



**BEFORE THE PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA**

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Order Instituting Rulemaking to Oversee the Resource Adequacy Program, Consider Program Refinements, and Establish Annual Local and Flexible Procurement Obligations for the 2016 and 2017 Compliance Years.

Rulemaking 14-10-010
(Filed October 16, 2014)

**RESPONSE OF NRG ENERGY, INC. TO
THE ASSIGNED COMMISSIONER AND
ADMINISTRATIVE LAW JUDGE'S
PHASE 3 SCOPING RULING**

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NRG Energy, Inc.¹ (“NRG”) respectfully submits the following responses in accordance with the September 13, 2016 *Assigned Commissioner and Administrative Law Judge’s Phase 3 Scoping Memo and Ruling* (“Phase 3 Scoping Ruling”).

I. INTRODUCTION

The Phase 3 Scoping Memo directs that the following issues are in scope for the upcoming phase of the Resource Adequacy (“RA”) proceeding:

- Local and flexible RA requirements for 2018;

¹ NRG Energy, Inc. is the parent of NRG Power Marketing LLC, GenOn Energy Management, LLC, Cabrillo Power I LLC, Cabrillo Power II LLC, El Segundo Power LLC, NRG Delta LLC, NRG Marsh Landing LLC, NRG California South LP, High Plains Ranch II, LLC, Long Beach Generation LLC, NRG Solar Alpine LLC, NRG Solar Borrego I LLC, NRG Solar Blythe LLC, NRG Solar Roadrunner LLC and Avenal Solar Holdings LLC, each of which owns and operates or markets generating resources in California. Because the focus of this proceeding is on California market issues, NRG Energy, Inc. appears on behalf of these entities.

- A durable form of Flexible Capacity Requirements (“FCR”);
- Multi-year RA requirements; and
- The Effective Load Carrying Capability (“ELCC”) of wind and solar resources.²

Among these four topics, the Phase 3 Scoping Ruling devotes much of its attention to the topic of durable FCR and asks for responses to five “guiding questions.” Additionally, the Phase 3 Scoping Ruling invites parties, in particular, the California Independent System Operator Corporation (“CAISO”), to submit analyses indicating whether the current set of FCR meets the current system needs and whether the current market design adequately induces resources to make their flexible capacity available to meet those system needs.³

NRG supports the Phase 3 Scoping Ruling’s resurrection of the topic of multi-year RA requirements. A mandatory multi-year forward structure is necessary to help existing resources plan and take the maintenance needed to remain in operation. Prudent generation management warrants a forward planning and contracting period, and will allow generators to reduce the risk premiums associated with participating in a spot market. Multi-year requirements could also help mitigate the “boom-bust” effect of flexible capacity having no value when the system has sufficient flexible capacity, and then having strong value only when there is a deficiency in flexibility – at which point it is too late to add flexibility in the near term.

NRG also supports the Phase 3 Scoping Memo’s focus on developing a durable set of FCRs to replace the interim set of FCRs in place now. The initial set of FCRs fashioned around a single three-hour product and need has served as a proof of concept and has given parties experience with transacting, reporting, and operationalizing a new form of RA capacity that appropriately places greater emphasis on capability instead of just capacity. However, this single

² Phase 3 Scoping Ruling at 2.

³ *Id.* at 6.

product-focused program is unlikely to adequately deal with the challenges emerging from the rapidly increasing amount of variable energy resources. Such challenges include growing net load ramps, mid-day over-supply, and increasingly, renewable curtailment.

II. RESPONSES TO GUIDING QUESTIONS

NRG offers the following responses and comments to the five guiding questions posed in the Phase 3 Scoping Ruling.

1. Have the current FCRs changed the quality or quantity of resources procured by the LSEs to meet RA requirements since the adoption of these requirements for the 2015 RA year?

Response: NRG has no response to this question, which is directed at LSEs.

2. Have the FCRs changed the overall quantity or quality of resources bidding in to CAISO energy and ancillary services markets (vs. self-scheduling)? Have the FCRs substantially changed the bidding behavior of LSEs and Scheduling Coordinators?

