

PG&E Comments

Renewables Integration Market Vision & Roadmap - Initial Straw Proposal

Submitted by	Company	Date Submitted
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Pacific Gas & Electric (PG&E) appreciates the opportunity to participate in the stakeholder process for the California Independent System Operator's (CAISO) Renewable Integration Market Vision & Roadmap (Phase 2) Initiative and to submit comments regarding the July 6, 2011 Initial Straw Proposal for Day-of Market Changes.

PG&E's detailed answers are provided in the CAISO provided template below. The major points of PG&E's comments are:

1. The CAISO's timeline is overly aggressive and should be modified to properly reflect the effort required by both the CAISO and market participants.
2. The Guiding Principles should reflect cost allocation based on cost causation.
3. The CAISO needs to better explain how Real Time Imbalance Service (RTIS) addresses net load following requirements.
4. PG&E does not agree that RTIS is a good measure of the cost of balancing variability on the CAISO system.
5. Conceptually PG&E supports elimination of Hour Ahead Scheduling Process (HASP), but more discussion and analysis is required.
6. PG&E supports Option B (5 minute dispatch) now but would consider changing our position with further cost-benefit evidence.

CAISO Template

1. Please provide any comments on the ISO's proposed schedule, timeline, or process for this stakeholder process.

The Timeline is Overly Aggressive and Should be Modified to Properly Reflect the Effort Required

PG&E understands and shares the CAISO's sense of urgency on this initiative. However, given the number of design elements and complexity of the issues the stakeholder timeline is too accelerated and not realistic. It is essential that the initiative be scheduled at a pace that gets the design right. Too much is at stake for the future of CAISO market and its market participants since it will require significant investments in new processes and software (less than five years after the start of MRTU, which itself required significant investment). It is worth taking additional time at the conceptual planning stage to make sure these are wise decisions and good investments.

Over the three weeks PG&E has discussed the Proposal, three general concerns have risen. First, market participants as a whole do not have a good understanding of how markets outside of the CAISO are integrating renewables. This includes not only the US markets but also European markets. Second, the CAISO is asking market participants to make design judgments without analysis or knowing the complete proposed design. Asking participants to decide on "day-of" design elements without providing the proposed "day-ahead" design is unreasonable since the overall design is not viewed holistically. Moreover, it would be helpful for the CAISO to provide analysis or even simple Excel modeling to help inform the decisions. As discussed below, some simple models comparing Real-Time options "A" and "B" would be helpful. Third, these are complex issues that take time for market participants to understand, discuss, and reach consensus. Adequate time needs to be provided to participants to vet these proposals adequately.

Based on the above, PG&E recommends the CAISO modify its timeline to include the following: (1) a survey of how other markets are integrating renewables, (2) adequate time for analysis and modeling by both the CAISO and market participants to better evaluate options, and (3) additional time for market participants to review the proposals more thoughtfully (e.g., four weeks to comment instead of the standard two).

The CAISO Should Develop an Incremental Implementation Option Along with a Comprehensive Implementation Option

In trying to meet all the guiding principles (durable, sustainable, scalable, etc.), the CAISO is contemplating broad and deep changes to the market. PG&E is supportive of approaching the conceptual design holistically. However, consideration of a complete conceptual design does not mean all the elements need to be implemented simultaneously.

Instead of implementing a comprehensive solution, the CAISO should consider incremental implementation. This does not change the conceptual discussion, but it could affect how elements would be implemented. An incremental approach could focus on implementing the highest pay-off changes first instead of the entire solution all at once. The CAISO could then monitor the market to see if additional elements of the conceptual design should be implemented.

Such an approach may not meet all the CAISO's principles immediately, but it could limit technology, market, and project cost risks. PG&E recommends that the CAISO consider developing an incremental implementation approach that can be considered along with the simultaneous approach.

2. Are there additional goals or operational challenges that the ISO should be addressing through this stakeholder process?

The CAISO Needs to Coordinate Its Design with Federal Energy Regulatory Commission (FERC) Rules and Other State Policy Objectives

The CAISO needs to acknowledge that the two recent FERC proposed rules regarding renewables integration (Nov. 2010 Notice of Proposed Rulemaking (NOPR) on Variable Energy Resources, and Feb. 2011 NOPR on Regulation Compensation) will likely affect the CAISO's design. For example, FERC's decision on a 15-minute intertie scheduling requirement could impact the timing of the CAISO's implementation. The CAISO should be explicit about its assumptions regarding these future rulings. It also makes sense to leave some options open until FERC issues its final rule making.

