



California ISO
Shaping a Renewed Future

Draft Final Proposal

**Post-emergency
bid cost recovery filing review**

January 4, 2012

Post-emergency BCR filing review

Prepared for discussion on a stakeholder call – January 11, 2012

1 Introduction

In the first half of 2011, the ISO made two emergency filings with FERC to mitigate observed adverse market behavior that resulted in the increase of bid cost recovery uplift payments. In the first of these two filings which was made on March 21, 2011, the ISO committed to “conduct a stakeholder process to provide stakeholders an opportunity to comment and raise any further changes or refinements to the ISO’s proposed tariff amendments.”¹

This stakeholder initiative is intended to provide stakeholders with a forum through which any residual issues related to those filings can be discussed. In particular, if there are market issues that are continuing despite the changes to the BCR rules, or if there are unintended consequences of those rule changes, the ISO would like to discuss those thoroughly in this initiative.

The following issues were raised through this stakeholder process: (1) the need for changes to the cap for the registered cost option for start-up and minimum load costs, (2) the need for increased granularity in BCR monitoring reports, (3) the need to assess potential increases in BCR payments through strategic use of resource identification numbers for intertie resources, (4) the need to address increased BCR due to deviations from dispatch by resources with forbidden operating regions, as well as inefficiency of ancillary services procurement from such resources, and (5) the need to clarify a tariff provision related to the minimum load tolerance band for resources receiving a residual unit commitment (RUC) award. Descriptions of these issues, stakeholder feedback on them, and the ISO’s proposal on each item are discussed below.

2 Process and Timetable

The purpose of this draft final proposal is to share and respond to stakeholder feedback on the December 5 straw proposal. The timeline for the stakeholder initiative culminates in taking the final policy recommendation to the ISO Board of Governors in February, 2012. The table below summarizes the key steps in the stakeholder process starting with the release of the issue paper and ending with submission of the ISO management proposal to the Board.

November 8, 2011	<i>Issue Paper</i> Posted
November 14	Conference call
November 21	Comments due *
December 5	<i>Straw Proposal</i> Posted
December 12	Conference call

¹ Docket no. ER11-3149-000

December 19	Comments due *
January 4, 2012	<i>Draft Final Proposal</i> Posted
January 11	Conference call
January 18	Comments due *
February 17	Presentation to ISO Board of Governors

* Please e-mail comments to bcr-review@caiso.com

3 Background

In the first half of 2011, the ISO made two emergency filings with FERC to mitigate observed adverse market behavior that resulted in the increase of bid cost recovery uplift payments. A summary of the two filings is provided below. For additional details, please refer to the filings themselves.

March 25, 2011 Emergency BCR Filing

In the March 25 filing (docket no. ER11-3149-000), the ISO identified a bidding strategy that expanded bid cost recovery beyond competitive market outcomes. Specifically, resources were bid into the day-ahead market in a manner that forced the market to commit the resource at maximum capacity, and subsequently bid into the real-time market forcing the ISO to decrementally dispatch the resource to its minimum load. Because the metered energy adjustment factor (MEAF) neared zero when the resource was decremented by the ISO in real time, an under-accounting of day-ahead market revenue was occurring. This in turn led to over-payment of bid cost recovery.

In response to this market behavior, the ISO modified its bid cost recovery calculation to account for day-ahead market revenues based on scheduled (rather than delivered) energy for decremented resources. In short, the day ahead MEAF is no longer applied to day-ahead revenues when the ISO dispatches a resource downward from its ISO committed schedule in the day-ahead market.

June 22, 2011 Emergency BCR Filing

Subsequent to the March 25 filing, the ISO observed a continuing bidding strategy causing multiple opportunities for the expansion of uplift associated with bid cost recovery and exceptional dispatch payments. This prompted the ISO to develop rule changes to remove the incentives for these complex strategies. The strategies and the rule changes are described in detail in the ISO's filing with FERC on June 22, 2011 (docket no. ER11-3856-000).

