

Stakeholder Comments

Renewable Integration: Market Vision & Roadmap Revised Straw Proposal

Submitted by	Company	Date Submitted
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SCE thanks the California Independent System Operator ("CAISO") for the opportunity to provide comments on the Renewable Integration: Market Vision & Roadmap ("RIMVR") Revised Straw Proposal. We appreciate the CAISO's further thought and effort in dealing with the future operating challenges. SCE also thanks the CAISO for hosting a stakeholder review meeting to discuss the proposal.

I. Executive Summary:

SCE supports the broad direction of the proposed market enhancements including the introduction of a Flexi-ramp product. The CAISO's studies document that uncertainty and variability in both generation and Load create a need for additional flexible responsiveness in the system. SCE supports the use of market products to address these growing needs.

The creation of the correct mix of products to address future needs presents a complex challenge. Herein, SCE generally differentiates "Balancing Products" from Contingency Reserves. Balancing Products refers to both Regulation and the future Flexi-ramp product. Contingency Reserves refers to Spinning Reserve and Non-Spinning Reserve. Renewable integration will require incremental Balancing Products, and all products will need to work in concert to provide the necessary range of flexibility. We anticipate that the development of this product mix, particularly the construction of the Flexi-ramp product, will prove complex, and SCE thus recommends that the effort and time required for this market design enhancement not be underestimated.

The cost-causation principle is an important improvement in the guiding principles. This principle will broadly direct changes pursued in the "Renewables Integration: Market and Product Review" Phase 2 ("RIMPR 2") initiative towards an efficient, lowest cost solution. For instance, in developing market-based solutions to provide incremental flexibility, costs for such balancing services need appropriate allocation so that all market participants have incentives to take corrective actions. This process can and should start immediately by overhauling cost-allocation structures for Regulation. Because Regulation is likely to serve as the primary balancing product until the proposed Flexi-ramp product is developed, it is logical to reconfigure

cost-allocation for Regulation towards all contributors of uncertainty and variability, rather than just to Load¹.

Beyond cost-causation, the Guiding Principles need to direct market design activities in RIMPR 2 and should influence our design proposals at all stages of development.

SCE appreciates the need for short and mid-term market enhancements but a clearer vision of a long-term market design at this stage would benefit the process. Without a clearer vision of what we expect beyond 2015, stakeholders can't evaluate if the mid-term enhancements progress towards that end, or impede us from reaching it. A clear picture of the end-state market should include a vision for real-time markets and HASP and clear pictures of how and why certain market features are in place. To this end, the CAISO should crystalize the role and definition for key market features such as Contingency Reserves, Balancing Products, RUC, etc. In so doing stakeholder and observers will have clarity in the intended functioning of the design, and ultimately help in developing designs that work efficiently and effectively toward reaching that vision.

II. Recommended changes in scope for RIMVR and RIMPR 2

A. A clearer long-term vision should be included

The CAISO should develop a clearer long-term vision of how the market will operate beyond 2015. SCE recommends this vision explore an end-state capability of 15-minute scheduling where the Real-Time Market and interties settle simultaneously. A clear end-state vision will also highlight where changes are needed most, and will clarify the roles and interplay for Flexi-ramp, RUC, and Regulation. This includes how the Flexi-ramp and Regulation products will work in concert, and of the "ideal" role of Regulation in the long-term. This clear vision of the end-state will enable more durable market designs and avoid possible misalignment of any mid-term enhancements implemented along the way.

B. To the extent possible, the CAISO should clearly identify and define the roles for Regulation, Flexi-ramp, RUC and Contingency Reserves

As the CAISO defines new market products, it should also define what operational problem each product addresses, and identify what is the driving need for that product. This is important since the justification of each aspect of the market and its products lays the foundation for proper cost-allocation. The CAISO should also be highly transparent regarding the drivers behind the sources of system uncertainty and variability since these

¹ To the extent the CAISO uses Spinning or Non-spinning reserves as Balancing Products, the cost allocation of these products should likewise be addressed immediately.

ultimately drive the procurement of Balancing Products.² As noted, SCE defines “Balancing Products” as Regulation Services and the proposed Flexi-ramp product within this document. SCE defines Contingency Reserves, as Spinning and Non-spinning Reserves.

