to recognize future changes in transmission encumbrances over the horizon of the nominated Long Term CRRs (mainly the expiration of ETCs, CVRs and previously-released Long Term CRRs). The multi-period optimization algorithm will thus enable the CAISO to find a more optimal balance between the competing objectives of releasing as many Long Term CRRs to the market as possible while minimizing the risk of CRR revenue inadequacy. In the context of an auction for Long Term CRRs, the multi-period optimization will result in auction prices that more accurately reflect the expected values of the Long Term CRRs

being awarded. The CAISO therefore believes that the multi-period optimization algorithm is an essential component of a Long Term CRR auction.

With regard to flexible term lengths for Long Term CRRs (see below), the implementation of the multi-period optimization algorithm will make it possible to allow additional choices by market participants beyond the current single 10-year term provided under the existing rules. The exact nature of the allowable choices will be a topic for discussion with stakeholders as the policy and design of this item are developed.

2.7.5 Flexible Term Lengths of Long Term CRRs (D)

FERC's July 6, 2007 Order on CRRs encourages the CAISO to consider future flexibility to allow: (i) Long Term CRRs in excess of 10 years, or (ii) annual CRRs with guaranteed renewal rights up to year 10, or (iii) Long Term CRRs with terms ranging from 2 to 9 years. FERC notes that any subsequent change in the available term lengths would have to respect the rights of the holders of any outstanding 10-year CRRs.

2.7.6 Multi-period Optimization Algorithm for Long Term CRRs (D)

When the CAISO performs the initial release of Long Term CRRs for the period 2008-2017, the Simultaneous Feasibility Test (SFT) optimization will treat the entire 10-year time horizon as a single time period (for each combination of Season and Time of Use period) with respect to network model assumptions. The CAISO has recognized that a multi-period algorithm can result in a more optimal allocation of Long Term CRRs because it would be able to reflect different assumptions for each year regarding the availability of grid capacity for CRRs, in particular the known expiration of previously released Long Term CRRs, Existing Transmission Contracts and Converted Rights. FERC's July 6 Order affirms that if the CAISO and its stakeholders choose to implement the multi-period algorithm, the CAISO must make a compliance filing within 30 days explaining the reasons for the change, how the change will affect Long Term CRR nominations, and how the change has been tested. The CAISO had planned to develop this functionality in time for the CRR Year Two release process, but is now deferring implementation of this feature beyond CRR Year 2.

2.7.7 Sale of CRRs in the CRR Auctions (F)

The CRR systems for CRR Year One do not have functionality to allow a party to offer for sale in a CAISO CRR auction some of the same CRRs that were previously awarded in an auction or allocation process. The systems do allow the party to engage in a financially equivalent transaction, but this equivalent transaction results in the party holding two equal and opposite CRRs that net out financially, rather than allowing an actual transfer of the original CRR. For example, if the party holds a CRR of 10 MW from source A to sink B and wants to sell that CRR in a CAISO auction, under the CRR Year One functionality the party cannot offer to sell that exact CRR, but must offer to buy at a negative price (assuming the original A to B CRR has positive expected value) a CRR of 10 MW from source B to sink A. If this offer clears the auction, the party ends up holding two 10 MW CRRs, one from A to B and another from B to A, and receives payment for the negative auction clearing price of the B to A CRR which should be the same as the price the party would have received for selling the A to B CRR at a positive price.

Of course, the party also has the option of selling the original A to B CRR bilaterally and then registering the bilateral transaction in the CAISO's Secondary Registration System, but several parties have previously indicated in the stakeholder process that the ability to offer CRR

holdings for sale in a CAISO auction process would enhance the efficiency of the CRR market. FERC's September 21, 2006 MRTU Order affirms that it would be useful to have this feature, and the CAISO has planned to consider this functionality among the enhancements to the CRR systems for CRR Year Two. The September 21 Order directs the CAISO to file tariff language to implement the ability to sell CRRs in the CRR auctions no later than MAP Release 2. The CAISO had planned to develop this functionality in time for the CRR Year 2 release process, but is now deferring implementation beyond CRR Year 2 because CAISO resources were needed to run an FTR auction in 2008 and to continue focus on MRTU start-up.

