CALIFORNIA ISO
FLEXIBLE RAMPING PRODUCTS

COMMENTS OF THE STAFF OF THE CALIFORNIA PUBLIC UTILITIES COMMISSION FOLLOWING THE JULY 17 STAKEHOLDER MEETING

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July 25, 2012

Overview

The Staff of the California Public Utilities Commission (the CPUC Staff) appreciates this opportunity to comment on the California Independent System Operator's (ISO's) Flexible Ramping Products (FRP) initiative through the recent stakeholder meeting on July 17, 2012. The evolving nature of this very technical proposal, including extensive examples and ongoing stakeholder feedback reflects the complexity and novelty of the issues involved, and the CPUC Staff appreciates the ISO's willingness to work with stakeholders on these complex matters. Because of the unprecedented nature of the issues involved, and considering that the CAISO has already deployed the flexible ramping constraint, there is not an urgent need to deploy a complex FRP solution in the near term. Rather, the CPUC Staff recommends the following.

1. The initial FRP rollout (as submitted to FERC) should incorporate the most promising (likely to be efficient and effective) design features distilled out of what has been a long but constructive stakeholder process.
2. There is still much uncertainty and much to be learned regarding how the proposed FRP will perform in the real world and what truly constitutes the best design. Therefore, high complexity and poor transparency should be avoided in the initial FRP rollout.
3. The initial rollout design should emphasize cost control, administrative efficiency, and transparency of process and results.
4. As part of the proposal, the ISO should plan for post-deployment monitoring and FRP revision going forward, including use of (1) a design that supports both monitoring and design refinement (e.g., using design parameters that are readily derived, critiqued and adjusted) and (2) specific monitoring and reporting programs.

5. Results and costs for FRP up should be compared to those for the ongoing flexible ramping constraint.

The remaining comments and recommendations below discuss specific aspects of the FRP proposal that need further clarification, analysis, or discussion.

1. CPUC Staff tentatively support the recently introduced option of basing FRP procurement needs on "real ramp" rather than "unexpected ramp", but this requires additional assessment and discussion regarding how it would interact with overall FRP design.

Basing FRP procurement amounts on statistical ranges of real up and down ramps between 5 minute real time dispatch (RTD) intervals rather than on statistical ranges of "unexpected" 5-minute ramps *above and below* the 15-minute real time unit commitment (RTUC) forecasts appears to offer advantages in terms of simplicity, transparency and data management. This would likely eliminate the need to collect, process, and justify 15-minute RTUC forecasts for purposes of calculating unexpected ramp probability distributions. But while the CPUC Staff thus tentatively supports this "real ramp" approach the following issues should be clarified before the initial FRP design is completed.

a) The ISO should clarify where within market timelines and on what basis FRP would be procured or committed under the real ramp approach. What expected range of real ramps would be considered for (i) procuring FRP in the DA market, (ii) committing FRP resources in RTUC, and (iii) making FRP capacity procurement versus energy dispatch decisions in each RTD interval? For what time horizon (how far ahead) and duration (e.g., individual 5-minute periods versus an hour) would statistically-characterized 5-minute ramp expectations be utilized for each of these purposes?

b) The CAISO should extend the "RTD dispatch example" in Section 2.2 of the July 11FRP document to clarify how the ISO will complete procurement and commitment of FRP resources in DA and RTUC, and how this impacts use of such resources in RTD.[1] The ISO should clarify if all resources that are available to provide FRP in energy binding interval t are assumed to have been committed for FRP in RTUC and/or previously procured as FRP in the DA market. The "false opportunity cost" issue should also be clarified, including how it manifests

[1] CAISO *Flexible Ramping Product Supplemental: Foundational Approach, July 11, 2012.*

under the real versus unexpected ramp approaches and using the extended example requested above.

c) The ISO should confirm and clarify that in energy binding interval t, an FRP resource's capacity would be either dispatched to meet interval t's net load (energy) or else held as FRP to meet the upper and lower statistical bounds of 5-minute ramp from interval t to interval t+1.

d) The ISO should clarify if under the "real ramp" approach all resources having incremental and decremental energy bids are automatically considered to offer FRP for each RTD interval (for which the energy bids apply), and also if such resources are assumed to offer FRP at a zero FRP capacity bid if not providing an explicit FRP capacity bid.

e) Under the original "unexpected ramp" approach the RTD decision of whether to deploy previously procured (in DA) or committed (in RTUC) FRP capacity for RT energy was to have been based on how much "unexpected" system ramp had been realized when moving through successive 5-minute RTD intervals.[2] The ISO should clarify and discuss how the analogous RTD decision to deploy FRP resources for RT energy would be made under the "real ramp" approach.

2. Initial FRP design should use "explicit" FRP procurement floors and ceilings but demand curves could be used for procurement between the floor and ceiling.