Response: While this question is directed at the LSEs, NRG notes that when a resource supplies flexibility capacity, the CAISO requires the Scheduling Coordinator for that resource to submit an economic bid into the CAISO's markets and does not allow the Scheduling Coordinator for that resource to submit a self-schedule for the flexible capacity provided. From that standpoint, the implementation of FCRs has served to reduce the amount of self-scheduling, though NRG does not have the information needed to quantify this reduction. Reducing self-scheduling improves price formation because it deepens the pool of supply bids and reduces the chance that market prices will be set through administrative means.

3. What are the characteristics of flexibility that are needed now and over the next five years? For example, does the expected increase in variable energy resources, and potential for increased uncertainty and variability in net-load, change the

needed characteristics of flexibility in this time? What specific reliability metrics or goals might not be achieved due to inadequate flexibility? Do the current FCRs address the full spectrum of the electricity system's flexible needs now and over the next five years?

Response: Flexible resources must be able to (1) change output over a defined period of time and (2) sustain that changed output for a defined period of time. These two attributes define the needed characteristics for flexible resources. The increase in variable energy resources does not change these needed characteristics, but will change the amount of needed flexibility, and will likely change the time granularity (e.g., the duration over which the resource's output must be changed and sustained) of flexible resources.

With regards to specific reliability metrics, NRG offers the following:

- The failure to have adequate flexible resources will jeopardize the ability to comply with reliability standards related to the balancing authority area's balancing function (specifically, requirements R1 and R2 of standard BAL-001-2). If the failure to maintain adequate flexible capacity also results in the CAISO being unable to maintain adequate contingency reserves, it could result a violation of standard BAL-002-WECC-2. In the most severe circumstances, the failure to maintain adequate flexibility in the upwards direction (i.e., to follow increasing net load) could result in capacity shortfalls that could trigger the need to shed firm load to maintain adequate reserves.

- The failure to maintain adequate flexibility in the downward direction could also result in violations of requirements R1 and R2 of standard BAL-001-2. Further, the failure to maintain adequate downward flexibility likely will result in the curtailment of renewable generation needed to meet the state’s RPS goals. While renewables curtailment does not constitute a reliability metric, renewables curtailment will undermine the state’s ability to meet its policy goals.

With regards to whether the current set of FCRs address the full spectrum of the system’s flexibility needs: the current set of FCRs are based on a simplified product and need: the three-hour ramp. The current three-hour product does not, by design, specifically address at least two sets of ramping needs: (1) the maximum net load ramp across summer days, and (2) one-hour ramps, which, according to the CAISO, are becoming an increasing challenge.⁴ To the extent the procurement that meets the current FCRs manage to address the full spectrum of the electricity system’s flexibility needs, they would do so as a matter of coincidence and not by design. A three-hour ramping product, properly “stacked”, might meet ramping needs across the day (assuming that the ability to sustain the changed energy output is appropriately defined). However, a

⁴ See July 25, 2015 *Reliability Services Initiative – Phase 2 and Flexible Resource Adequacy Criteria and Must Offer Obligation – Phase 2: Issue Paper* (available at http://www.caiso.com/Documents/IssuePaper_ReliabilityServices_FlexibleRACriteria_MustOfferObligationsPhase2.pdf) at 9-11.

ramping product of longer duration may not be able to meet ramping needs of shorter duration.

As the Commission and parties consider a durable set of FCRs that addresses the need for flexibility in all relevant time frames, that discussion must consider the important interactions between forward-procured bilateral capacity products and CAISO spot market products that signal the need for, and provide appropriate compensation for, time-differentiated flexibility. This should not be framed as an “either/or” exercise in which the answer is *either* a forward-procured capacity product *or* a CAISO spot market product. The CAISO’s energy and ancillary service markets, in and of themselves, do not provide anything close to the revenues needed to keep needed resources in operation. Resource viability depends on forward capacity contracting, and that reality is not likely to change. At the same time, something must exist to “operationalize” the capacity procured in a forward time frame to meet real-time system operating requirements, and to signal to forward procurement what operating attributes are the most valuable. To be most effective, the consideration of a durable set of FCRs must incorporate, and integrate, both forward capacity procurement and CAISO spot market product design.