Additionally, the redesign should be compatible with State and Local Regulatory Authority (e.g., California Public Utilities Commission - CPUC) policy objectives. This includes such issues as resource portfolio standards (RPS), renewable energy credits, green house gas rules, loading order, and resource adequacy. An example of needed coordination is the need to synchronize the CPUC's RPS compliance rules with the CAISO's objective of economic curtailment of renewable resources. Without synchronization, the CAISO's planned market changes to provide incentives to curtail will be much less effective.

3. Please indicate whether your organization agrees with the guiding principles listed in the straw proposal. If not, please indicate why not. If you would like to have other guiding principles added, please describe those additional principles.

The Guiding Principles Should Indicate Cost Allocation Be Based on Cost Causation

The "Transparent" Guiding Principle is defined as, "The market relies on price signals to incent participant behaviors that align with the ISO operating needs." Only one of the Expected Outcomes for this Principle discusses cost allocation: "Pricing rules allow transparent allocation of renewable integration costs."

This discussion of cost allocation is incomplete because it does not discuss the basis of the allocation. Certainly, allocations based on socialization or cost causation can both be transparent allocations. However, if the goal is to provide price signals to incent actions by participants that align with the CAISO operating needs, then the allocation basis needs to be cost causation. The Expected Outcome above should recognize this and be modified to say, "Pricing rules allow transparent allocation of renewable integration costs based on cost causation."

4. Please provide your organization's views on any incremental ancillary services you believe are necessary to accommodate the intermittency of renewable resources.

CAISO Needs to Explain How RTIS Addresses the Net Load Following Requirement

Although PG&E is not opposed to consideration of the CAISO's proposed changes to Regulation and the Real Time Imbalance Service (RTIS), the Proposal does not appear to address the more pressing ancillary services (AS) issues as identified by the CAISO's integration studies for 20% and 33% RPS and recent market experience.

The CAISO estimates the need for incremental amounts of Reg-Up and Reg-Down services (on the order of 500 MW), and significantly larger increases (on the order of 2,000 MW) in net load following requirements being needed to integrate 33% RPS.¹ The CAISO's current Reg-Up and Reg-Down services manage the variability and forecast uncertainty of load, wind, and solar within the 5-minute dispatch interval period, while the estimated net load following requirements measure the remaining forecast uncertainty and variability between the hour ahead forecast and the Real-Time forecast. Not included in CAISO's estimates is the need for additional unit commitment to cover forecast variability beyond the hour-ahead uncertainty covered by net load following requirements. As highlighted in the CAISO's modeling, the greatest AS need is for net load following and not regulation. Although modeling done for planning purposes may not translate directly to operational considerations, the problem of net load following identified in recent studies seems to be borne out by the CAISO in its recent flexible ramping initiative which is geared to increasing net load following capability and not regulation.

RTIS and the revised regulation as proposed by the CAISO are both intra-dispatch AS products. They are basically designed as slow and fast flavors of today's regulation. The introduction of RTIS may help to deepen the regulation pool to provide the additional regulation needed to integrate 33% renewables. However, for the current 5-minute dispatch market, RTIS does little to address the net load following need within the 15-minute commitment period.

RTIS may do more to cover some of net load following need in a 15-minute market since regulation will be available for use during the 15-minute dispatch instead of just five

¹ Comparison of operating flexibility estimates for 33% RPS in 2020 which CAISO filed in the 2010 LTPP proceeding on July 1, 2011 against CAISO's estimates for 2011 contained in its *Supplement to August 2010 Report on the Integration of Renewable Resources Operational Requirements and Generation Fleet Capability at 20% RPS*, dated May 31, 2011 (See <http://www.caiso.com/2bb3/2bb3e45232930.pdf>)

minutes. But even in a 15-minute market, it is not clear RTIS will address the entire additional net load following need or the variability beyond the hour-ahead uncertainty covered by net load following requirements. While there may be a need to refine the regulation products, based on the LTPP modeling and recent market experience, this is a secondary priority. PG&E would like to see the CAISO develop proposals to address the load following need and the longer-term flexibility needed by the system beyond the five or 15 minute dispatch.

