

**California Independent System Operator's**  
**Renewable Integration Market and Product Review Phase II**  
**Discussion and Scoping Paper**

**Comments of Jack Ellis**

Disclaimer

I am submitting these comments on the CAISO's Renewable Integration Market and Product Review Phase II discussion paper on my own initiative. They represent my views and do not represent the views of Resero Consulting, its clients or any other stakeholder interest.

Introduction

In its April 5, 2011 Discussion and Scoping Paper, the CAISO outlines a number of ideas and asks for stakeholder comments. In this comment paper, I will address several of those ideas having to do with market design and cost allocation. My recommendations can be summarized as follows:

- The CAISO should follow its tariff by assigning "renewable integration costs", which I refer to as balancing costs, to Scheduling Coordinators (SCs). Whether those costs should be passed on to load or borne by the owners and operators of Variable Energy Resources (VERs) or dealt with by some other means is a commercial issue to be negotiated among SCs and the loads and resources they represent. It should not be addressed by the CAISO or decided in a CAISO stakeholder process or be subject to FERC oversight.
- The CAISO's role as risk manager for SCs should be limited to backstop authority. The CAISO should avoid procuring optionality and instead ensure that spot prices reflect the short-run cost of balancing – no matter how high - so that SCs are motivated to either manage the financial risk themselves or procure and deliver optionality and operating flexibility to the CAISO.
- The CAISO should design and implement extensions to its *spot energy markets* that will allow SCs to better manage variability and uncertainty by allowing SCs to adjust the commitments against which imbalances are measured, either by changing self-schedules or by purchasing and selling energy.
- The CAISO should implement a market-based mechanism that would allow resources to be paid a premium for faster performance *when it is needed*. However the concept of a mileage payment outlined in the FERC NOPR on Frequency Regulation is a badly flawed and should not be adopted.

Background

The CAISO has published this discussion paper to kick off the next phase of what will be a multi-year initiative to adapt California's wholesale market to meet the demands of increasing supply and demand variability. In the course of its initiative, the CAISO and stakeholders will be confronted with a number of challenges. These include:

- Accommodating the state's "loading order" preference for energy efficiency and demand response.
- Supporting and being supported by the state's Smart Grid initiatives. In particular, providing appropriate mechanisms, incentives and market rules so that customers will make flexible end-use devices and distributed resources available when and as necessary to help balance the grid.
- Avoiding distortions that skew incentives<sup>1</sup> for efficient investment in new infrastructure and cost-effective retirements of existing infrastructure.
- Supporting California's 33% RPS mandate.

The CAISO's ability to deal with these challenges is both enhanced and constrained by the multiple, often conflicting roles it plays in the wholesale market:

- As market operator, the CAISO is obligated to be a neutral facilitator with no interest in price outcomes.
- By purchasing and selling energy to balance supply and demand in real time, the CAISO acts like a market maker, although it does not profit from a bid/ask spread as would be the case in other markets.
- The CAISO manages both financial and operational risk by purchasing options on energy (to provide contingency reserves and regulation), through its reliability unit commitment (RUC) process, and when it uses its exceptional dispatch and backstop procurement authorities. The CAISO's proposed flexible ramping constraint and a hypothetical load following reserve products are other examples of options used by the CAISO in its role as risk manager. By managing risks on behalf of many other market participants, the CAISO is in a unique position to influence both spot (real-time) and forward (day-ahead) market prices.
- The CAISO performs a quasi-regulatory function by monitoring its markets for manipulation and by proposing, or sometimes unilaterally implementing, changes to its market rules as embodied in its FERC tariff and its Business Practice Manuals. Although most financial exchanges and commodity markets including an internal regulator, as a single-state market, the CAISO operates in a unique regulatory and political environment that tends to favor the interests of electricity consumers<sup>2</sup>.