Those bidding strategies are briefly described below:

[1] Resources continued to supply negative bids to the day-ahead market while their minimum load costs were registered at 200% of their proxy costs. When those resources were dispatched down to or near their minimum load, again the day-ahead MEAF neared zero. The outcome of this was that the negative bids were not considered which resulted in an inconsistency with consideration of those bids in the commitment of the resource as well as in the over-accounting of bid costs. The market rule was changed so that the day ahead MEAF is no longer applied to negative bid costs.

[2] The ISO identified the opportunity for day-ahead bid cost recovery at high prices during full ramp across and within the day-ahead market.

[3] The ISO also observed market behavior that forced exceptional dispatch at high bid prices to capture stranded ancillary services and residual unit commitment capacity.

4 Identified issues and stakeholder feedback

This stakeholder initiative is intended to provide stakeholders with a forum through which any residual issues related to the filings can be discussed. In particular, if there are market issues that are continuing despite the changes to the BCR rules that were intended to stop them, or if there are unintended consequences of the rule changes that came out of the two emergency filings, the ISO would like to address those issues through this initiative.

The summary of stakeholder feedback provided below incorporates comments on the issue paper and the straw proposal from NRG Energy, Pacific Gas & Electric (PG&E), and Southern California Edison (SCE), Northern California Power Agency (NCPA), and Calpine Corporation.

4.1 General comments

- SCE noted that they have found the rule changes prescribed in the emergency filings to be effective.
- PG&E recommended that all BCR changes be consolidated into one initiative. While we appreciate the logic of this recommendation, we need to keep changes to the current BCR structure grouped together in this initiative, and the “re-design” of BCR related to the separation of the netting between day-ahead and real-time separate. The instant stakeholder process is undertaken out of a commitment to the FERC to explore the efficacy of the two emergency BCR filings made this year, and to determine if there are residual games or inefficiencies under the *existing* market design.
- SCE stated that they support in concept and intent the performance metric (PM) and persistent uninstructed imbalance energy (PUIE) check, but state that the proposals on these measures need to be further developed and tested. Through the Renewable Integration Market and Product Review initiative, several stakeholders as well as the ISO’s Department of Market Monitoring and Market Surveillance Committee have expressed this same concern. In response to that stakeholder feedback, the ISO has separated the discussion of the PM and PUIE check into a follow-on stakeholder initiative to the Renewable Integration Market and Product Review Phase 1 proposal. Approval of the ISO Board of Governors is targeted for March of 2012.

4.2 Registered Cost Option

SCE states changes to the 200% of proxy costs cap on registered start-up and minimum load costs are needed immediately and that it is appropriate to undertake this change in this current stakeholder process. SCE’s contention is that “exploiting this cap has been primary to the BCR gaming strategies described in the Emergency Filings, and that addressing this issue is completely relevant to this [post emergency bid cost recovery filing review] stakeholder process.”

In comments on the issue paper, SCE posited that lowering the registered cost cap or eliminating the registered cost option altogether “could complement the ‘Persistent UIE’ check, and perhaps allow for greater tolerance for that check.”

NRG remains opposed to addressing changes to the registered cost option for start-up and minimum load costs in this initiative in isolation of an evaluation of other changes to commitment costs.

PG&E states that they believe that “a comprehensive commitment cost model is a sufficiently complicated system requiring careful review and consideration.” They state further that they “support the CAISO in focusing a specific initiative on the evolution of the current model.”

The ISO appreciates that the exploitation of the 200% cost cap was integral to the strategies addressed in the emergency filings. However, the registered cost cap is set at 200% out of recognition that there can be legitimate minimum load costs above the calculated proxy minimum load cost. Therefore, changes to the registered cost cap must be considered holistically with other potential changes to commitment costs rather than in isolation. The ISO remains convinced that, especially since the market rule changes put in place through the emergency filings have been effective, it is not appropriate to change the registered cost cap without providing consideration of how market participants might otherwise account for those legitimate costs.

The ISO maintains its proposal to address changes to the registered cost option and its cap in the Commitment Costs, Part 2 stakeholder initiative which will commence in the first quarter of 2012. In that initiative, consideration will be given to multiple aspects of start-up and minimum load costs, including the registered cost option and its cap.