The CAISO should consider and discuss further the approach and philosophy to the procurement of Contingency Reserves. To SCE, there are two directional approaches to consider. One approach is to clearly differentiate the procurement needs for Balancing Products from Contingency Reserves. Under this “bright-line” approach, Balancing Products would be used strictly to manage the system for expected ranges of uncertainty and variability. Contingency Reserves would be strictly for extreme and unanticipated events, such as N-1 conditions, extreme output deviations from VERs, or declared NERC energy emergency events.³

The “bright-line” division should receive serious discussion and consideration. It provides clear and simple justifications for the procurement for each category of product. It also clearly differentiates capacity procured for contingency events from capacity procured for balancing. It provides sellers with a clear understanding of what the product will be used for, and this in turn should allow efficient pricing. It also provides a clear basis for differing cost-allocation approaches for Contingency Reserves and Balancing Products.

An alternative approach would blend Balancing Products and Contingency Reserves into a single “pool of flexibility”. Here, Balancing Products could pull from Contingency Reserves, and in some cases Balancing Products might serve as Contingency Reserves. This approach may have the potential to lead to a lower overall procurement of Contingency Reserves with potentially lower total system costs, but could also compromise dispatch or capacity “reservation” decisions. In other words, if Contingency Reserves are blended into Balancing Products, the optimization becomes more complicated by needing to optimize among energy resources, Flexi-ramp resources and Spin resources, all while preserving capacity reserves for ramping or for distinct and potentially large contingency events. It also complicates cost allocation, and does not provide transparency to the market over how the CAISO will use the products.

Both approaches have merit, and we encourage the CAISO to further explore the pros/cons of both approaches in the RIMPR process.

C. The design of Regulation should be in scope for the RIMVR and should be addressed both near-term and mid-term.

² Nelson and Nelson, “Integrating Variable Energy Resources while Maintaining Reliability: The Role of Integrating Services and the Importance of Proper Cost Allocation,” This Conference Paper was previously submitted with SCE’s comments to the first RIMVR Straw Proposal: <http://www.aiso.com/Documents/SCECommentsRewewablesIntegrationMarketAndProductReviewPhase2StrawProposal.pdf>

³ A potential exception to this rule could be made where any over-procurement of Contingency Reserves could be used as Balancing Products. .

Since Regulation will play an increasingly important role in the near-term, Regulation should be in the near-term scope. Because time is required to develop any new Balancing Products such as Flexi-ramp, Regulation will likely provide the predominant balancing service for years to come. Therefore, it is necessary for the CAISO to apply cost-causation and cost-allocation principles to Regulation procurement in the near term.⁴

On a longer timeline, the interplay and functional responsibilities of Regulation and the Flexi-ramp product need to be considered. Previously, the CAISO contemplated a Regulation service that was predominately a zero-net energy product. This design coupled with mileage and other pay-for-performance structures presumably yields a more efficient and effective Regulation product specifically to deal with “noise”, as opposed to trending and balancing. Although SCE and others identified several critical issues that require resolution, enhancements to Regulation should still be part of RIMPR 2.⁵

Additionally, the RIMVR is incomplete without a long-term plan for limited energy resources. Currently, these resources participate in the Regulation market via the Regulation Energy Management (“REM”) construct. Although REM might provide helpful services, this product is clearly different from the current Regulation and, in the long run, may play a different role than traditional Regulation. A long-term plan for limited energy resources and their potential roles to provide short-duration Regulation is needed.

For all of these reasons, Regulation design should be more in scope for the RIMVR.