Finally, NRG notes that the current rules for counting flexible capacity currently emphasize the amount of MW a resource can ramp up over a three-hour period and do not fully consider or value other characteristics important to flexibility – the ability for a resource to cycle on and off, for example. On May 15, 2016, the CAISO observed a minimum net load less than 12,000 MW – a minimum net load level that, earlier, the CAISO did not expect to observe until 2020. While the ability to change (currently,

increase) output and sustain that change in output remains important, other characteristics, such as the ability to cycle on and off, will become increasingly important. A durable FCR program should find ways to value those kinds of characteristics at the same time it continues to value the ability to change output and sustain that changed output.

4. What, if any, characteristics of flexibility are not currently supplied appropriately through the FCR program, other procurement programs, or CAISO energy and ancillary services markets?

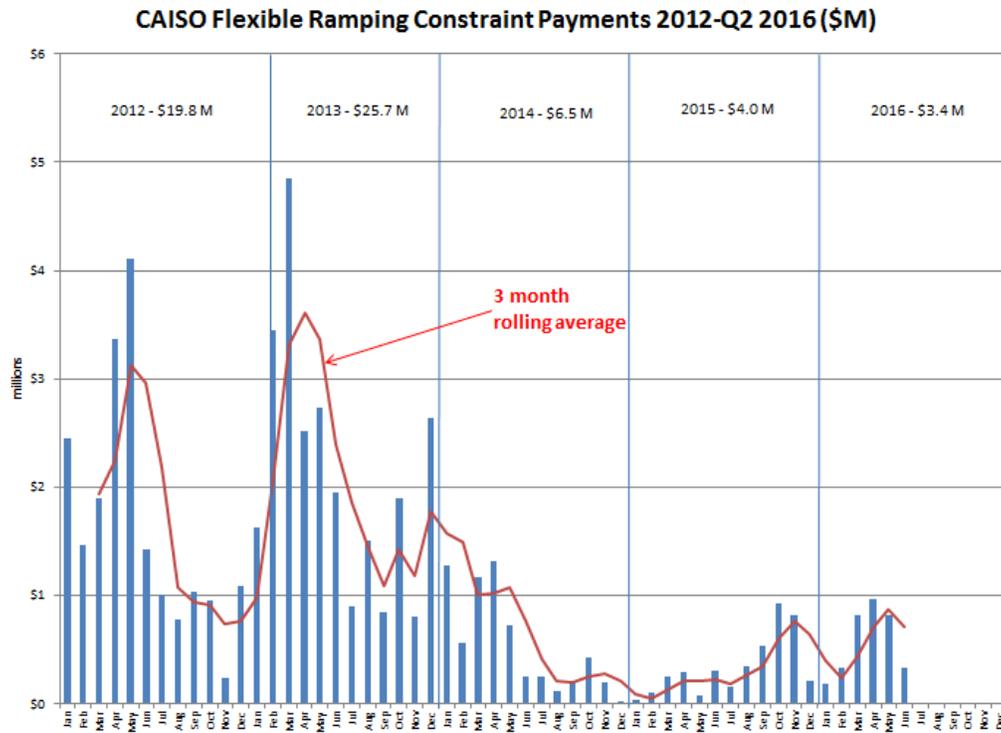
Response: Ramping needs that extend over longer than a three-hour period (e.g., the continuous net load ramp that is typical on summer days from hour ending nine to hour ending 20) or, in some cases, are shorter than over a three-hour period (e.g., one-hour ramping needs) are not specifically met through the current FCR program or through CAISO market products with durations that match the ramping period. The CAISO may be able meet those longer-duration needs by “stacking” other shorter duration products, but the ability to do so will depend on how those shorter duration products are defined.

5. What, if any, contractual, economic, or structural barriers exist that hamper the ability of existing or planned resources capable of providing flexibility from doing so?

Response: Several barriers – structural and financial - exist.

The first barrier is the lack of any kind of market product associated with the provision of flexibility that provides any kind of value. Currently, there is no market product – capacity or ancillary service – that provides any kind of meaningful value for flexibility. In NRG’s experience, RA buyers are unwilling to pay any premium for

flexible RA capacity over generic RA capacity. Moreover, the Flexible Ramping Constraint (FRC) in place in the CAISO’s markets provided modest value in the first few years of operation, but, as the graphs below shows, has provided very little value since the CAISO imposed a price cap on that product.