- 5. Does your organization believe that Residual Unit Commitment should be performed more granularly than daily (i.e. on-demand RUC)? Is on-demand RUC needed if the 15 minute unit commitment, either in RTED (Option A) or RTPD (Option B) looks forward 8-10 hours?**

On-Demand RUC Appears Unnecessary

The need for on-demand RUC is not apparent to PG&E. The Proposal indicates that both Real-Time (RT) market options "A" and "B" will include a short-term unit commitment process that looks out 8-10 hours to ensure sufficient generation is available. That would seem to negate the need for an on-demand RUC that looks out 8-10 hours.

- 6. Please provide your organization's views on replacing today's Hour Ahead Scheduling Process (HASP) for inter-ties with a simpler method that would not involve establishing separate hourly prices for the inter-ties and that would not include bid cost recovery. Please suggest proposals concerning what accommodations are necessary at the inter-ties to provide scheduling flexibility for western market entities.**

PG&E Conceptually Supports Elimination of HASP - More Work is Needed

PG&E shares the CAISO's concerns about market issues related to price disparities between interties committed based on the HASP price and internal generation committed based on the 5-minute interval price, most notably the creation of the Real Time Imbalance Energy Uplift. Elimination of these issues along with benefits that come from the simplification of moving to a two-settlement market is attractive. PG&E conceptually supports this elimination, especially if neighboring balancing area authorities move to 15-minute scheduling on the interties.

However, the issue is more complicated if there is not 15-minute scheduling on the interties. In this case, the CAISO suggests intertie scheduling could be accommodated through self-scheduling, or by submitting a bid for the first period of each hour and price-taking bids for the remaining intervals of the hour. Alternatively, the CAISO could consider the bid using the forward looking feature of RTED to estimate how the bid would function over all intervals of the hour; however there would be no guarantee of bid cost recovery. It is unclear whether importers would be willing to take on the price risk, especially without bid cost recovery. Given the CAISO's dependence on imports, this concern needs further discussion. Moreover, before making a decision on the elimination of HASP, market participants should have an understanding of the changes the CAISO is proposing for the Day-Ahead market.

7. **Does your organization prefer a two settlement market or a three settlement market? Please describe why.**

Preliminary Support for Two Settlement Market

See answer to question 6.

8. **Please provide your organization's feedback on the concept of a 1 minute Real Time Imbalance Service (RTIS).**

Do Not Agree that RTIS is a Good Measure of the Cost of Integrating Renewables on the CAISO system

Although PG&E is not opposed to consideration of the CAISO's proposed changes to Regulation and the Real Time Imbalance Service (RTIS), the Proposal does not appear to address the more pressing AS requirement as identified by the CAISO's modeling and recent market experience - the need for additional net load following. See answer to question #4.

Regarding RTIS as a measure of the costs of variability, the CAISO asserts:

Another potential benefit that the ISO is evaluating is the ability of RTIS to serve as a measure of the cost of balancing or variability on the ISO system. The costs of RTIS are essentially a measure of what the ISO has to pay to secure sufficient resources to deal with the variability that arises because market participants' production and/or usage differs from what was scheduled for them in the RTED. If all market participants were able to keep their load and production exactly at what was scheduled for them in the RTED there would be no need to procure RTIS. This suggests a simple and elegant solution to the question of how the costs of variability might be allocated. The costs of the variability could be measured as the total costs of this new ancillary service, RTIS, and the allocation could be based simply on a measure of how each market participant deviates from its RTED schedule.

PG&E does not agree that RTIS should serve as a measure of the cost of balancing or variability (i.e., integrating renewables) on the ISO system. As proposed RTIS is an incomplete measure of the cost of variability. For example, it does not include the cost for the additional fast regulation, for load following beyond regulation-type AS or the fixed cost of investment in resources that provide balancing for renewable intermittency.

- a. **Does your organization agree that with RTIS, regulation should be changed to a bi-directional service?**

PG&E will provide comments at a later date.

- b. **Is one minute the correct dispatch interval for RTIS?**

PG&E will provide comments at a later date.

- c. How should RTIS be bid, selected, and dispatched? Should a mileage bid be used for dispatch with a market clearing mileage price determined each minute?**

PG&E will provide comments at a later date.