D. The CAISO should consider key issues from its Market Design Catalog while scoping out the RIMVR

The CAISO needs to prioritize its RIMVR efforts with other initiatives. If initiatives outside of the RIMPR impact or seriously impede renewables integration market design goals, the market needs to understand what will take priority. Since many market elements link together, the interplay and phasing of market enhancements requires consideration and planning.

SCE has provided a list of near-term market design initiatives that should be addressed in addition to the RIMPR 2 initiatives. We note three key items: Enhancements to start-up bids to better recognize start-up costs; cost-allocation to variable dynamic transfers and pseudo-ties; and enabling multi-day unit optimization horizon.⁶ These three topics (and

⁴ The cost-allocation protocols for Spinning Reserve and Non-spinning Reserve should also be refined if these product are procured as Balancing Products.

⁵ http://www.aiso.com/Documents/SCEComments_RewewablesIntegrationMarketAndProductReviewPhase2StrawProposal.pdf

⁶ SCE full comments, submitted as part of the 2011 Market Design Catalog initiative, are available at: http://www.aiso.com/Documents/SCEComments_2011MarketDesignInitiative.pdf

potentially others) should be incorporated into the broader renewables integration market redesign.

E. The CAISO's expectations for the future generation fleet should drive discussions on Day-Ahead market timing.

The Day-Ahead market was designed in part to provide reasonable planning timelines for generators to operate and deliver power. To the extent that the future fleet is comprised of resources that operate on shorter start-up timelines, the RIMPR 2 initiative should consider how a delay in the Day-Ahead market timing could improve market efficiency by reducing uncertainty for VERs and Load. This reduction would occur because expectations for VERs and Load can be more accurately forecasted closer to Real-Time. As reductions in uncertainty will presumably lead to lower procurement of Balancing Products, this issue is in scope for the RIMPR 2 initiative and should be explored as part of discussions on the Flexi-ramp product and on long-term capacity assurance mechanisms.

Any material change in the Day Ahead market timing would require comprehensive agreement and coordination among many parties. Because some of these parties (e.g. gas trading entities) operate on nation-wide bases with linkages beyond Western power markets, aligning all parties would require reconfiguration of practices in large and institutionalized industries. These obstacles are significant and could likely be addressed only through robust outreach and coordination by the CAISO, Utilities, other market participants, and impacted industry groups.

III. Comments on the short, mid, and long-term proposed market enhancements

SCE's comments in this section provide targeted feedback and specific recommendations on the short-term, mid-term, and long-term components of the RIMVR revised straw proposal. SCE also provides input on new elements it proposes for inclusion in the RIMVR.

A. Short-term

i. Redesign of the cost-allocation for Regulation (as currently designed) should be immediately addressed in the RIMPR 2 initiative.

This change is important because Regulation will likely be the main form of Balancing Product for years to come, until the Flexi-ramp product is released around 2014. Between now and 2014, the need for this product will be increasingly driven by VERs, yet the current cost allocation structure would inappropriately allocate all costs to load. Consistent with the principle of cost-causation, both load and variable or uncertain generation should pay this cost. Due to this misallocation, load will unfairly bear the cost of Balancing Products that are in part needed for integrating VERs until cost allocation for Regulation is reconfigured.

Methodologies are currently available to allocate costs for Regulation in line with cost-causation principles. For example, the CAISO can consider a methodology where historical data establishes a baseline need for Regulation for load, and incremental purchases are allocated to other resource classes contributing to uncertainty and variability. Baseline amounts for this approach can be found in the CAISO's 20% and 33% RPS Studies which quantify needs for increasing flexibility above current levels⁷.

