

## PG&E Comments

### CAISO Market Initiatives Roadmap High Level Ranking Process

Submitted by	Company	Date Submitted
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Pacific Gas & Electric (PG&E) appreciates the opportunity to participate in the CAISO's Market Initiatives Roadmap stakeholder process and to submit comments regarding the July 13, 2009 Preliminary Results of High Level Prioritization of Market Enhancements and the July 23, 2009 CAISO presentation.

**1. Should rankings be different for the initiatives that the CAISO ranked "High" in the preliminary ranking process?**

Yes.

**If yes:**

**a) Provide your revised ranking of the initiatives:**

As shown on the attached chart, the following are PG&E's rankings of the high priority initiatives:

- 1) RA Must Offer Obligation
- 2) Bid Cost Recovery for Units Running Over Multiple Operating Days
- 3) Addressing Ramping Capacity Constraints
- 4) Multi-Day Unit Commitment in the IFM
- 5) Initial Conditions Management (submitted by PG&E)
- 6) Enhancements to Standard RA Capacity Product
- 7) Potential Modifications to Market Rules of DA Intertie Schedules
- 8) Rules to Encourage Dispatchability of Wind & Solar Resources
- 9) Day Ahead Scheduling of Intermittent Resources
- 10) Use of "Weighted Least Squares" CRR Optimization Algorithm in CRR Allocation
- 11) A/S Maximum Capacity Operating Limits for Spin and Non-Spin

PG&E has ranked eleven initiatives as high priorities. Of these eleven, PG&E and the CAISO are in agreement that nine of them should be ranked as high priorities. One of the remaining two issues, Initial Conditions Management, was proposed by PG&E and has not yet been ranked by the CAISO. The final issue, A/S Maximum Capacity Operating Limits for Spin and Non-Spin was ranked by the CAISO as a medium priority and increased by PG&E to a high priority.

In addition, there are three initiatives the CAISO ranked as high priorities but PG&E ranked as medium or low priorities. PG&E ranked Simultaneous RUC and IFM as a medium priority and Load Aggregation Point Granularity and Ability to Bid Start Up and Minimum Load Costs in the IFM as low priority initiatives.

**b) Explain what factors led to your ranking decision:**

The following paragraphs explain PG&E's ranking decision for each initiative ranked by the CAISO as a high priority.

- ***Resource Adequacy Must Offer Obligation (8.3) – Recommend High Priority.***

PG&E agrees with the CAISO's assessment that this initiative has a limited implementation impact on market participants and that this initiative should be ranked as a high priority.

- ***Enhancements to Standard Resource Adequacy Capacity Product (8.1) – Recommend High Priority.***

PG&E agrees with the CAISO's assessment that this initiative offers benefits and is feasible and therefore should be ranked as a high priority because it imposes universal standards on the availability of capacity and the performance of generation in the CAISO's territory. This initiative also allows the CAISO to procure one hundred percent of its Ancillary Services requirements in the Day Ahead market. The CAISO must procure Ancillary Services at a local level and failure to meet this requirement in the Day Ahead market could result in giving certain generators the market power to charge high Ancillary Services prices.

- ***Bid Cost Recovery for Units Running Over Multiple Operating Days (2.8) – Recommend High Priority.***

PG&E agrees with the CAISO's assessment that Bid Cost Recovery for Units Running Over Multiple Days is a high priority initiative. We view this initiative as highly desirable to stakeholders and therefore we increased the score in that category from a 7 to a 10.

It is important to consider this initiative as a companion to the Multi-Day Unit Commitment in the IFM / Extremely Long Start initiative. The design of the Extremely Long Start process will necessarily require discussion of equitable Bid

Cost Recovery payments for daily cycling resources and resources that usually remain online for several days at a time. In addition, PG&E believes that the IFM bias to cycle units would be reduced if the CAISO implemented a Multi-Day Unit Commitment. PG&E and the CAISO ranked both Bid Cost Recovery for Units Running Over Multiple Days and Multi-Day Unit Commitment in the IFM / Extremely Long Start as high priorities and we strongly encourage the CAISO to consider them in tandem.