4.3 BCR Monitoring

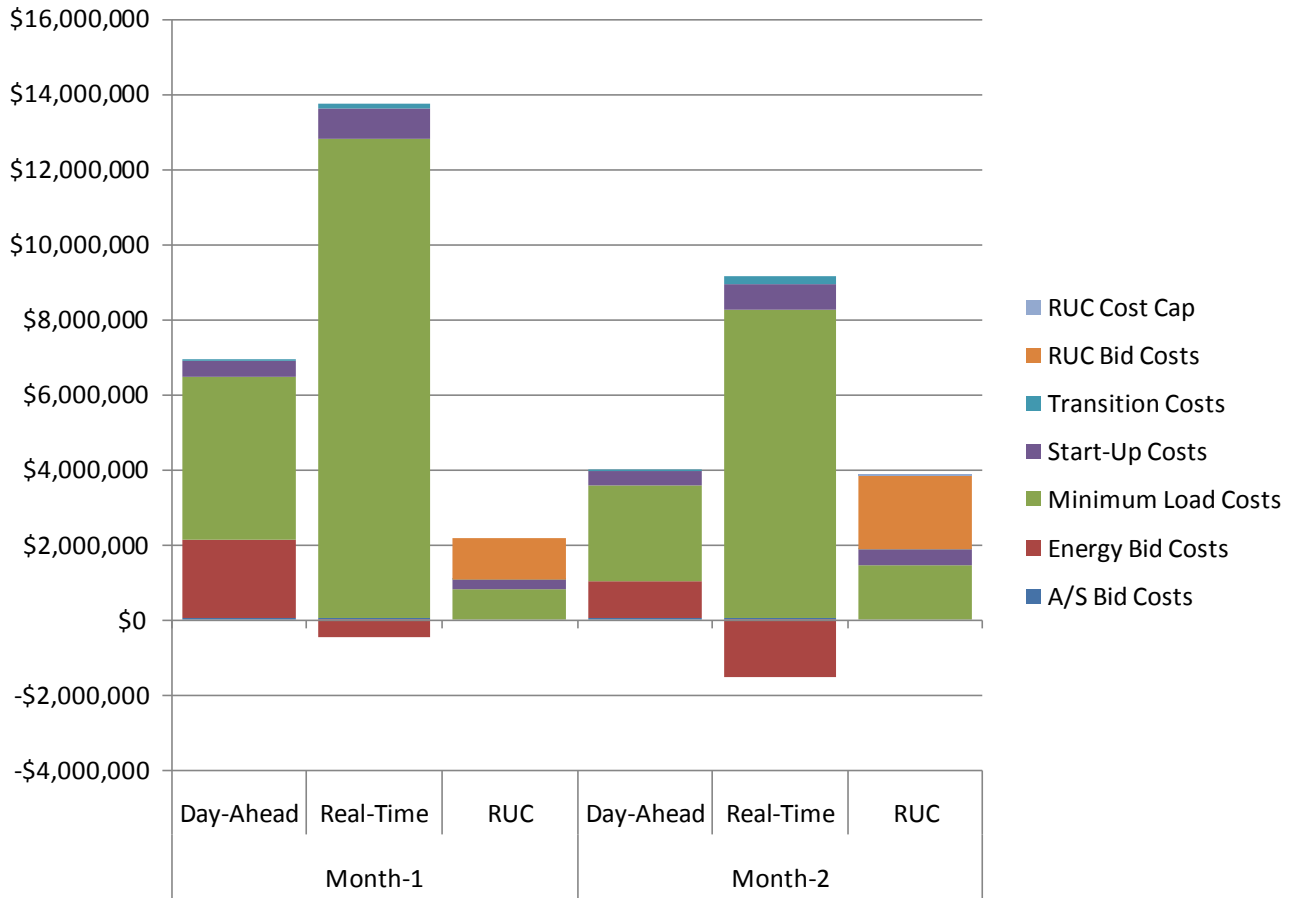
SCE has recommended that the ISO publish reports on bid cost recovery uplift payments by market and cost component stating that “detailed and consistent reporting of market wide BCR uplift totals is necessary to provide minimal assurance that uplift are reasonable and just.” Specifically, SCE requests that the bid cost recovery reporting include start-up costs, and both costs and revenues for energy, ancillary services, residual unit commitment, minimum load.