Other methodologies to consider involve a clearer breakdown of the total system drivers for uncertainty and variability. Westar, Puget Sound Energy, and the Bonneville Power Administration ("BPA") have adopted this approach already and are charging market participants that contribute to uncertainty and variability for a larger percentage of the Regulation need than load. Westar allocates six times more Regulation requirements to VERs relative to load, a methodology approved by the FERC.⁸ Puget Sound Energy proposed allocating more hourly Regulation requirement to two of its VERs than to its entire Load.⁹ BPA maintains VER following reserves that are three times higher than its Load following reserves.¹⁰ With at least two FERC-approved methodologies available for review, the CAISO should consider how to reconfigure the cost-allocation for Regulation to provide signals for corrective action and to avoid unfair cross-subsidization of certain market participants by load.

ii. **Updated structures for cost-recovery of start-up costs are also needed in the near-term.**

The CAISO's list of operational challenges emphasizes that changing operational conditions "will cause more frequent dispatches and starting and stopping of flexible, gas-fired generators and, therefore, potentially more wear and tear."¹¹ A fixed start-up cost component must be developed to provide a safe-harbor value for start-up costs that are expressly excluded from variable operating and maintenance costs. Improved methods to compensate generators for start-up costs will enable bids to better reflect true marginal costs, and in turn should produce more efficient market results.¹² The CAISO's optimization algorithm can be readily adapted to incorporate more salient start-up cost information, and this capability should be leveraged forthwith.

⁷ <http://www.aiso.com/Documents/Integration-RenewableResources-OperationalRequirementsandGenerationFleetCapabilityAt20PercRPS.pdf>

⁸ FERC: ER09-1273.

⁹ FERC: ER11-3735

¹⁰ http://www.aiso.com/Documents/SCEComments-RenewablesIntegrationMarketandProductReviewPhase2_Discussion_ScopingPaper.pdf

¹¹ "Renewables Integration Market Vision & Roadmap, Revised Straw Proposal", August 29th, 2011, pg. 12.

¹² SCE commented on this issue recently:

http://www.aiso.com/Documents/SCEComments_2011MarketDesignInitiative.pdf

B. Mid-term

i. The CAISO should clearly articulate the expected roles and purposes for each of the market design aspects.

Defining the purpose of key market structures is, in some cases, a precursor to the effective design of such structures. SCE recommends that the CAISO articulate the intent and parameters of Flexi-ramp, Regulation, RUC, and Contingency Reserves.

For each product, the CAISO will use some method to identify hour needs. This method should be transparent so the market can understand need-drivers, and for designing cost-allocation (which in turn should result in self-corrective actions by market participants responsible for contributing uncertainty and variability.)

Additionally, the CAISO should specifically discuss the role for Contingency Reserves. As noted, we see two general market design pathways on this topic. Under the “bright-line” scenario, Contingency Reserves are expressly reserved for extreme, rare, or reasonably unpredictable conditions such as N-1 events. Balancing Products, meanwhile, address routine grid uncertainty and variability. Alternatively, the CAISO could design Contingency Reserves, e.g. Spinning Reserve, to be available for more some expected system balancing duties and design for substitution between and among Balancing Products and Contingency Reserves. This division will have clear implications for both the cost-allocation and design goals for each capacity-based service.

ii. SCE supports a transition from a Flexi-ramp constraint to a Flexi-ramp product but emphasizes the effort required to develop the product should not be underestimated.

For durable market operations, a Flexi-ramp product is preferable to a Flexi-ramp constraint. A product design that ensures targeted compensation that rewards performance and flexibility should yield more efficient outcomes than a simple constraint and will prevent market participants from potentially receiving windfall profits for services they don’t provide. (The current compensation structure for the Flexi-ramp constraint, however, may allow such windfall profits.) Proper payments also provide incentives for market participants to develop or expand current capabilities in order to offer the CAISO the flexibility needed for operations.

Cost allocation for a Flexi-ramp product should be based on the pre-determined needs for procurement. As some or all of this capacity will be procured in the Day-Ahead market, the CAISO’s methodology for allocation must, to some extent, be based on the information available at the time of procurement. For day-ahead procurement, Flexi-ramp capacity will presumably be procured based on statistical ranges of expected performance and on other forecasts (weather, etc.). Cost-allocation should tie back to the information that drives procurement at the time of the decision.