The CAISO's markets are also dominated by two market participants that are individually the largest owners of generating capacity in the California wholesale electricity market and are collectively responsible for more than half of the state's end-use deliveries of electricity. As scheduling coordinators

---

<sup>1</sup> Incentives that cause too much supply or the wrong kinds of resources to be built are as problematic as incentives that cause too little supply to be built.

<sup>2</sup> Financial exchanges would not survive if they favored one side of the market over the other.

for VERs and QFs, they control bidding and scheduling for several thousand MW of additional for which they are the buyer but not the owner or operator.

The CAISO's recent decision to implement a "flexible ramping constraint" in its real-time market illustrates how these conflicting roles influence market outcomes. It also shows how operational risk management by the ISO can undermine other important policy initiatives like demand response.

The CAISO is implementing this flexible ramping constraint in order to deal with "minor short-term insufficiencies of energy bids that could be dispatched due to 5-minute ramping limitations<sup>3</sup>". DMM notes that this lack of energy bids is responsible for many of the price spikes observed during this period and indeed, real-time prices appear to appropriately reflect a scarcity of ramping capacity. According to the CAISO, factors that drive the need for additional ramping capacity include<sup>4</sup>:

- Changes in load conditions from forecast
- Differences between average 15 minute imbalance energy needs and 5 minute imbalance energy needs within the 15 minute interval
- Resources shutting down without sufficient notice
- Variable energy resources delivering more or less than forecast
- Contingency events<sup>5</sup>
- High hydro run-off decreasing resource flexibility
- Interties tagging and delivering less than awarded in HASP
- Interchange ramp in and out between hours

In some instances, such as load forecast error and mismatches between the 15 minute RTPD process and the 5 minute RTD process, the CAISO is pursuing improvements in its market and operational systems. In cases where suppliers fail to follow through on their forward market commitments (intertie schedules, VER energy deliveries, or resources that shut down unexpectedly), those suppliers are apparently incurring imbalances that impose operational risks on the grid. From both an operational and a financial perspective, the CAISO is attempting to provide itself with a means for managing those risks on behalf of parties that have failed to do so themselves.

### Impacts of CAISO Market Intervention

As described in the technical bulletin for its proposed flexible ramping constraint, the CAISO intends to procure optionality in the up and down directions<sup>6</sup> by committing additional supply in amounts that it will determine in its sole discretion. By doing so, the CAISO will influence prices in several ways. First, the CAISO will have additional flexibility at its disposal, which will minimize the likelihood that ramp constraints trigger penalty prices, which will in turn depress five-minute prices in circumstances where

---

<sup>3</sup> "Quarterly Report on Market Issues and Performance", February 8, 2011, page 10.

<http://www.aiso.com/2b1f/2b1f838819910.pdf>

<sup>4</sup> The following list is taken from a technical bulletin on the flexible ramping constraint that was revised on April 19, 2011. See <http://www.aiso.com/2b30/2b307b2a64380.pdf>, page 4.

<sup>5</sup> The CAISO does not explain why contingency reserves are not being deployed for contingency events.

<sup>6</sup> Technical bulletin, page 6. "The flexible ramping constraint utilizes an operator-specified quantity of upward and downward five-minute ramping capability..."

they might otherwise have reflected a brief shortage of ramping capacity. Second, by committing additional capacity in real-time in anticipation of a shortage of ramping capacity, the CAISO will increase supply in that time frame and likely depress real time prices even if a ramping capacity shortage never materializes. Third, suppliers that are committed to provide additional ramping will be reimbursed for their out-of-pocket costs unless they are, in fact, dispatched above minimum output, but they will be paid nothing for the optionality they provide<sup>7</sup>. Consequently, the real time price paid by SCs that do a poor job of managing their imbalance risk will be subsidized by providers of flexible supply and flexible demand who are not being compensated for the optionality they are providing.