PG&E recognizes that the Bid Cost Recovery for Units Running Over Multiple Days is a complicated initiative. For example, when the CAISO commits resources that stay on for a number of days, by performing Bid Cost Recovery calculations for one day, the allocations are too high because energy margins earned in the subsequent days are not considered in the “make whole” calculation. In this instance PG&E supports mitigation of these costs. Moreover, the CAISO IFM process, whose analysis time horizon is the same as the period for which it is outputting commitment instructions, is systematically biased towards de-committing units whose benefits would likely continue to accrue beyond the given horizon. It is not yet clear how Bid Cost Recovery will be managed for resources that the CAISO keeps online in Real-Time that the CAISO had scheduled to de-commit in the IFM. Several corresponding questions will need to be addressed as we continue to refine this initiative. First, would a resource that is de-committed in the IFM by the CAISO but chooses to self-commit to prevent a shut down, be subject to the multi-day Bid Cost Recovery? Second, would a resource be disallowed to receive Bid Cost Recovery if it benefits from energy margins for future days because the CAISO had committed it and it chooses to remain online through self-commitment? PG&E recommends that the CAISO thoroughly address resource accounting needs as it develops and plans the implementation of this initiative.

In addition, the CAISO should carefully consider the impact on settlements for implementing a new charge code that can span multiple days, address any Business Practice Manual (BPM) and tariff revisions as well as impacts on its software. This is a highly desirable initiative and PG&E will work closely with the CAISO to address and solidify the implementation details.

- ***Rules to Encourage Dispatchability of Wind & Solar Resources (4.1) – Recommend High Priority.***

PG&E recognizes the importance of encouraging dispatchability of wind and solar resources. While one option is to reduce the decremental energy bid floor, it is unclear this is necessary if the CAISO’s initiative on Addressing Ramping Capacity Constraints will also include considerations for ramp down capability. As a result, PG&E recommends the CAISO include this initiative as part of a larger Addressing Ramping Capacity Constraint stakeholder process.

- ***Load Aggregation Point Granularity (2.11) – Recommend Low Priority.***

PG&E recommends decreasing the overall rank of this initiative from HIGH (34) to LOW (16). The straw-man ranking overstates the improvements in overall market efficiency and grid reliability and understates the effort to implement. The 2008 ranking of LOW seems to more accurately reflect the potential benefits and required effort of this initiative. There is little evidence that increased granularity will improve grid reliability (rank of 3). We do agree that there may be a more pronounced market efficiency benefit by enabling LSEs to more accurately incorporate price responsive load, but currently these programs are still small in magnitude relative to the level of demand (rank of 7). Finally, regarding desirability by market participants, this initiative ranks low for PG&E. We continue to see numerous instances in which the modeled power flows do not match physical flows. Over the next several years our collective focus should be on improving the Full Network Model (FNM) and its inputs (metering, telemetry, Load Distribution Factor algorithms) In short, more experience with current markets' performance needs to be established before initiating such a significant new market feature (rank of 3).

The implementation effort required of PG&E will be significant, and, other than Convergence Bidding, may have the largest impact on PG&E systems (rank of 0). Additionally, we believe the CAISO underestimates the effort that will be required on its part. This change will likely impact bidding, settlements, CRRs, mitigation measures, convergence bidding, and other processes in significant ways.

- ***Simultaneous RUC and IFM (5.2) – Recommend Medium Priority.***

PG&E recommends decreasing the overall rank of this initiative from HIGH (31) to MEDIUM (23). The rationale for having Simultaneous RUC and IFM is analogous to co-optimizing energy and ancillary services. This initiative would improve overall market efficiency by optimally trading off the opportunity costs associated with energy and ancillary services against RUC awards. Simultaneous RUC and IFM would also eliminate the problem of having IFM schedules fixed in the RUC run that cannot be backed down to ensure energy is available in the appropriate places to meet CAISO forecasted demand. While PG&E recognizes these benefits for efficiency and reliability, we believe the CAISO has underestimated the scope of the complexity of this initiative. As a result, PG&E has lowered the market participant implementation (rank of 3) and the desired by stakeholders (rank of 3) which places this initiative in the medium priority category.