2.7.8 Software for Bundling Individual PNode CRRs into Trading Hub CRRs (D)

The rules for handling CRR nominations sourced at a Trading Hub in the allocation process use a "disaggregation" approach whereby such nominations are disaggregated or unbundled into individual Point-to-Point CRRs each of which has as its source a Generating Unit PNode that is a constituent of the Trading Hub. Such nominations are then submitted to the optimization and eventually awarded to the nominating LSE in the unbundled form. Although the CRR Sources in the awarded "bundle" are expected to closely resemble the composition of the Trading Hub, they will in general not match the Trading Hub exactly. FERC's July 6 Order directed the CAISO to consider whether to develop software to assist LSEs in the trading of Trading Hub CRRs by "rebundling" individual PNode CRRs to reconstitute a Trading Hub CRR. More generally the CAISO is also required by the Order to make a compliance filing within 6 months after the start of MRTU that explains whether the disaggregation method remains appropriate.

2.7.9 CRR Source Verification After CRR Year One (I)

The current MRTU tariff provides for CRR source verification in conjunction with CRR allocation to LSEs serving internal load only for CRR Year One. FERC's July 6, 2007 Order on Long Term CRRs (Paragraph 100) encourages the CAISO to consider implementing some form of source verification process in CRR Year Two and beyond.

During the spring of 2008 the CAISO will review and determine with stakeholders this issue, focusing on whether to re-do source verification for seasonal CRRs that did not become effective due to the delay in MRTU start-up beyond April 2008, as well as for the CRR Year 2 release process, which is expected to begin during the summer of 2008.

Documents related to this stakeholder process on various CRR issues, including whether to re-do source verification for certain Seasonal CRRs, are located at:

http://www.caiso.com/1b8c/1b8cdf25138a0.html

The CAISO Board of Governors approved this initiative at the May 2008 Board of Governors Meeting.

2.7.10 Credit Requirements for Long-Term CRRs (F)

The CAISO conducted a stakeholder process in summer 2007 and obtained the CAISO Board of Governors' approval for full-term credit coverage for LT-CRRs. The CAISO filed this proposal with FERC. FERC instead approved only a one year credit requirement for LT-CRRs finding that "multiplying by ten (or by the remaining number of years in the long-term CRR's term) the

auction price of a one-year CRR does not accurately forecast the expected value of a long-term CRR for the duration of its term."[6] Based on this concern, FERC found it was "reasonable under the circumstances to choose lower barriers to entry over the risk of potentially burdensome over-collateralization. Nevertheless, we encourage the CAISO to develop an appropriate method for estimating the value of allocated long-term CRRs that is representative of the financial risk associated with the long-term CRR, and takes into account all years covered by the long-term CRR."[7] In the March 25, 2008 "CRR Credit Policy Enhancement Issue Paper", the CAISO discussed its intent to re-file the full-term credit coverage for LT-CRRs with a modified credit requirement calculation formula to include the "one year historical expected value" of the LT-CRR.[8] Per stakeholder comments received on April 8, 2008, most stakeholders support enhancing the credit requirement for LT-CRRs, but believe that the proposal would benefit from additional stakeholder discussion. To allow more time to develop an appropriate methodology to assess the credit requirement for LT-CRRs, the CAISO will include this issue in the CAISO Market Initiatives Roadmap for stakeholders to discuss.

This initiative should be coupled with Long Term CRR Auction 2.7.3 described above.

2.7.11 Release of CRR Options (D)

FERC's July 6, 2007 Order on CRRs urges the CAISO to continue exploring the feasibility of implementing option CRRs in a subsequent MRTU release.

2.7.12 Use of "Weighted Least Squares" CRR Optimization Algorithm (D)

Under the current algorithm, when two or more CRR allocation nominations by different LSEs compete for limited transfer capacity on a binding transmission constraint, the optimization algorithm will try to maximize the amount of CRRs released by reducing the CRR nomination that has highest effectiveness in relieving the constraint. The advantage of this approach is that the total overall MW of CRRs released is maximized. An undesirable side effect, however, is that the reduction in awarded CRRs due to the constraint will typically fall entirely on the one LSE that nominated the most effective CRR. In previous stakeholder discussions this aspect of the optimization algorithm was identified as a feature we could not change for CRR Year One. A possible alternative the CAISO now wants to discuss with stakeholders at a later time is to utilize a "weighted least squares" algorithm that would allocate shares of the constrained transmission facility to each CRR nomination that has some effectiveness on the constraint. Although this approach will typically result in fewer total CRRs being allocated, it may be considered a more equitable approach to CRR allocation because it distributes the impact of the constraint across all LSEs whose nominations contribute to that constraint.