### Significance of the CAISO's Spot Markets

The principal purpose of physical spot markets is to provide a mechanism for cash settlement of supply-demand imbalances at the time of delivery. The CAISO's five-minute market provides this cash settlement function. Forward markets provide a mechanism for limiting exposure to spot prices by allowing parties to hedge prices and volumes against a range of uncertainties, including changes in demand, changes in production, and changes in other system conditions. When the CAISO intervenes after the forward markets close and before the spot market opens in order to maintain reliability by procuring an option on capacity (e.g. activating the flexible ramping constraint), exercising its exceptional dispatch authority or procuring capacity in connection with RUC, it influences spot market outcomes and incurs costs that are outside the control of SCs. By intervening, the CAISO protects users of the grid generally - and consumers in particular - from physical consequences such as equipment damage and supply interruptions, but it also protects SCs from financial consequences, thereby weakening incentives to perform in accordance with forward commitments and schedules, self-manage variability and uncertainty, or offer sufficient flexibility in the spot market so the CAISO can manage those risk factors. Moreover, to the extent they reduce spot market volatility, the CAISO's interventions undermine both the motivation and the signaling mechanism for potentially significant amounts of price-responsive demand as source of system flexibility<sup>8</sup>. But the most corrosive effect of intervention by the CAISO is that it expands the role of the CAISO as risk manager by forcing it to develop markets forward of the day-ahead time frame and in doing so, shifts responsibility for hedging and risk management away from LSEs and suppliers acting through their SCs, which is where the responsibility for risk management responsibility should rest in the first place.

### The CAISO's Role in Risk Management

The CAISO's role as market maker in the spot market time frame is necessary, but it should not usurp the ability of SCs to manage imbalances on their own. However the CAISO's role as risk manager is

---

<sup>7</sup> Although the CAISO does discuss a mechanism for paying an option premium, it nonetheless ignores the impact of its risk management activities on the prices paid by SCs that are out of balance and in my opinion it mischaracterizes the impact on SCs that provide real-time flexibility.

<sup>8</sup> Option premiums (capacity payments) may help motivate large consumers operating through aggregators, but they will be less effective for consumers that are too small to be profitable for aggregators but could be engaged with the right kinds of automation. Moreover, while industrial consumers are typically able to curtail load on infrequent peak demand days, they may not be able to offer the kinds of on-demand flexibility the CAISO will need in order to continually manage variability and uncertainty associated with load and VERs.

entirely inappropriate and it needlessly complicates commercial decision-making and regulatory policymaking. The CAISO's motivation to manage risk on behalf of market participants is no stronger than the motivation of a vertically integrated utility selling electricity at cost-based rates, and the CAISO has weaker, less effective incentives than either a regulated utility or any other market participant to perform this function as cost-effectively as possible. Moreover, casting the CAISO in the role of primary risk manager is further complicated by the breadth and complexity of its tariff and the need to undertake lengthy stakeholder processes to resolve what should be commercial matters between SCs and their customers.

The CAISO's role in managing risk should be limited to providing a better set of tools that allow market participants to shoulder the burden themselves. This will undoubtedly not satisfy many stakeholders, who will argue that the CAISO must be able to act when and as necessary in order to maintain reliability. If the CAISO does retain some backstop authority, it should be on terms that a) inflict enough financial pain on SCs that "lean" on the CAISO to motivate self-management, and b) hold the CAISO accountable if it exercises its backstop authority without sufficient cause. The CAISO should not be expected to solve problems that are properly within the domain of an SC's responsibility and it should not try to do so.

There are already ample precedents for SCs to self-manage certain market risks. SCs can self-provide ancillary services by conveying options on energy to the CAISO that have well defined terms, conditions and performance standards. SCs have as much information as the CAISO does regarding forecasts of demand and production. Unlike the CAISO, however, SCs have considerable flexibility to act forward of delivery. If an SC that represents geographically concentrated VERs anticipates a large ramp several hours into the future, it could, for example, exercise options it had purchased ahead of time to mitigate its imbalance risk without waiting for the CAISO to act. Whereas the CAISO purchases options where the premiums and the strike prices are variable and uncertain, an SC could arrange for options with premiums and/or strike prices that can be fixed for an extended period of time. The foregoing examples are illustrative but by no means comprehensive, and they could easily be arranged via the bilateral market rather than placing this burden on the CAISO.