Simultaneous RUC and IFM should also not be considered in isolation but rather as part of the Convergence Bidding stakeholder process. This initiative would have significant interaction with the design of convergence bidding because virtual bids will be a part of the IFM run but are not capable of satisfying RUC requirements. The details of how this initiative would work with virtual bids warrants further stakeholder discussion.

- ***Multi-Day Unit Commitment in the IFM (2.4) – Recommend High Priority.***

PG&E agrees with the CAISO's assessment of the Multi-Day Unit Commitment in the IFM as a high priority initiative and we recommend increasing the overall rank from 31 to 37. This initiative will ensure significantly more efficient dispatch through the IFM process (rank of 10), especially in cross day hours, and will improve overall grid reliability (rank of 10).

By using a one day optimization period, the CAISO is unnecessarily biased against long start resources that may have high start-up costs and would likely be uneconomic for one day, but are highly economic as the time horizon extends to several days. While two day optimizations may still be limited in their ability to justify a long start resource that usually requires three or more days to amortize, it will at the least overcome the de-commitment problem that exists in the one day time frame for the late hours of the day. The reason is that with a Multi-Day Unit Commitment, the IFM would consider the benefits of keeping the resource on for the off-peak hours to meet the next day's peak load, whereas the one day horizon cannot see the benefits or the cost of starting the resource again. The one day horizon naturally leads to excessive cycling and over-utilization of peaking resources as many of the traditionally base load resources are not committed due to their high startup costs. Furthermore, PG&E believes that the implementation of Multi-Day Unit Commitment would improve grid reliability because the appropriate base load units would be committed in the IFM leaving more peaking capability available in Real-Time if necessary.

PG&E recognizes there are issues that need to be resolved and we look forward to working with the CAISO and other stakeholders to implement this important initiative.

- ***Day Ahead Scheduling of Intermittent Resources (2.5) – Recommend High Priority.***

PG&E agrees with the CAISO's prioritization of this initiative. PG&E recognizes understands the need to incorporate an estimate of energy produced by Participating Intermittent Resource Program (PIRP) resources into its day-ahead process for the purposes of satisfying energy and regulating obligations, and the potential direct and indirect effect on LMPs. The primary concern with moving forward with this initiative at this time is the level of accuracy the CAISO or market participants could reasonably expect to achieve and the effect on the IFM. Clearly, the CAISO needs to incorporate its best estimate of intermittent energy production day-ahead to ensure that energy is not over-procured day-ahead and that there are adequate resources available to provide regulation. However, PG&E has identified three corresponding issues which require clarification. First, what is the CAISO's accuracy expectation of day-ahead forecasting? Second, what is the mechanism by which to incorporate intermittent generation into determining reliability requirements on day-ahead basis? And third, how will costs be allocated for additional regulation requirements? The

stakeholder process needs to address these issues prior to moving forward with the implementation efforts.

- ***Ability to Bid Start Up and Minimum Load Costs in the IFM (5.3) – Recommend Low Priority.***

PG&E recommends decreasing the overall rank of this initiative from HIGH (31) to LOW (12). While PG&E understands the potential efficiency benefits of offering the ability to bid start-up or minimum load costs more dynamically than monthly, we also find that relative to other market initiatives, this is a low priority. The improvement in grid reliability is minimal and does not warrant a score of 7, but rather a 3. In addition, the overall market efficiency score of 7 is overestimated and a 3 is more appropriate. By having the ability to update start-up and minimum load costs monthly, the values are sufficiently accurate. If generators are concerned about minimum load costs not reflecting gas price volatility, they can hedge with fixed monthly gas contracts in which case the fuel component of the start-up costs are accurate. However, PG&E does recommend that the CAISO enable market participants to bid their start-up costs as a linear function of the form  $ax+b$  where  $a$  represents the fuel multiplier and  $b$  represents fixed costs. The choice of either  $ax$  (based on fuel) or  $b$  (registered cost) is an unnecessary restriction.