As a final point, note that the problem described is really only a problem in the CRR allocation processes. In the CRR auction processes the objective of the optimization algorithm is to maximize net auction revenues and therefore the bid prices are also taken into account in any reductions of bid MW to relieve constraints. Auction participants can use their bid prices to express the relative value they place on obtaining CRRs that impact congested transmission facilities.

[6] "Order Conditionally Accepting in Part and Rejecting in Part Tariff Revisions." 120 FERC ¶ 61,192 at P 45 (2007)

[7] *Id.*

[8] The March 25, 2008 CRR Credit Policy Enhancement Issue Paper and stakeholder comments are posted to the CAISO website at http://www.caiso.com/1b8c/1b8cdf25138a0.html

2.7.13 Transition to Auction Revenue Rights System (D)

The initial design of the Congestion Revenue Rights release process, as developed through an extensive stakeholder process during 2005, consists of a process for allocating CRRs to eligible Load Serving Entities, followed by an auction process that enables all creditworthy parties to obtain CRRs both for managing their congestion cost exposure and for speculative purposes. An alternative approach that was considered but rejected during the 2005 design process would be not to allocate CRRs directly to eligible LSEs, but instead to release all available CRRs through an auction process and to allocate shares of the net auction revenues to those LSEs that would otherwise have been eligible for CRR allocation. At the time it was recognized that such an "Auction Revenue Rights" or "ARR" approach to CRR release would offer considerable administrative simplification to the CRR program (to effect transfers of CRRs to reflect direct access load migration, for example), would provide maximum flexibility to all CRR Holders to restructure their CRR portfolios to best meet their business needs, and would ensure deep and liquid CRR auction markets for efficient pricing of all CRRs (important for setting CRR credit requirements, for example). Indeed, for the same reasons the eastern ISOs that started with direct allocation of financial transmission rights to LSEs have since converted to ARR systems. Although the dominant preference among CAISO stakeholders was to start the LMP markets with a system of direct allocation of CRRs to eligible LSEs, the CAISO understood that this design decision was not necessarily intended as the permanent approach for releasing CRRs. Once participants have gained some practical operating experience with CRRs and with the LMP markets in general, the CAISO believes it would be valuable to look again at the potential benefits of an ARR system and consider transitioning to such a system. The CAISO further suggests that this initiative could be undertaken in conjunction with the initiative to develop an auction process for releasing Long Term CRRs, which FERC has directed the CAISO to consider in the MAP Release 2 time frame and is identified elsewhere in this section of the Roadmap.

3. Supply Adequacy Initiatives

The broad area of Supply Adequacy includes primarily activities in which the CAISO is a participant but does not play a lead role, although in most activities the CAISO does have very specific and essential roles and responsibilities. In addition most – but not all – of the initiatives included in this area fall under state or local regulatory jurisdiction rather than under FERC jurisdiction.

3.1 Long Term System Security

The larger share of activities that will ultimately support Long Term System Security are being conducted under the procedural umbrella of the CPUC's Long Term Procurement Plan (LTPP) Rulemaking. This CPUC rulemaking includes the Phase 1 and Phase 2 Resource Adequacy proceedings as well as several more narrowly focused activities such as the Demand Response proceeding, all of which are discussed in the next four sub-sections, the first of which provides an overview of the entire Long Term Procurement Plan Rulemaking. The final two sub-sections describe Long Term System Security initiatives that are closely inter-related with the CPUC's LTPP Rulemaking but are led by the CAISO.

3.1.1 CPUC Long Term Procurement Plan Rulemaking (I)

On February 16, 2006, the CPUC issued its Order Instituting Rulemaking ("OIR") for Long Term Procurement Plans (R.06-02-003). This new proceeding functions as the umbrella rulemaking

for all other procurement related proceedings at the CPUC. It encompasses all phases of the CPUC's Resource Adequacy proceeding, including Phase 1 and Phase 2 described below, as well as the original Resource Adequacy proceeding conducted in 2004-2005. In its OIR the CPUC describes this Rulemaking as follows:

> *The primary purpose of this rulemaking is to serve as the Commission's forum to integrate all procurement policies and related programs. A key representation of this integration is the filing, review and adoption of long-term procurement plans by the IOUs. These plans will cover the period 2007 to 2016 and they will reflect all of the decisions made by the Commission since the last filing of long-term plans. In addition, this rulemaking will seek the participation of ESPs [retail Electric Service Providers] and CCAs [Community Choice Aggregators} as contributors to the state's long-term resource planning process. …This rulemaking will serve as an umbrella proceeding to handle the procurement policy issues that do not warrant a separate rulemaking and it will provide a place to integrate all of our efforts ongoing in the other procurement related dockets, including:*
>
> 1. *Community Choice Aggregation (R.03-10-003);*
> 2. *Demand Response program plans (A.05-06-006 et al.);*
> 3. *Critical Peak Pricing (A.05-01-016 et al.);*
> 4. *Distributed Generation (R.04-03-017 and its successor);*
> 5. *Energy Efficiency (R.01-08-028 and its successor);*
> 6. *Avoided Cost and Qualifying Facility (QF) Pricing (R.04-04-025);*
> 7. *Renewable Portfolio Standards (R.04-04-026 and its successor);*
> 8. *Transmission OII, I.00-11-001; and Renewable Energy Transmission (I.05-09-005);*
> 9. *Confidentiality (R.05-06-040); and*
> 10. *Resource Adequacy Requirements (R.05-12-013).*
>
> *This rulemaking will host any other procurement policy issues that need to be addressed by the Commission in a comprehensive or integrated fashion.*

Consistent with previous CAISO Board directives, the CAISO is supporting the CPUC in this Rulemaking to ensure that the objectives and outcomes of the various phases are aligned and an appropriate mix of resources is procured, in the right geographic areas, in adequate amounts to operate the grid reliably.

The LTPP Rulemaking has been separated into two phases. In LTPP Phase 1 the CPUC reviewed the need for additional policies to support new generation and long-term contracts in California, including possible transitional and/or permanent mechanisms (e.g., cost allocation and benefit sharing, or some other alternative) which can ensure investment in and construction of new generation in a timely fashion. In Phase 2 the LTPP Rulemaking will serve as the forum for the CPUC's biennial procurement review process, established pursuant to AB57, D.04-01-050 and D.04-12-048, which requires that investor-owned utilities submit long-term procurement plans that serve as the basis for their procurement, and will comprehensively integrate all CPUC decisions from all procurement related proceedings. The CAISO is expected to take an active role in the review of these plans to provide insight as to their ability to provide the necessary portfolio of resources that can reliably serve the load in the CAISO control area.

3.1.2 Long Term Resource Adequacy Framework (N)

The nature of the CAISO initiative in this area will depend critically on the outcome of the CPUC's forthcoming decision on the Long Term Resource Adequacy framework (LTRA). For example, if the CPUC decides to adopt a Centralized Capacity Market (CCM) with a primary auction 4-5 years forward of the delivery year, the CAISO would expect to conduct a stakeholder process to develop the details of the CCM design and associated tariff provisions. Alternatively, if the CPUC decides to retain today's purely bilateral RA procurement framework, the CAISO would need to develop a permanent backstop capacity procurement mechanism.

With the start-up of MRTU, the CAISO will implement the Interim Capacity Pricing Mechanism (ICPM) to be used as a backstop capacity procurement device. The ICPM will allow the CAISO to backstop or supplement the RA procurement of LSEs if necessary to ensure that there is sufficient generation capacity available to the CAISO operators to maintain reliable grid operations. The ICPM is scheduled to sunset on December 31, 2010, at which time another backstop capacity mechanism will be needed as a replacement.

In addition, the CPUC Phase 2 Resource Adequacy proceeding initiated in late summer 2006, addressed a number of new topics and suggested improvements to the current RA program. New topics include significant issues such as the institution of a centralized capacity market and a zonal capacity requirements obligation on load-serving entities.

On December 15 2006, the CPUC issued a scoping memorandum that stated that the question of whether to implement a Capacity Market as a central element of its LTRA framework would be included in this proceeding, and a decision on this was scheduled for May, 2008. Most recently the May, 2008 decision has been deferred to an as-yet unspecified date.