Enhanced BCR monitoring and reporting was also suggested by Six Cities as part of the feedback received on the BCR element of Phase 1 of the Renewable Integration – Market and Product Review stakeholder initiative.

The ISO currently publishes monthly market performance reports which include daily shortfalls by market (IFM, RUC and real-time) and daily bid cost recovery. (A link to the page on which these reports are archived is provided in the footnote below.²) In response to stakeholder requests, that report will be modified to include the requested breakdown of costs and revenues at a monthly aggregation. The rationale for providing this information on a monthly basis is that daily breakdowns can show much more varied results which are not indicative of overall trends. A draft of the ISO’s proposed new chart is provided below. Note that the draft chart includes two sample months; once this chart is incorporated into the published monthly reports, we will move to having a rolling six months of data so that trends in BCR uplift can be readily identified.

² <http://www.caiso.com/Documents/Monthly%20market%20performance>

Break-Down of BCR Components – 2 Sample Months



4.4 BCR for intertie resources

PG&E identifies that for non-resource specific system resources (NRSSR), a possible opportunity through which intertie resources can avoid netting of energy costs and revenues over the course of the day by employing multiple resource identification numbers at a particular tie point. The ISO optimizes schedules for such resources at the tie-point and thus the ISO does not have insight into the resource behind that import. It is the privilege and purview of the participant bidding such resources to manage their physical delivery of those imports. Thus, the ISO does not propose any changes to bid cost recovery calculations for NRSSRs.

Note that NRSSR resources are not eligible for minimum load or start-up costs recovery. Therefore the only netting that an NRSSR can avoid would be the netting of energy bid costs. In general HASP prices are expected to be compensatory for an NRSSR and we would not expect to see significant netting of revenue surpluses and shortfalls. Therefore, this is not considered to be problematic under today's market structure. PG&E notes however that "with the possible changes to the HASP Intertie pricing process being considered by CAISO the use of these multiple intertie resources to bypass the netting process could be used to isolate considerable uneconomic costs and raise overall BCR allocation costs unreasonably to the market." The ISO commits to addressing this concern during the development of the aforementioned possible changes to the HASP intertie pricing. Thus, as new intertie pricing rules are developed, the

ramifications of the new rules as well as existing market rules with respect to BCR for inertie resources can be considered in concert. In the stakeholder conference call on December 12, PG&E was supportive of this approach. More information on the ongoing Intertie Pricing and Settlement initiative can be found at the following link:

http://www.caiso.com/informed/Pages/StakeholderProcesses/IntertiePricing_Settlement.aspx

4.5 Forbidden Operating Region versus Multi-Stage Generating unit modeling

Prior to the launch of its LMP-based market, the ISO received an order from the FERC³ compelling us to implement functionality, beyond the FOR model, to model combined-cycle resources specifically (and other resources with multiple operating regions by extension). The FOR functionality had been part of the original design but because of software performance and stability issues related to the enforcement of the treatment FORs in the real-time market by our market software, the ISO sought and received BOG approval to defer the FOR functionality to after the start of its new LMP-based market.⁴ Subsequently, and in light of expected delays in the implementation of the MSG modeling functionality, the ISO was able to implement performance improvements to the treatment of resources with FORs. Thus, the FOR model enabled the ISO to implement functionality to address the operational need for dispatch accuracy while the MSG model – the robust solution to the modeling of resources with multiple operating regions – was under development. So importantly, the use of forbidden operating regions has always been considered in nearly all cases to be a temporary solution to be used as a second-best only until MSG modeling was in place.

Even with the performance and stability improvements put into place, in order to use FOR upon the launch of the LMP market, using FORs instead of modeling operating ranges as logical generators – as is the case with MSG modeling – leads to significant gaps and inefficiencies which have been highlighted in this initiative. Nonetheless, FORs were employed as a measure for resources with simple operating restrictions and to bridge the gap until MSG could be fully developed and implemented for resources with more complicated operating characteristics.