- ***Use of “Weighted Least Squares” CRR Optimization Algorithm in CRR Allocation (7.7) – Recommend High Priority.***

PG&E tentatively supports CAISO’s assessment of this initiative as a high priority. PG&E agrees it is more equitable to spread reductions in CRR awards among all nominations that have an impact on binding constraints. However, before fully supporting this specific initiative, PG&E would like to see the formula for the revised objective function under the weighted least squares methodology. In addition, we request that the CAISO hold a stakeholder meeting on this subject. One specific issue PG&E wants to explore is whether a threshold effectiveness factor should be implemented.

PG&E also notes that it has licensed software and developed tools to simulate the CRR allocation process as currently designed. The implementation of this initiative would require unspecified time and cost to license and develop new tools to simulate a weighted least cost algorithm. PG&E suspects this is true for most CRR market participants.

- ***Addressing Ramping Capacity Constraints (6.8) – Recommend High Priority.***

PG&E recommends increasing the overall rank from 30 to 37. Thus far for the Real-Time market, the CAISO has cited ramping constraints as a significant driver of Real-Time price volatility. In the day-ahead time frame, the CAISO optimizes on hourly intervals whereas Real-Time is optimized for 5-minute intervals creating a natural divergence of ramping needs to meet hourly demand versus those necessary to

respond to 5-minute fluctuations. In addition, as discussed earlier, we recommend the CAISO include the Rules to Encourage Dispatchability of Wind & Solar Resources initiative with this one. PG&E agrees with the CAISO that addressing the ramping capacity constraints is a high priority, is desirable, and that it will improve overall market efficiency and grid reliability.

- ***Potential Modifications to Market Rules of DA Intertie Schedules (2.15) – Recommend High Priority.***

PG&E recommends increasing the overall rank from 30 to 34. The potential for market manipulation at the interties is a significant concern. Of specific concern is implicit Convergence Bidding at the interties where a market participant schedules an import or export in the IFM and simply does not deliver in the HASP. Scheduling behavior observed at some of the interties in the first few months of the market reinforces this concern. Because of this, the desirability ranking is increased from a 3 to a 7.

**2. Should rankings be different for the initiatives that the ISO ranked “Medium” or “Low” in the preliminary ranking process?**

Yes.

**If yes:**

**a) Provide your revised ranking of the initiative:**

As shown on the attached chart, the following are initiatives that PG&E proposes different rankings than the medium or low priority rankings assigned by the CAISO in the preliminary ranking process:

- Long Term CRR Auction
- Ability to Designate A/S Contingency Hourly
- Pumped Storage Generation Plant Modeling
- A/S Maximum Capacity Operating Limits for Spin and Non-Spin
- Multi-Settlement System for Ancillary Services
- Initial Conditions Management Proposal
- Extend Look Ahead for Real Time Optimization

PG&E agrees with the CAISO that four of these initiatives should be ranked as medium priorities and made only relatively minor changes to two of their scores. In addition, PG&E recommends a medium priority for the Enhanced ISTs initiative which has not yet been ranked by the CAISO. Finally, PG&E ranked the Long Term CRR Auction initiative as a low priority while the CAISO ranked it as a medium priority.

**b) Explain what factors led to your ranking decision:**

- ***Long Term CRR Auction (7.3) – Recommend Low Priority.***

PG&E recommends decreasing the overall rank of this initiative from MEDIUM (27) to LOW (16) since any redesign of the Long Term CRR markets is premature. Due to the lack of MRTU LMP data and the future goal of SLAP bidding/scheduling in the IFM market, the value of Long Term CRRs with a DLAP sink is uncertain. Implementing a Long Term CRR Auction under these conditions is not warranted at present and PG&E identifies this initiative as Low Priority.

- ***Ability to Designate A/S Contingency Hourly (6.5) – Recommend Medium Priority.***

PG&E is supportive of this proposal, agrees with the CAISO's medium ranking and recommends increasing its overall rank from 23 to 27. By forcing resources to designate A/S Contingency at daily granularity, resources that can only offer A/S as contingency only for certain hours are required to maintain that designation for all hours of the day. The CAISO has underestimated the benefits of allowing flexibility for resources to convert A/S to energy at times of the day that they do not consider contingency only. This would improve overall market efficiency by making available to the CAISO A/S that can be converted to energy when energy is needed but not considered a contingency in Real-Time.