The CPUC staff published its "Staff Recommendations on Capacity Market Structure: A Report on the August 2007 Workshops in Collaboration with the CAISO" on January 18, 2008. Comments were filed in February 2008 and Reply Comments were submitted in March, 2008. In its comments the CAISO recommended a Central Capacity Market with a multi-year forward assessment of capacity needs (to be performed collaboratively by CPUC, CEC and CAISO), a multi-year forward primary auction, followed by periodic reconfiguration auctions leading up to each delivery year. All Information related to the Long Term Resource Adequacy proceeding can be found on the CAISO website at the following link:

http://caiso.com/1b7f/1b7fd6ebe740.html

Ultimately the CAISO will need to conduct a stakeholder process which would, at a minimum, develop the replacement for the ICPM when the ICPM sunsets. The specifics of the design of that replacement will of course depend to a large degree on the outcome of the CPUC's decision on the LTRA framework.

3.1.3 Demand Response (N)

With the heat storm of 2006 and record setting load growth in California and the nation, along with the persistent challenges associated with adding new transmission and generation capacity, policy makers, utilities and customers are taking a renewed interest in demand response as a viable option for meeting future resource needs. Interruptible and load cycling programs have long been effective demand "responsive" resources used by utility operators to

maintain reliability, after a system emergency has been declared. However, given deregulation and the spawning of wholesale energy markets, along with the advent of automated, addressable, and dispatchable demand response technologies that can be triggered in very specific and targeted ways, perspectives on demand response applications have broadened. Regulators and policy markers see the potential for demand response to not only enhance the reliability of the grid operator, but to create market efficiencies by adding additional capacity and liquidity to the wholesale energy markets.

The CAISO understood this potential. The CAISO also understood that California was serious about meeting the state's growing energy needs by first lowering demand before increasing supply[9]. Additionally, California is committing millions of dollars on demand response programs, yet both of these efforts are largely disconnected from the CAISO as the grid operator and wholesale market provider.

Understanding that the demand-side represents the "other" economy in the wholesale energy market, the CAISO is working in collaboration with the CPUC, CEC and demand resource providers to advance the integration of demand resources into the CAISO's wholesale market design and grid operations. In this regard, five key demand resource working groups have been formed to help meet this important objective. The five working groups are:

1. Demand Response Participation in MRTU – Completed 11/2008
    - Lead agency- CAISO
2. Demand Response Participation in Post MRTU start up
    - Lead agency- CAISO
3. Demand Resource Product Specification
    - Lead agency- CEC
4. Infrastructure for Demand Resources
    - Lead agency- CEC
5. Vision for Demand Resources
    - Lead agency- CPUC

Each group has specific objectives and resulting deliverables to produce with the over-arching objective being to enable greater participation from demand resources in the wholesale power markets.

This effort is reflected in the Five-Year Strategic Plan in Sub-Objective 2.3 Alignment with State and Federal Priorities under section 2.3.A entitled "Collaborate and help develop environmental policy consistent with reliable system operations."

3.1.4 Resource Adequacy Requirements for Non-CPUC Jurisdictional Entities (I)

The CAISO in collaboration with the CPUC and other local regulatory authorities is establishing a framework of requirements to ensure supply sufficiency for the control area. The CAISO has established appropriate tariff based reliability requirements, which include reporting and offer

[9] CPUC and CEC adopted the Joint Agency Energy Action Plan, which among other things, established a goal of 5% price-responsive demand by 2006 and a loading order that gives highest priority to energy efficiency and demand-side resources in the resource procurement priority order of the IOUs.

obligations to ensure comparability for all parties. Currently, the CAISO is working with non-CPUC jurisdictional entities to implement the reporting requirements such that these entities are providing the CAISO with critical operating information through a standard template. In addition, the CAISO is working with all stakeholders to review the study assumptions and methodologies employed to determine the locational capacity needs in the CAISO control area. Moving forward, this activity will continue to clarify and refine the obligations and processes that all non-CPUC jurisdictional entities will use in meeting the CAISO reliability requirements.

3.1.5 Standard RA Capacity Product (D)

Several parties have urged the CAISO to take up the development of a Standard RA Capacity Product to address the limited tradability of RA Capacity between LSEs that exists today due to the extensive variations among such contracts. Currently RA suppliers' performance and availability obligations are enforced through their bilateral agreements with the LSE buyers of RA Capacity, and there is no defined standard for measuring and ensuring that RA capacity is available when called. The advocates of a CAISO role in standardizing the RA Capacity Product believe that development of standardized performance requirements and compliance and penalty provisions within the CAISO tariff would increase capacity market efficiency (in either centralized or bilateral capacity markets) by creating a more liquid and tradable product.