Approaches used to determine the procurement amounts for a Flexi-ramp product should be transparent and based on expected levels of uncertainty and variability. SCE anticipates the assessment of procurement methodologies or approaches will be complex and highly involved. The CAISO should allocate considerable time for discussion of this important topic. At a high level, procurement decisions for Flexi-ramp must consider how to ensure adequate balancing capability at the least cost. In practice, however, achieving this outcome may involve optimizing procurement decisions around prices, availability, and expected needs that invariably change from Day-Ahead to the Day-of market.

Additionally, the compensation structure for Flexi-ramp may introduce uncertainty for opportunity costs, assuming compensation structures involve some form of mileage and “performance” payments beyond base capacity payments. Additional discussion is needed regarding the frequency and duration of Flexi-ramp dispatch. If these resources are frequently used, potential opportunity costs for these market resources may be small. The current CAISO proposal, in citing energy bids as key criteria for the selection and dispatch of Flexi-ramp resources, implies that these resources will be active in energy markets more so than as “set aside” capacity. How the optimization makes tradeoffs between Flexi-ramp capacity bids and associated energy bids will require significant discussion.

Further, the CAISO should consider the benefits of bidding “elastically” and finding the optimal timelines for the procurement of sufficient amounts of Flexi-ramp.¹³ Such an approach is different than that currently used to procure Contingency Reserves and Regulation today where all of the forecasted needs for Ancillary Services are procured in the Day Ahead market based on hard procurement targets without consideration of price. For the Flexi-ramp product, however, a “soft” target should be considered. If a “demand curve” is used for Flexi-ramp, the CAISO will need to explain the inputs that create the curve. SCE expects that only some portion of the Flexi-ramp capability will likely be procured in Day-Ahead markets, and a residual amount closer to real-time in order to utilize better forecasts and additional information.

In contrast to the need to optimize decisions across time, Flexi-ramp procurement might also be co-optimized with energy and RUC within a given market period, e.g. Day Ahead. SCE sees benefits in co-optimizing Flexi-ramp procurement with energy and RUC. The CAISO should seriously explore changes to the IFM run that could enable the market to simultaneously optimize procurement from energy providers, Flexi-ramp providers, and RUC resources. The co-optimization of all products in both Day-Ahead and Day-of markets represents a distinct change from current market structures. SCE continues to maintain that a simultaneous RUC and energy optimization will yield more efficient and market-driven solutions when compared with the current serial RUC timing. And we note that the CAISO will likely increase

¹³ This discussion centers on the timing of procurement in the face of changing conditions and thus changing forecasts for Flexi-ramp need in the midst of changing needs for energy generation.

the role of RUC to account not just for load, but also for VER forecasts. All this argues for an even greater need to co-optimize RUC. The potential complexity of this transition again highlights the need for robust discussion on Flexi-ramp product design.

RIMPR 2 should also provide discussion and clarification on the role of RUC, as opposed to Flexi-ramp, in addressing VER uncertainty in certain regions. The ISO has maintained that regional RUC requirements, a.k.a. zones, can be administratively set and adjusted. While SCE understands that the ISO's goals in adjusting capacity requirements for RUC zones is to ensure reliability, greater discussion is needed to ensure the challenges of regional VER uncertainty are resolved in the most efficient manner. As the incorporation of the Flexi-ramp product requires consideration of co-optimization between it and RUC, now is the time to clarify the role of RUC in addressing VER uncertainty and in providing Balancing Products.

Consideration of the future resource fleet's capability, e.g., from 2015 – 2020, should also factor in to the Flexi-ramp product design. Currently, market designs appear to be predicated on the basic premise that the Day-Ahead market will continue indefinitely and serve as a major element of market operations. With a more modern fleet in the future, however, the Day-Ahead market timing might well be shifted to be run closer to real-time. This timing adjustment might be possible if newer resources with shorter start-up times require less notice. A key benefit to such a shift would be the ability to better manage the Flexi-ramp procurement decisions in the Day Ahead in light of more updated (and thus less uncertain) VER forecasts, possibly resulting in lower variability and uncertainty. With Flexi-ramp adding to the complexity of multi-day IFM optimization, the CAISO will want to consider how the fleet resources predicate the timing of the Day-Ahead markets.