The MSG model was designed to fill these gaps. By respecting the unique operating characteristics of each configuration, the resource can be feasibly and efficiently awarded ancillary service, committed and subsequently dispatched, which is a significant benefit to market participants and to the ISO as well. In fact, stakeholders were very supportive of the MSG design.⁵ The ISO and stakeholders have benefitted from the successful, stable operation of MSG achieved over the past year. Now that the MSG modeling functionality

³ Paragraph 573 of FERC's September 21, 2006 Order on MRTU "direct(s) the ISO 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.

⁴ <http://www.caiso.com/Documents/081028DECISIONonDeferredorLimitedFunctionality-MEMO.pdf>: "while this functionality [FOR] is found to be useful for consideration of combined cycling units in the market, it is not as optimal as multi-state modeling, which the ISO has been intending to pursue. The deferment of this functionality enables the ISO to focus its efforts towards modeling combined cycle units, which resource owners also find more optimal. Furthermore, market simulations both with and without this feature, in its current state, have shown that the exclusion of this functionality in the real-time market substantially increases performance and stability of the software. Therefore, Management seeks approval to proceed towards MRTU go live without this feature and instead expedite the development and adoption of a multistate modeling approach that can better support, among other things, the operating characteristics of combined cycling units."

⁵ <http://www.caiso.com/Documents/Stakeholder%20Comments%20on%20Revised%20Straw%20Proposal%202013-Apr-2009>

is running with enhancements going into place in April 2012, there is no reason to maintain the temporary solution with its known flaws. With a complete solution in place, and we need applicable resources to use it. With BCR gaming, and with increasing penetration of variable energy resources, responsive commitment/dispatch and accurate procurement of A/S is crucial.

FOR crossing-times and deviation from dispatch instructions

The ISO has identified a potential opportunity for market participants to gain undue bid cost recovery uplift payments by registering resources that have multiple operating configurations as having a forbidden operating region(s) rather than using the MSG modeling functionality. To take advantage of this opportunity, that resource would submit high real-time bid prices for its operating range above the lower operating level of its FOR, and then ignore the real-time dispatch decrement instructions by staying above the FOR. In such events, due to the potential long crossing time of a FOR region, the dispatch signals from the optimization will still be above the FOR even when it is economic to dispatch it below the FOR. This occurs because the optimization considers where the unit is based on telemetry and the ramping/FOR crossing time. This dispatch will then be used to calculate real-time optimal energy and thus qualify the unit for bid cost recovery which could correspond to high bid prices for operating levels above the FOR. In addition to the explicit impact on BCR related to the behavior of ignoring dispatch instructions into its FOR, we have also observed that when a resource does not follow the ISO dispatch into its FOR multiple intervals, the resource may continue to be uneconomically dispatched into its FOR even though it becomes economic to dispatch the resource in the opposite direction. This can further inflate the resource's costs and create dispatch inefficiencies.

The problem of resources deviating from dispatch and thereby getting more bid cost recovery uplift than they are due is not unique to resources with forbidden operating regions. In fact, PG&E submitted comments noting that this seems like the same problem as the one in the June 22, 2011 emergency filing. The ISO concurs that this is a similar issue. For resources that are modeled using the MSG functionality, however, this problem is largely resolved because the ISO only dispatches MSG resources within the configuration into which the resource was committed. Rather than adjusting its dispatch based on telemetry, thus legitimizing the deviation, the MSG model dispatches resources within the dispatched configuration. Therefore, the MSG resource's deviations correctly incur uninstructed imbalance energy charges and are not compensated using BCR for such deviations in a different configuration.

BCR mitigation measures currently being developed by the ISO and stakeholders are expected to further address the behavior of ignoring ISO dispatch instructions.⁶

⁶ As that stakeholder process evolves, documents will be available on the ISO website as a sub-initiative to the renewable integration – market and product review phase 1 initiative.
<http://www.caiso.com/informed/Pages/StakeholderProcesses/RenewableIntegrationMarketProductReviewPhase1.aspx>

Infeasible awards of ancillary services

In addition to the issue noted above, there are inefficiencies associated with trying to model a multi-stage generating unit using only forbidden operating regions when it comes to ancillary services. When a non-MSG, non-FOR resource is certified for ancillary services, it is certified for the entire output range of the plant. That certification considers physical operating characteristics of the resource such as its ramp rate. A non-MSG resource with an FOR can be certified to provide ancillary services in one amount below the forbidden region based on the operating characteristics of that region, and for another amount above the forbidden region based on that range's characteristics. Such an FOR resource is considered by the market optimization software to have the maximum of those two ancillary services capacity amounts. Therefore, the resource can receive an ancillary services award that is not consistent with the operating characteristics of the range in which the resource is dispatched. The resulting problem is two-fold: (1) the resource receives an infeasible ancillary services award which poses a reliability problem, and (2) the resource receives a capacity payment for ancillary services when it could not have delivered energy had it been called upon to do so.