The first effort the CAISO would need to undertake with stakeholders would be to clearly scope the effort and identify all the issues that need to be addressed. For example, a key component of such standardization would be to determine appropriate performance obligations in a "standard" manner that would be applicable to the diverse types of resources that can offer RA Capacity, and to specify the behaviors that would constitute violations of the performance obligations that are subject to compliance actions such as financial penalties. In addition, the CAISO would need to establish business processes for monitoring compliance in accordance with the required tariff provisions, and settlement functions for assessing any penalties.

3.1.6 Qualifying Facilities (QF) Participation in CAISO Markets (N)

A recent CPUC decision ties utility contract pricing for combined heat and power (CHP) QF facilities to CAISO market prices, yet few CHP projects participate directly with the CAISO. This initiative will analyze related tariff issues and reach out to the industry to better understand the obstacles to their increased engagement with the CAISO and identify next steps (verbiage comes from Five Year Strategic Plan, Initiatives for Sub-Objective 2.3: Alignment with State and Federal Priorities; 2.3.A Collaborate and help develop environmental policy consistent with reliable system operations.

3.2 Renewable Integration (N)

The CAISO's 2008-2012 Five-Year Strategic Plan identified as a key corporate initiative to support State public policy regarding the development and reliable integration of renewable resources (Sub-Objective 1.0.C "Implement projects to facilitate integration of renewable resources."). In support of that objective, in November, 2007, the CAISO published a report entitled, "Integration of Renewable Resources Report, Transmission and Operating Issues and Recommendations For Integrating Renewable Resources on the CAISO Controlled Grid" (Renewable Resources Report or Report). The CAISO initiated the study and resulting report to ensure that the operation and design of the transmission grid fully supports California's

established standards with respect to the development and integration of renewable resources. A number of important follow-up tasks were identified in the CAISO's technical study.

Beginning in the Fall 2007, the CAISO began to develop a high-level program plan to better organize CAISO and stakeholder efforts to support the reliable integration of renewable resources. For purposes of developing and aligning CAISO and stakeholder efforts during the 2008-2012 time period, the program plan identifies five major "Tracks," with fourteen related projects. The program plan includes the following Tracks: 1) Develop Operational Tools; 2) Identify and Develop CPUC Rule and CAISO Tariff Changes and Other Regional Agreements; 3) Perform Required Studies; 4) Market Product Assessment and Development; and 5) Changes to Large Generator Interconnection and Transmission Planning Processes. (The CAISO's Integration of Renewable Resources Program Plan (IRRP) can be found at

http://www.caiso.com/1c51/1c51c7946a480.html).

The IRRP is related to the following other initiatives: 2.3.1.4 Dispatchable Demand Response; 2.3.2.3 Loss Over-collection For Renewable Resources; 2.4 Seams and Regional Issues; 2.4.1 Import and Export of Intermittent Resources; 2.4.2 Interchange Transactions After the Real Time Market; 3. Supply Adequacy Initiatives; 3.1 Long-Term System Security; 3.1.1 CPUC Long-Term Procurement Rulemaking; 3.1.2 Long Term Capacity Pricing Mechanism; 3.1.3 Demand Response; 3.1.4 RA Requirements for Non-CPUC Jurisdictional Entities.

Market Initiatives related to Renewables Integration will be included in this section of the Roadmap as they arise.

3.2.1 Day-Ahead Scheduling of Intermittent Resources (D)

The PIRP program design for MRTU only requires that intermittent resources schedule the Hour Ahead PIRP forecast in HASP to qualify for the program. By not having expected intermittent resource energy included in the Day Ahead IFM, the day ahead market solution is incomplete, adversely influencing day ahead LMP, congestion and RUC awards. As intermittent resources, both solar and wind, become a larger percentage in the California energy supplies, the CAISO should take steps to ensure this energy is fully incorporated into the market

Other issues to consider are:

- Day Ahead Market (DAM) wind scheduling looking at (a) how much wind can be scheduled day ahead (b) will LMP be calculated based on this value or the ISO's own forecast, and (c) how will DA wind schedules affect RUC decisions.
- The operational changes (e.g. additional reserves) and associated costs needed to integrate future wind resources.

This was added to the catalogue based on comments submitted by a market participant in April 11, 2008 comments.