- ***Pumped Storage Generation Plant Modeling (10.3) – Recommend Medium Priority.***

PG&E would like to see improved modeling of pumped storage generation plant modeling. However, relative to other market design initiatives we recognize and agree with the CAISO that this initiative is a medium priority.

- ***A/S Maximum Capacity Operating Limits for Spin and Non-Spin (6.7) – Recommend High Priority.***

PG&E recommends increasing the overall rank of this initiative from MEDIUM (23) to HIGH (31) for two primary reasons. First, the current limits overstate the reserve capability of resources. Hence the CAISO may procure reserves that are not deliverable creating obvious distortions in the markets. Presumably corrected limits would increase the deliverability of procured A/S, even though they would slightly reduce the amount of total A/S available. The first effect would reduce the frequency of scarcity pricing, the second might or might not increase it depending on whether scarcity pricing is called in Real-Time based on deliverable or procured A/S.



Second, the regions above the A/S operating limits are slow ramp regions. They are accessible as Real-Time energy, but have effects on Real-Time prices due to their ramp constraints which have been well documented. The interaction between the ramp rates, which will not change under this initiative, and the procurement of A/S not going above the limit should reduce reliance on these resources in Real-Time when contingent A/S has not been moved into the stack. Incremental A/S procured in Real-Time would also respect the maximum operating limits, which would dispose the markets to procure marginally less of them and perhaps reduce ramping effects.

PG&E also notes that during the CAISO's Release Planning Workshop on June 24, 2009, this initiative was categorized as one of the "Deferred Items" in slide 6 of its presentation planned for implementation in 2010.  
(<http://www.caiso.com/23d2/23d28b4029240.pdf>)

- ***Multi-Settlement System for Ancillary Services (6.3) – Recommend Medium Priority.***

In order to properly prioritize this issue, PG&E would need from the CAISO an assessment of whether the amount of Real-Time A/S procurement seen in the market is likely to continue, diminish or increase, and whether the impacts on overall A/S costs are expected to be large or small. This may be a high cost implementation effort that would only be a high priority if the assessment suggests significant value. Without further information from the CAISO, PG&E agrees with the medium ranking.

- ***Initial Conditions Management Proposal – Recommend High Priority.***

PG&E recommends that the Initial Conditions Management Proposal receive an overall rank of HIGH (35). The CAISO optimization uses as its initial conditions the results from the previous day's IFM. Performing a one day optimization, important resources needed to meet peak demand are committed for some hours but then de-committed in late hours and issued a Bid Cost Recovery in order to be made whole. This approach is biased against resources with large start-up costs that cannot amortize their costs over one day. Furthermore, it is inefficient even for units that can recoup their start-up costs because their costs of starting up again for the next day are not properly compared to their costs of remaining on at minimum over the off peak hours. Along these lines, if load forecasts significantly increase from the time of the CAISO's IFM run to when bids are submitted the next day, there is no flexibility for a resource to report to the CAISO its intention to stay on overnight when it would be economic for it to do so.

This initiative and the Multi-Day Unit Commitment have some overlap in the inefficiencies they can overcome. However, even with implementation of the Multi-Day Unit Commitment, the initiative would still have importance in

allowing market participants to respond to changing forecasted conditions between CAISO IFM runs. This initiative is also significantly easier to implement. For its exceptional dispatches, the CAISO can already adjust the initial conditions for the next IFM run and PG&E would suggest flexibility be offered to market participants. If implemented, the CAISO optimization would not unnecessarily bias a schedule against a resource because of a phantom start-up cost and allow market participants to use the most accurate forecasts to make economic commitment decisions.