As the CAISO proceeds with the RIMVR and subsequent design of the Flexi-ramp product, additional study on the impacts of this product is needed to understand total cost-impacts of this change. The total cost study should go beyond the procurement costs of the Flexi-ramp product and should include secondary costs associated with its effect, such as its impact on energy prices, costs for GHG rule compliance, etc.

In summary, the Flexi-ramp product represents a promising but complex market change. For its successful implementation, the RIMPR 2 initiative must sufficiently iron out many critical elements of its design, including:

- How will costs for Flexi-ramp be allocated for Day-Ahead procurements?
- What opportunity costs or expected mileage payments should be reflected in Flexi-ramp bids and selection? How will the optimization trade-off between capacity and energy bids from Flexi-ramp providers?
- What methodologies and analysis will be used to determine procurement amounts in the IFM? Near real-time?
- Will the CAISO create a “demand curve”, and if so, how will the CAISO develop the “demand curve” for Flexi-ramp?
- How will Contingency Reserves be substitutable (or not) with Flexi-ramp?

- How do administrative adjustments to RUC zones impact or interplay with Flexi-ramp procurement? How will RUC be co-optimized with Flexi-ramp and the rest of the IFM?

iii. Resolution of the Real Time Imbalance Energy Offset (RTIEO) is an important topic and should be prioritized by the CAISO.

The CAISO's second revised RIMVR straw proposal highlights clear timeline for resolving the Real-Time Imbalance Energy Offset. SCE supports resolution of this issue quickly as the uplift from this structural market design flaw impacts ratepayers. This issue is a high priority and, although listed in the CAISO's RIMVR as a mid-term issue, should instead be slotted for near-term resolution.

SCE supports the idea of establishing a stand-alone initiative to address this issue. The CAISO's timeline for resolving this issue in the first quarter of 2012, seems reasonable to SCE, given that parties are well informed of the complexities of this issue from participation in the initiative to look at the RTIEO from Convergence Bidding on the interties. As SCE mentioned in this previous effort, the "Pay as Bid" approach should be considered as a possible solution by which to resolve the pricing differences between HASP and Real-Time markets. "Pay as Bid" reduces uplifts relative to the status quo and relative to "Pay as Bid or Better", and is also not susceptible to arbitrage, unlike a "Pay as Bid or Better" structure.¹⁴

iv. Structures to allow for forecast updates closer to real-time should align with a future vision for real-time operations.

SCE supports a structural change to allow resources to submit production forecast updates closer to real-time. SCE differentiates the benefits of forecast updates from the benefits of schedule updates. To SCE, accurate forecast updates can reduce *uncertainty*, ultimately reducing the need for Balancing Products procured in/near real-time. Separately, better scheduling granularity, e.g. in 15-minute scheduling blocks in real-time markets versus today's one-hour blocks, will provide a more accurate gauge of intra-hour *variability* in order to improve energy dispatches and better quantify balancing needs.. With a clearer sense of the expected performance and intra-hour movements of market resources - including load - the optimization should produce lower costs without sacrificing reliability. Based on this distinction between the roles of forecasting updates as opposed to scheduling granularity, SCE sees several important opportunities for market design enhancements.