3.3 Responsiveness to State and Federal Greenhouse Gas (GHG) Policy (N)

The CAISO's 2008-2012 Five-Year Strategic Plan identifies several activities related to California's initiatives under AB32 to mitigate carbon emissions from the electricity sector. Over 2007, CAISO, and the Market Surveillance Committee (MSC), undertook a number of events to evaluate the market and reliability implications of GHG policy options. Testimony was provided

to the CPUC and CEC on specific issues. In particular, the policy issues associated with determining the appropriate point of regulation for GHG emissions were examined carefully, as different approaches would have significant implications for CAISO market and system operations. See, e.g., the MSC Opinion found at

http://www.caiso.com/1c9d/1c9d6f661ba60.pdf

In 2008-09, CAISO will continue to provide views on this issue on a consultative basis with state agencies as well as through the MSC. More generally, GHG policy will have a comprehensive impact on CAISO markets and planning functions. As such, CAISO will develop over 2008 an analysis of how GHG policy – and intersecting State regulatory initiatives, such as RPS and once-through cooling -- impacts the California and Western wholesale electricity markets and the implications for State public policy.

Appendix A - Catalogue of Market Enhancements by Status	Catalogue Section	Previous Roadmap Section
In Progress/Planned		
Operating Reserve Procurement	2.1.1	2.4.1
Study of Marginal Loss Surplus Allocation to Regional Measured Demand	2.2.1	2.1.1
Application of Methodology for Competitive Path Assessment	2.2.2	2.1.2
Station Power Initiative	2.2.3	2.1.3
Limits on Start-up/Minimum Load Costs	2.2.4	2.1.4
Tracking and Reallocation of CRRs as Load Migrates	2.2.5	2.1.5
Generation Resources for Meeting Resource Adequacy Requirements	2.2.6	2.1.6
New Methodology for Pricing and Settlement of Real-Time LAP Load Deviations	2.2.7	2.1.7
Interim Measures to Address Day-Ahead Underscheduling	2.2.8	2.1.8
Partial RA Units	2.2.9	2.1.8.1
Convergence Bidding	2.3.1.1	2.2.1.1
Day-Ahead Market Power Mitigation Based on Bid-In Demand	2.3.1.2	2.2.1.2
Scarcity Pricing	2.3.1.3	2.2.2
A/S Locational Cost Allocation	2.3.1.4	2.5.5
Dispatchable Demand Response	2.3.1.4	2.2.2.1
Relax DEC Bidding Activity Rules on Final Day-Ahead Resource Schedules	2.3.1.5	2.2.2.2
Issues Related to Constrained Output Generation Pricing (COG)	2.3.1.6	2.2.2.3
Competitive Path Assessment Seasonally	2.3.1.7	2.2.2.4
Automation of Sub-LAP adjustments in Step 3 of LAP Clearing Validation	2.3.2.20	2.2.3.20
Payment Acceleration	2.3.2.26	2.2.3.27
Compensation for Exceptional Dispatch	2.2.10	2.2.3.33
Integrated Balancing Authority (IBAA)	2.4.10	2.3.10
GMC Under MRTU	2.6.2	2.7.1
Default Charge-Back Mechanism	2.6.3	2.7.2

Maximum Unsecured Credit Limits	2.6.4	2.7.3
Credit Requirements for CRR Holders	2.7.1	2.8.1
Increased MW Granularity of CRR Tracking	2.7.2	2.8.2
Economic Methodology to Determine if an Outage Should be Scheduled 30 Days in Advance	2.7.3	2.2.3.30
CRR Source Verification after Year 1	2.7.9	2.8.6
CPUC Long Term Procurement Plan Rulemaking	3.1.1	3.2.1
Resource Adequacy Requirement for Non-CPUC Jurisdictional Entities	3.1.4	3.2.6
Non-Discretionary Items		
Import and Export of Intermittent Resources	2.4.1	2.3.1
Dynamic Scheduling (Import and Export) for Load and Generation	2.4.8	2.3.8
Normalization of Standards of Sale of RA Transmission and Generation Across Ties	2.4.9	2.3.9
Frequency Responsive Reserve	2.5.3	2.5.3
Long Term Resource Adequacy (RA) Framework	3.1.2	3.2.3
Demand Response	3.1.3	3.2.4
Qualifying Facilities (QF) Participation in CAISO Markets	3.1.6	
Renewable Integration	3.2	3.3
Strengthening General Market Power Provisions	2.3.2.31	2.2.3.26
Responsiveness to State and Federal Greenhouse Gas (GHG) Policy	3.3	3.4
FERC Mandated Items		
Multi-Hour Block Contraints in RUC	2.3.2.2	2.2.3.2
Rebate of Loss Overcollection for Renewable Resources	2.3.2.3	2.2.3.3
Ancillary Services Substitution	2.3.2.7	2.2.3.7
Bid Cost Recovery for Units with Run Times that exceed 24 Hours	2.3.2.10	2.2.3.10
Exports of Ancillary Services	2.3.2.13	2.2.3.14
Modeling Constraints of Combined Cycle Units	2.3.2.16	2.2.3.17
LAP Granularity	2.3.2.20	2.2.3.21
Two-Tier rather than single-tier Real-Time Bid Cost Recovery	2.3.2.22	2.2.3.23
Long Term CRR Auction	2.7.4	2.8.8