#### Pay-for-Performance

The CAISO should consider market changes that allow fast-ramping resources to be paid a premium, but only when faster performance is required and only when resources perform in accordance with their commitments. I do not agree with FERC's proposal for a mileage payment because it does not provide the right incentives, it could require consumers to pay for performance that is unneeded, it increases out-of-market payments that are recovered via uplifts, and under the CAISO's current market rules it discriminates against resources that have variable ramp rates. Moreover, unless fast-ramping resources meet eligibility requirements for the CPUC's RA program and can permanently displace other RA-eligible resources, any short-term savings that might be realized by procuring smaller amounts of regulation are likely to be offset by higher long-term costs as suppliers seek to recover lost ancillary services revenue in other ways.

Since any pay-for-performance mechanism will require verification on time intervals of one minute or perhaps less, the CAISO should implement pay-for-performance by establishing market intervals at the same level of time granularity it would use to verify performance. This would require changes in the way the CAISO and SCs communicate market information, but on time intervals that are likely to be no shorter than the 4-second intervals used for Automatic Generation Control (AGC). The technology to enable trading on short intervals and fast turnaround times is already widely used in equity markets.

I recently submitted comments in the FERC rulemaking on Frequency Regulation that address this issue in more detail<sup>9</sup>. In those comments, I suggest that it is insufficient to limit the concept of pay-for-performance to frequency regulation and recommend instead that the idea be extended to other types of services.

#### Directional Guidance for This Initiative

This initiative should be directed toward designing and building extensions to the CAISO's *spot energy markets* that better enable SCs to self-manage price and volume risks associated with higher levels of variable generation, and also address the pay-for-performance issue. These extensions should include:

- A limited set of well-defined options on energy that meet the CAISO's need for optionality and can be easily traded and modified when and as necessary.
- A mechanism for conveying these energy options to the CAISO for operational control.
- A mechanism for cash-settling options conveyed by one party that are used by the CAISO for the benefit of another party.
- More frequent opportunities to adjust self-schedules on smaller time scales closer to delivery (intra-hour self-schedules).
- More frequent opportunities to trade energy on smaller time scales (hour-ahead and intra-hour energy markets).
- Changes in the mechanism for invoking penalty prices so that resulting changes in market prices are roughly proportional to the shortfall and not as sudden or as extreme as they are today.
- Energy market closing times that are closer to the start of delivery.

If the CAISO's role as risk manager is limited to intervening only when supply reliability and security are clearly threatened, and if the risks of failing to self-manage imbalances are fully reflected in CAISO spot market prices, then these extensions provide SCs with the flexibility they need to self-manage the financial risks associated with variability and uncertainty of both supply and demand. They offer SCs a choice between physical management by buying, selling or changing self-schedules; or financial management by trading and hedging. To the extent commercial arrangements between SCs and their customers require the cost of balancing transactions undertaken by SCs on behalf of their customers to be passed through, CAISO spot prices provide an unbiased settlement price. SCs and their customers can also hedge risk outside the CAISO markets if they so choose. If SCs choose to leave all balancing to

---

<sup>9</sup> <http://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=12616576>

the CAISO, they should expect to be charged the applicable spot price and should not expect the CAISO to hedge or mitigate those costs on their behalf.

Shorter scheduling and trading intervals close to delivery would allow SCs to offer faster ramping at a higher price (which could be purchased by SCs that need ramping) consistent with their ability to deliver at any point in time by turning ramping into an energy product. SCs could also offer options on energy (a reserve-like product) but a short-interval energy market would provide a means of pricing and cash-settling deviations on option delivery.

Please direct question to:

Jack Ellis  
PO Box 6600  
Tahoe City, CA 96145  
+1 530-581-2134  
[jellis@resero.com](mailto:jellis@resero.com)