For example, assume a wind-generator with 100 MW of capacity. At seventy-five minutes prior to real-time (T - 75) it believes its output will be 0 MWs for the first 30

¹⁴ http://www.caiso.com/Documents/SCEComments_RevisedStrawProposalandIntermediateTermOptions.pdf

A one-way "Pay as Bid or Better" for importers only (NYISO approach) will not provide exporters any incentive to buy power during times of over generation, even though these over generation situations are expected to create increasingly frequent operational challenges in the future.

minutes of the hour and 50 MWs for the last 30 minutes of the hour. Thus, at T-75, it enters into a binding energy schedule for 25 MWh.¹⁵ At thirty minutes prior to real-time (T – 30), however, an updated forecast reveals its output will likely be 50 MW for the first 30 minutes and 100 MW for the last 30 minutes, creating an expected energy delivery of 75 MWh.¹⁶ Currently, there is neither an incentive nor a mechanism for this wind-generator to submit this updated forecast to the CAISO. Also, the CAISO’s hourly scheduling practices, although a long-standing convention sufficient for low variability generation, fail to reflect the forecasted intra-hour variability or to allow for a “profiled” (as opposed to “flat”) schedule at the T-75 submission deadline. To SCE, there is value in this updated information and incentives should be in place to ensure it is submitted to and used by the CAISO.

The cost-allocation for Balancing Products should be such that participants have incentives to 1) submit accurate and shaped schedules in the HASP process (T-75), and 2) provide the CAISO with accurate forecast updates after the HASP run but prior to the RTED run. Such incentives could take the form of reductions of uplifts allocated to participants who provide updates such that procurement decisions for Balancing Products are improved. Accurate forecasts will reduce uncertainty, and in turn should reduce the amount of procured Balancing Products. Additionally, to the extent the optimization considers properly “shaped” schedules (as opposed to flat), this too should improve the efficiency of the optimization.

The timing of forecast and/or schedule updates should be such that updates are useful for system operations and for improving optimization results, including reducing the quantity of procured Balancing Products. The above example assumes a forecast update at T – 30 would allow the benefits of the update to be captured by the market and market participants. In reality, the CAISO should explore the timing requirements for using such information.

Forecast updates between the HASP and RTED runs should be optional for all participants¹⁷. In line with the principle of technology neutrality, all participants should have the option to submit updated forecasts. With proper cost-allocation, the CAISO should receive additional valuable and actionable information from the market. Although there may be little need to update forecasts or use “profiled” schedules for dispatchable resources who can accurately forecast Day Ahead performance, they should still be allowed the opportunity to do so. For highly variable resources, the ability to provide close-to-real-time forecast updates may become a routine and common practice if significant benefits result.

A shift to more granular scheduling and forecast updates should be part of RIMPR 2. A vision for the length of real-time scheduling periods should influence this

¹⁵ Calculated as 30 min * 0 MW + 30 min * 50 MW = 25 MWh.

¹⁶ Calculated as 30 min * 50 MW + 30 min * 100 MW = 75 MWh.

¹⁷ Should the CAISO see the need to make such forecast updates mandatory for market participants that consistently contribute large amounts of uncertainty and variability, such requirements could be considered in the future.

discussion. A clearer end-state vision would help guide these mid-term market changes. In the long-term, there are clear indications of a policy shift towards more granular schedules.¹⁸ With an assumed end-state goal of 15-minute scheduling blocks, the CAISO could readily provide 30 minute scheduling periods by simply doubling the basic block.

Recapping the issue, currently settlements are typically based only on *schedules* and deviation from schedules. While that structure should continue for energy settlements, the RIMPR process should explore allocating some portion of Balancing Product costs based on *forecast* accuracy. Unlike today, parties should have an incentive to provide accurate and actionable forecasts to the CAISO prior to real-time, which in turn should reduce uncertainty and result in a reduction in the procurement of Balancing Products.

v. The ability for Participating Intermittent Resource Program (“PIRP”) resources to opt-in to provide decremental energy bids creates structural concerns and preferential treatment.

SCE’s comments in RIMPR 1 highlighted some of the flaws of PIRP, including how its provisions for the monthly netting of schedule imbalances create a subsidy for PIRP participants and how this program violates many of the CAISO’s current RIMPR 2 guiding principles. Ideally, SCE advocates that this program should sunset to avoid the need to develop work-around rules for it and the operational issues it exacerbates. If the CAISO continues PIRP, however, it makes sense to address the program’s deficiencies as much as possible.