Sale of CRRs in CRR Auction	2.7.7	2.8.3
Credit Requirements for Long Term CRRs	2.7.10	2.8.9
Discretionary Items		
Simultaneous Residual Unit Commitment (RUC) and IFM	2.3.2.1	2.2.3.1
Consideration of Full Hour-Ahead Settlement	2.3.2.4	2.2.3.4
Dynamic Pivotal Supplier Test	2.3.2.5	2.2.3.5
Multi Settlement System for A/S	2.3.2.6	2.2.3.6
Consideration of Import Energy in RUC	2.3.2.8	2.2.3.8
Multi-Day Unit Commitment in the IFM	2.3.2.9	2.2.3.9
Ramp Rate Enhancements	2.3.2.11	2.2.3.12
Ancillary Service Self-Provision at the Interties	2.3.2.12	2.2.3.13
Ability to Designate A/S Contingency Hourly	2.3.2.14	2.2.3.15
Multi Segment A/S bidding	2.3.2.15	2.2.3.16
Treatment of Use-Limited Resources with Limited Number of Hours or Start-Up	2.3.2.17	2.2.3.18
Start-Up Energy Considered as Instructed Energy During Dispatch	2.3.2.18	2.2.3.19
RUC Self-Provision	2.3.2.21	2.2.3.22
Consideration of UFE as Part of Metered Demand for Cost Allocation	2.3.2.23	2.2.3.24
Multiple SCs at a Single Meter	2.3.2.24	2.2.3.25
Forward Energy Products	2.3.2.25	2.2.3.28
Extend Look Ahead for Real-Time Optimization	2.3.2.26	2.2.3.29
Marginal Loss Hedging Products	2.3.2.27	2.2.3.31
Ability to Bid Start-Up Costs and Minimum Load Costs	2.3.2.28	2.2.3.34
Sequential Physical Trading Capability	2.3.2.29	2.2.3.35
Expedited Reporting of SC Bidding	2.3.2.30	2.2.3.36
Mitigation of Start Up and Minimum Load Cost Bids	2.3.2.32	
Interchange Transactions After the Real-Time Market	2.4.2	2.3.2
Import and Export of Ancillary Services	2.4.3	2.3.3
Improving Tagging Procedures and Functionality	2.4.4	2.3.4

Exchange of Day-Ahead Scheduling Information	2.4.5	2.3.5
Dynamic Pseudo Ties	2.4.6	2.3.6
Maximizing Intertie Transfer Capability	2.4.7	2.3.7
Voltage Support Procurement	2.5.1	2.5.1
Black Start Procurement	2.5.2	2.5.2
30 Minute Operating Reserve	2.5.4.1	2.5.4
Operating Reserve Products Needed to Support Renewable Integration	2.5.4.2	
Flexible Term Lengths of Long Term CRRs	2.7.5	2.8.7
Multi Period Optimization Algorithm for Long Term CRRs	2.7.6	2.8.4
Software for Bundling Individual Pnode CRRs into Trading Hub CRRs	2.7.8	2.8.5
Release of CRR Options	2.7.11	2.8.10
Use of Weighted Least Squares CRR Optimization Algorithm	2.7.12	2.8.11
Transition to Auction Revenue Rights System	2.7.13	2.8.12
Standard RA Capacity Product	3.1.5	3.2.7
Day-Ahead Scheduling of Intermittent Resources	3.2.1	3.3.1