- d. Does your organization's opinion on RTIS differ depending on whether Option A or Option B is chosen?**

PG&E will provide comments at a later date.

- 9. Please comment on your organization's preference for Option A or Option B with regard to the real time market. If neither option is feasible in your view, please provide input on how the real time market should be configured.**

Support Option "B" Now - Open to Changing Position with Further Evidence

PG&E does recognize some potential benefits with moving to a 15-minute dispatch interval (option "A"). Chief among these is the possibility of synchronizing with the 15-minute intertie pricing and co-optimization with commitment. However, it is not yet clear to PG&E that these benefits outweigh the costs of moving away from the current 5-minute dispatch. As such, PG&E supports the 5-minute dispatch (Option "B"). PG&E is open to reconsidering its position if the CAISO can make a cost-benefit case to support moving to Option A, or if it is compatible with a more holistic view of the markets given the structure of day-ahead markets.

Regarding the cost of changing to Option A, the CAISO notes that moving to a 15-minute dispatch could be costly and is investigating the difficulty of the change.

"The implementation costs and time for the ISO and all market participants would be minimized by retaining the current 5 minute market structure. The current operating systems, as well as the settlement systems, are all designed around the 5 minute market. Change to a 15 minute market and real time price would require potentially costly and time consuming revisions to both the operations and settlement systems. The ISO is investigating how difficult such changes would be to implement, and is seeking comments from stakeholders as to how hard it would be for them to move from the current 5 minute market to a 15 minute market."

PG&E expects it would be an expensive endeavor to change its systems to support Option A.

This design question could use modeling or analysis to better inform the decision. PG&E suggests the CAISO perform some simple side-by-side comparisons to see how the two

options perform and their respective impacts on cost. PG&E would like to explore this idea with the CAISO and its participants. At a minimum, PG&E thinks some simple modeling (with Excel spreadsheets) would help participants and the CAISO understand the two options better. PG&E points to the CAISO's experience with Regulation Energy Management. There was a lack of understanding of how REM operated until the CAISO modeled the functionality in Excel. After REM was modeled, there was a fuller understanding of how the proposal worked and the design was strengthened because of the participants' insights gained through the modeling. A similar exercise here would produce the same benefits.

a. Would 15 minute real time prices enable price responsive demand or demand response?

15 Minute Dispatch Could be Helpful to Demand Response

A fifteen dispatch may be helpful in two ways. First, this may increase the time between when the dispatch instruction is received via ADS and when the resource must reach the RT Dispatch Operating Target (currently this interval is 6.5 minutes). Increasing this time is helpful in that it provides more time for the demand response provider to react to dispatch changes. Second, fewer changes in dispatch instructions during an hour (four instead of twelve) are easier to manage for demand response providers and for customers responding to wholesale prices.

Also, the 15 minutes dispatch corresponds to the smallest time increment that PG&E is planning for its SmartMeter. Synchronization of the dispatch interval with the SmartMeter interval will simplify DR settlements and other activities.

b. In Option A, with 15 minute RTED, what is your organization's opinion about a 10 minute ramp period?

PG&E will provide comments at a later date.

10. How often should renewable resources be allowed to schedule?

Open to Consideration of 15-minute Scheduling and Rebidding of All Resources

PG&E is open to consideration of 15-minute scheduling and re-bidding of all resources (when must-offer requirements and local market power mitigation can be feasibly implemented on fifteen minute frequency). However, the CAISO needs to better explain the details of how this would work. As discussed in the answer to question 9, simple modeling in Excel by the CAISO would help illustrate the mechanics and identify potential issues. Scheduling in a time increment less than 15 minutes seems to have diminishing returns.

a. In Option A does every 15 minutes make sense?

15-minutes (see above).

- b. In Option B should renewable generation be able to schedule every 5 minutes, 15 minutes, or some other time interval?**

15-minutes (see above).

- c. Does it make sense to limit this scheduling opportunity to only renewable resources, or should it apply more generally? Who should be able to schedule more granularly than hourly?**

All resources (see above).

11. Please provide any other comments your organization would like the CAISO to consider through this initiative.

PG&E plans to submit additional comments on questions 8(a)-(d) and 9(b) by August 8.