- ***Extend Look Ahead for Real Time Optimization (4.5) – Recommend Medium Priority.***

In the current framework, where any non-binding periods are populated with CAISO forecasts and binding bids from the current trading period, the priority of extending the look ahead from 5 hours is medium for purposes of unit commitment. However, in the long term it may be more appropriate for the CAISO to run Real-Time Look Ahead binding markets beyond unit commitment of resources. The value of this would be high as the CAISO would use the most up to date information to make scheduling decisions. These decisions could alleviate a lot of inter-day commitment issues, more efficiently even than by means of offering availability per the Initial Conditions Management Proposal, and more cheaply and based on better forecast information than the multi-day unit commitment would offer. PG&E recognizes that such a binding market would be a significant effort for both the CAISO and market participants. Relative to other market initiatives, PG&E agrees with the CAISO ranking of MEDIUM.

### **3. Are there initiatives that were missing from the Market Design Catalogue (or the presentation)?**

Yes.

#### **a) Describe the Market Design Initiative to be added:**

- PG&E requests that the CAISO add our ***Enhanced Inter-SC Trades (After-Market Inter-SC Trades)*** proposal to the Market Design Catalogue. This proposal would make it possible to submit and match Inter-SC Trades (ISTs) after the close of the market, with three possible options at varying levels of implementation difficulty.

First (and simplest), trades at points not currently having matched trades are permitted after the market closes. These would be new trades, hence there are no issues about pre-market trades being cancelled to game the price outcomes. Second, trades are permitted after market close if incremental to existing trades, but existing trades cannot be reduced after market close. Third, identify post-market ISTs as distinct products from pre-market ISTs.

**b) Rank the initiative and provide the reasoning for your ranking.**

- PG&E recommends that the Enhanced ISTs proposal be ranked MEDIUM (24). This initiative will likely require moderate implementation effort for both Market Participants and the CAISO because settlements processes would require additional instruments.

**4. Do you have any comments on or suggestions to improve the annual roadmap process?**

PG&E is appreciative of the CAISO's work to develop the Catalogue of Market Design Initiatives and the Preliminary Results of the High Level Prioritization of Market Enhancements. PG&E believes this is an important endeavor and offers five recommendations for how to continue to develop and improve the CAISO's annual roadmap process.

First, PG&E requests the CAISO provide a more detailed explanation of its process for determining which initiatives to implement. The CAISO's Ability to Bid Start Up and Minimum Load Costs in the IFM initiative provides a current example of an initiative that is being implemented in apparent contradiction with the CAISO's list of priorities. The CAISO ranked this initiative as a medium priority in 2008 and as a low-end high priority (rank of 31) in 2009. However, despite being ranked ninth on the list of priorities, the CAISO currently plans to seek Board of Governors approval for it in September 2009.

The process or criteria employed by the CAISO in its decision to implement this initiative out of order is unclear to PG&E. As described above PG&E believes this issue should be a low priority. However, from a broader perspective for the CAISO's roadmap stakeholder process to be effective it is essential to provide Market Participants with a clear understanding of how these decisions are made. This clarification is important for planning purposes and would add significant value to the CAISO's prioritization of market enhancements. Without greater clarity, the integrity of the roadmap process could be compromised.

Second, PG&E requests that the CAISO clearly identify all the dependencies between the initiatives. This information would be highly valuable as we analyze and prioritize the initiatives and determine the potential implications on our systems.

Third, PG&E recommends the CAISO organize the market initiatives by category in future roadmap processes. Use of categorizations such as *General Market Design*, *Integration of Renewables*, and *Real-Time Performance* would provide market participants with a better understanding of the issues and how they relate to other initiatives.

Fourth, as discussed during previous stakeholder meetings and conference calls, PG&E requests that the CAISO continue to increase its level of focus on the settlement implications of market initiatives. Many of these initiatives will have significant implications for our settlement systems and the more detail the CAISO can provide as early in the process as possible, the more effectively PG&E will be able to implement new initiatives.

Finally, PG&E recognizes and appreciates the CAISO's receptivity to stakeholder input regarding how to continue to improve the clarity of the Catalogue and the prioritization process. We encourage the CAISO to continue to work closely with PG&E and other stakeholders to make this a transparent and valuable process.