The CPUC Staff agree that a demand curve approach (combined with supply curves based on FRP bids) could ultimately be a desirable way to determine amounts of FRP procurement in a manner that is both sufficiently transparent and economically efficient. So far, the method proposed by the ISO for developing such a demand curve is based on (1) empirically derived probability distributions giving the probabilities of different MW levels of power balance violation (PBV) for different MW levels of FRP procurement, plus (2) assigned dollar costs for each MW level of PBV. However, the CPUC Staff still has the following concerns about this proposal:

- this approach is new and apparently untested;

[2] The CPUC Staff understand that under the "unexpected ramp" approach it was proposed that the energy deployment decision for individual resources providing FRP would also be based on those resources' energy bids, ramp rates and capacity constraints.

- the variables used to construct the demand curve are not obviously "correct" or uncontestable;

- such demand curves do not capture all economic costs and values arising from use of FRP (such as energy market cost impacts); and

- identifying and collecting the appropriate (and not out of date) empirical/historical information needed to construct demand curves is problematic and sensitive to changing future conditions.

The CPUC Staff therefore supports an initial design in which the FRP uses explicit and transparent procurement floors and ceilings derived from relevant, familiar data regarding system ramping. The "implicit" supply/demand curve approach can be simultaneously applied and refined for any FRP procurement between the floor and ceiling. Gaining such experience with demand curves and their adjustment will be valuable because demand curve parameters and perhaps even the fundamental formulation will likely need to be refined to produce FRP procurement targets that are empirically and intuitively reasonable, transparent and accepted.

3. Clarification is needed on how the probabilistic relationship between MW Power Balance Violation (PBV) and MW FRP procurement will be developed and updated under the demand curve approach.

If the implicit (demand curve) approach is used to set FRP procurement targets (e.g., for procurement levels between a floor and ceiling) then a key driver of FRP procurement targets would be the constructed FRP "demand" (value) curve. A critical component of that curve is the relationship between the amount (MW) of FRP procurement (for up and down separately) and the probability distribution of the PBV. The latter distribution represents the probability of PBV exceeding 100 MW, 200 MW, etc. If physical and economic characteristics of market operations (e.g., forecasting, scheduling, generator response capabilities) improve over time due to desirable reaction to FRP cost allocation signals, this should be reflected in a change in the FRP demand curve. In particular, any given PBV probability distribution (probabilities of different MW levels of PBV) would then be achieved at a reduced MW of FRP procurement.

Due to this important role of the PBV-versus- FRP procurement relationship under the implicit approach, the ISO should first clarify how the relationship between the PBV probability distribution and MW of FRP procurement is derived based on assumptions, data, and logic regarding system "real ramp." For what vintage (e.g., how far back in time) and temporal

granularity of information would this relationship be derived? For example, would separate relationships be derived for 5-minute ramps in each of 24 daily hours, separately for each of 4 seasons, or even separately for weekdays versus weekends? Second, because the future will differ from the past and various market reforms including FRP deployment will hopefully improve system ramping issues, how will the PBV distribution-versus-FRP procurement relationship be updated going forward?

4. The CAISO should provide more details on how it will apportion FRP procurement between day-ahead and real-time markets.

In particular, how this would be done under the "real ramp" approach combined with the implicit (demand curve) approach should be explained**.** For example, will the assumed probability distribution for real, 5-minute ramps within any given hour of a season be adjusted when moving from DA to RT to reflect decrease in uncertainty regarding the load and supply mix contributing to RT net load? Will this in turn impact the split between DA versus RT FRP procurement? Or, would the DA versus RT split be based solely on the DA versus RT supply curves (reflecting FRP supplier bids), while keeping the demand curve unchanged for DA versus RT? These details should be clarified.

5. **The CPUC Staff tentatively agree with the revised cost allocation proposal.**

The CPUC Staff tentatively agree with the CAISO's revised proposal to allocate FRP costs among three categories (supply, load, fixed-ramp schedules) based on 10-minute changes netted within each category. The FRP costs would then be allocated to market participants within each category (to individual scheduling coordinators) based on gross deviations summed monthly over each of 24 hours. However, the ISO should clarify if "gross deviations would apply to scheduling coordinators (SCs) (i.e., netted across resources) or to the individual supply resources for which a given SC is responsible. We welcome consideration of any refinements of the cost allocation method based on further vetting and discussion, especially as informed by specific outcomes that are foreseeable or that are ultimately experienced after implementation.

6. **The consequences and possible mitigation of FRP cost allocation in conjunction with existing power purchase contracts not anticipating such costs could be problematic and need to be further assessed.**

CPUC Staff support the ISO's proposed approach to initially allocate FRP costs to scheduling coordinators and to provide sufficient statistics such as regarding resource operation to inform relevant negations among generators and load serving entities concerning cost responsibility and contract terms. The CPUC would have an ongoing interest and role regarding such negotiations, for CPUC-jurisdictional load serving entities.

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