With regard to the reliability issue, the ISO's systems do perform a check such that, when a unit is crossing the FOR region, the optimization will not procure regulation for that crossing period. However, spinning and non-spinning reserves can be procured from a resource with an FOR if the resource has a crossing time that allows. The dynamic A/S stakeholder initiative did result in an improvement in this respect in that it enables the optimization software to account for different ramp rates over the range of a resource's output. Nonetheless, it does not do anything to address other operating parameters that differ over the resource's output range such as differences in certified capacities.

On the financial side, the ISO has in place ancillary services "no-pay" which disqualifies an A/S capacity payment if post-market checks indicate that a resource was awarded A/S upon which it could not have physically delivered. However, those checks do not account for different operating characteristics for ranges above and below an FOR. What the forbidden operating region feature does not have is a fundamental recognition of the configuration in which the resource is operating. Very often, those operating ranges reflect physical operational modes in which the power plant can offer different AS capacities.

The measures described here do not fully address the issues whereas the use of MSG will address this problem fully to the extent a resource has a configuration that cannot provide reserves within a certain range. The ISO has developed and implemented the MSG modeling functionality in December 2010 precisely to address the types of reliability and financial issues described above. The MSG modeling functionality does so by recognizing ranges with different operating characteristics as logical generators and certifying and awarding them A/S accordingly.

PG&E states in their comments that "the FOR model also allows these resources to offer spinning and flexible ramping reserves through their whole range which could add up to several hundred MW of capacity in the reserve market. CAISO would then lose RTD access to a significant, though perhaps not critical, amount of spin and flexible ramping capacity if all FOR resources were forced to use the MSG model." Thus ISO contends that this extra ancillary services capacity is actually non-existent and that, as such, procuring it poses a reliability concern, and erroneously pays market participants for ancillary services. By contrast, ancillary services are accurately procured through MSG modeling since they are procured based on certification for ancillary services at the configuration level.

In written comments, Calpine stated that the ISO “should provide substantial analysis of this shortcoming of the existing market software” in order to support “the assertion that this is a real and compelling problem.” In response, the ISO asserts that the *extent* to which inefficient market outcomes are occurring should not be the focus of the discussion. Rather, the ISO and market participants should endeavor to eliminate inefficiencies *wherever possible*. That was, in fact, a prime motivation for developing the MSG modeling functionality, which does in fact deal with the issues discussed here.

Notwithstanding the above point, the ISO did undertake an enhancement to consider operational ramp-rates in ancillary services procurement decisions. Please refer to the following technical bulletin available at the following link: http://www.caiso.com/Documents/TechnicalBulletin-DynamicRampRate_AncillaryServiceProcurement.pdf.

Calpine also noted that the ISO “should identify alternative solutions such as selecting the minimum rather than maximum A/S range.” That option is technically feasible and would eliminate the problem of paying for awarded but infeasible ancillary services. However, it would generate a different inefficiency – namely, that the ISO would not be able to include in its optimization ancillary services that are in fact available. The ISO maintains that the best alternative solution is MSG modeling functionality which is already in place.

Definition and exceptions

The ISO continues to propose that MSG registration be mandatory for resources that fall into the definition of Multi-Stage Generating Resources. Specifically, registration as an MSG resource will be mandatory for (1) combined cycle resources, (2) resources with 1 or more forbidden operating region, (3) resources with hold times after a transition through a forbidden operating region, and (4) generating units with multiple operating or regulating ranges but which can operate in only one of these ranges at any given time.