The CAISO’s proposal allowing for optional decremental bidding by PIRP resources needs refinement. The current proposal creates a structure in which PIRP resources may opt to selectively provide decremental energy capability, optimizing around different settlement choices available in any hour. Giving options for settlements causes asymmetry problems. Consider a scenario in which output from wind generators is expected to fall naturally towards the end of an hour. Resources in PIRP have a clear incentive to capture the benefits of the alternative settlement rule, even though any over-generation problem would be resolved without the need for additional payments. This settlement “cherry-picking” is likely to increase the subsidies for PIRP resources by increasing PIRP uplift, essentially a cross-subsidization currently largely charged to load. Furthermore, optionality in any form is typically valuable, and providing potentially valuable optionality to a certain “class” of market participants without charging for it creates an uneven playing field. While the CAISO is correct in proposing changes to PIRP as a means of addressing over-generation situations or for providing downward balancing capabilities, the current proposal remain insufficient and requires additional work.

¹⁸ FERC’s NOPR on Integration of Variable Energy Resources [Docket No. RM10-11-000].

vi. Pay-for-performance structures should be added into the settlement approaches for all Balancing Products.

In a recent stakeholder workshop regarding this revised RIMVR straw proposal, the CAISO emphasized that pay-for-performance settlement structures, such as mileage payments, will be considered and likely incorporated into the suite of market design changes to occur under RIMPR 2. SCE supports these structures but believes that effective design will require a significant stakeholder process. The primary intention of such structures is to optimize market operations by using the best resources for each of the various market roles. To achieve this goal, pay-for-performance structures must compensate superior performance, such as faster, accurate or more prolific (mileage) responses to signals or dispatch instructions. At a minimum, resources that fail to perform as instructed should be subject to lower or no payments. The “pay-for-performance” concept should manifest in RIMPR 2 redesigns as clear market incentives for accurate and superior performance.

vii. The CAISO’s study on Frequency response and Inertia should be used to plan an initiative to address these issues (if needed.)

. SCE looks forward to reviewing the findings of the CAISO’s Inertia study, scheduled for release in September 2011, and to participating in subsequent discussions on this matter.

C. Long-term

i. SCE supports the consideration of forward structures to ensure the grid has needed operating flexibility.

It is likely that a CAISO-run structure designed to secure forward operating flexibility would take years to design and implement. Assuming the CAISO agrees such a mechanism is needed within the coming years, a discussion for such a mechanism should begin soon. Further, if the CAISO determines there is a need for new capacity to integrate VERs or address local issues, an effective capacity mechanism should be in place as soon as possible.

The implementation of such a structure or mechanism will require cross-agency collaboration and should be well coordinated with the CPUC and other state policy-makers. Broad consensus on the need for such a mechanism will be necessary for its implementation and will pave the way for requirements and cost-allocation methods designed into the market.

ii. A clear long-term vision for the Real-Time market should be included in the early stages of the RIMPR 2 process and also be sufficiently detailed in the RIMVR.

Designing for the future will always involve uncertainty. For particular market structures, the CAISO can manage this uncertainty by building market capability for “best-case” scenarios that can be relaxed to meet changing requirements. To that end, an end-vision for 15-minute scheduling is appropriate at this time as it can be doubled to accommodate 30-minute scheduling blocks. Based on FERC activity, the CAISO can reasonably assume that 30-minute scheduling at the minimum will be required. The CAISO can also assume there will be a single settlement for both the interties and in-state nodes. Ultimately, this long-term vision ensures that near and mid-term steps are building towards the correct capabilities.

iii. The optimization should be designed to find least cost solution in light of uncertainty.

While the short-term and mid-term design features give the CAISO additional needed operating tools, the optimization at its core continues to find least-cost solutions based on deterministic “point forecasts”. The long-term vision should include an optimization that minimizes costs based on a distribution of possible outcome, while ensuring the CAISO has sufficient operating flexibility. Thus a “stochastic cost-minimization optimization” should be included as part of the long-term vision.