Per the original tariff definition of Multi-Stage Generating Units, metered sub-systems, pumped-storage hydro units, and pumping loads are not eligible to use the MSG modeling functionality. The exclusion of metered sub-systems will serve to address concerns submitted by NCPA. The exclusion of pump loads and pumped-storage hydro units will serve to address concerns submitted by PG&E.

Resources that are designated as regulatory must take (RMT) will be excluded from the mandatory MSG registration. For those resources, the ISO is required to take any or all of their output, and thus they are dispatchable. For this reason, the ISO proposes that RMT resources not be required to go through the exercise of MSG registration. Dispatchable qualifying facilities (QF) that are not under a regulatory must-take provision that meet the above definition will be required to register as MSG resources. System resources will not be mandated to register as MSG resources. The ISO can negotiate exceptions based on physical or contractual circumstances that demonstrate how a resource within one of the four categories listed above should not be modeled using MSG. The ISO will revisit the outcomes of those negotiations if the resource undergoes a physical or contractual change.

FOR will remain available for resources with a single simple forbidding operating region that simply requires the resource to transit the FOR after entering the FOR and no hold times around the FOR as long as those two regions have the same ancillary service capability.

Proposed timeline

All resources that fall under the MSG definition that have not been granted an exception must be registered as MSG resources by the ISO's spring release in 2013. This extended timeline is given so that resources have ample time to participate in the on-going MSG market simulation. By the spring of 2013, the ISO and stakeholders will have had approximately two years and four months of experience with and refinements of the MSG modeling functionality. In addition, by spring 2013, we will have offered a market simulation environment for MSG on an ongoing basis for nearly three years. Finally, the suite of MSG enhancements, including revision to MLC accounting, will go into effect April 2012. Those enhancements include, among other things, improvements to the accounting of costs for MSG resources which will enable those resources to recover their minimum load costs.⁷

The ISO notes that Calpine suggested that mandatory MSG registration "occur no sooner than the later of (1) one year after FERC approval of mandatory designations, and (2) implementation of BCR reforms which separate Day-ahead and Real Time BCR calculation." The timeline the ISO proposes will give market participants slightly less than one year from the date of the anticipated FERC order before mandatory MSG registration takes effect. Spring 2013 will be approximately six months prior to the anticipated implementation of the BCR changes which are targeted for the ISO's fall 2012 release.

The ISO does not propose to extend this timeline out to fall 2013 in anticipation of the BCR netting changes. The primary driver of changing the netting rules is that the ISO intends to simultaneously lower the energy bid floor in order to provide incentives for market participants to submit real-time economic bids. Again, the bid floor will not be lowered prior to the changes to the bid cost recovery netting rules.

Note that the FERC's September 21, 2006 Order on MRTU compelled the ISO to implement "combined cycle modeling" within three years of the initial implementation of the LMP market. The proposed timeline of mandatory MSG in spring 2013 coincides with this timeframe.

4.6 RUC MLC tolerance band test

The ISO has identified an issue with the qualification of the residual unit commitment (RUC) minimum load costs (MLC) when a resource's meter is zero and the resource has a low minimum load value. When a resource receives a RUC award, it may be eligible for cost recovery associated with minimum load for the duration of that RUC award. The determination of whether or not the resource is eligible for cost recovery involves checking whether the resource was operating within the tolerance band around its minimum operating level (p_{min}). That tolerance band is 5 MWh or 3% of the resource's maximum operating level (p_{max}), whichever is greater. For some resources, the entire range from zero to the resource p_{min} can be covered by the tolerance band. In this case, the resource can be offline, but still be eligible to receive minimum load cost recovery.

The ISO proposes to make a change to the tariff to reflect the intention of the cost recovery policy in such cases, which is to only make MLC eligible for cost recovery only if the resource is in fact on. SCE and PG&E have expressed support for this proposal.

5 Conclusion

The ISO will conduct a conference call to review this draft final proposal on January 10, 2012 from 11:00 a.m. to 12:00 p.m. The ISO appreciates stakeholder comments and discussion on the issues discussed in

⁷ <http://www.caiso.com/informed/Pages/StakeholderProcesses/Multi-StageGenerationEnhancements.aspx>

this initiative and the proposed resolutions. Please send your comments by close of business on January 18, 2012 to bcr-review@caiso.com.