The recently-finalized Flexible Ramping Product (FRP), intended to supersede the FRC, seems unlikely to be the CAISO market product that will adequately value flexibility. While the CAISO will procure the FRP in both the upwards and downwards directions, the FRP can only be provided in the real-time market (as with the FRC). Moreover, market participants cannot bid to provide the FRP (even when a fully competitive supply of FRP is available). Given the financial performance of the FRC, it seems highly unlikely that the FRP will suddenly provide meaningful value for flexibility.

Suppliers will be reluctant to invest in providing flexible capacity until there is value in doing so. The system, currently flush with flexibility, may face some lean times if no party invests to provide the increasing levels of flexibility needed until a deficiency in flexibility finally provides the proper price signal to do so.

The second barrier is the lack of any kind of mid-term contracting requirement. Structurally, the lack of any kind of mandatory multi-year forward contracting structure makes it difficult for existing resources to plan and conduct maintenance to sustain their existing levels of flexibility. The RA program directs procurement in the short term to maintain reliability in the prompt RA year. The Long-Term Procurement Planning framework, as may be absorbed or modified by the coming Integrated Resource Planning process, is expected to specify procurement to maintain reliability in the far-forward planning horizon (e.g., 10 years out). However, no program intentionally bridges these two time frames to direct procurement to ensure reliability. A planning and contracting structure that not only looks at the time frame between these two horizons but also mandates meaningful action to address the needs in the time frame between is needed. Such a structure must emerge either from the RA proceeding or the Integrated Resource Planning proceeding.

III. COMMENTS ON STUDY PLANS

The Phase 3 Scoping Ruling invited parties to submit analyses of whether the system's current needs are being met by the current FCR, and whether the current market design (FCR and CAISO market) adequately induces resources to make their flexible

capacity available to meet those needs.⁵ The Phase 3 Scoping Ruling also asked that parties submit plans for their work or research or to submit questions for Energy Division staff to research.⁶

NRG notes that the CAISO is currently analyzing the potential economic early retirement of gas-fired generation as part of its 2016-2017 Transmission Planning Process.⁷ This analysis should inform consideration of a multi-year forward contracting structure. As the Phase 3 Scoping Ruling recognized, it is wholly appropriate to consider multi-year contracting in concert with considering a durable set of FCRs.⁸

The fundamental analysis needed to support of the development of a durable set of FCRs is to project and understand the system's net load ramping needs across multiple time frames – *e.g.*, across each day, across the morning and afternoon load pulls. The time frames over which this analysis should be conducted must tie both to market design and to the associated reliability requirements. With regards to market design, the analyses need to consider these time horizons: the day-ahead time horizon (24 hours); the time horizon(s) of the CAISO's real-time market (*e.g.*, how far forward do these market system look ahead and make unit commitment decisions). The studies must also look at ramping needs related to the time horizons of the reliability standards with which the

⁵ Phase 3 Scoping Ruling at 5.

⁶ *Id.* at 8-9.

⁷ See Presentation from Day 2 of the September 21-22 Transmission Planning Process Meeting, <http://www.caiso.com/Documents/Day2Presentation-2016-2017TransmissionPlanningProcess-PreliminaryReliabilityResults.pdf>, at slides 84-88.

⁸ Phase 3 Scoping Ruling at 3.

CAISO must comply (e.g., the balancing requirement/disturbance response time frame - ten to 15 minutes).

The ramping analyses must also evaluate the “on-demand” ramping need created by weather-driven changes in wind and solar output – needs not tied to regular solar or wind patterns.

A second set of analyses important to the future FCRs would look at the system’s ability to maintain adequate flexibility and contingency response across the decreasing minimum net loads. Parties differ in their perceptions as to whether the potential for oversupply amounts to an economic challenge or a reliability challenge. In reality, it is both. It is an economic challenge to determine what resources should be curtailed and how they will be curtailed in order to achieve load/supply balance at minimum net load levels. However, it is a reliability challenge to determine whether the system has adequate ability to respond to unforeseen events when operating at these minimum net load levels.

Finally, as noted above, providing parties with access to historical time-granular data can be essential to facilitating parties’ analysis. Given that such analysis supports parties developing proposals for a durable set of FCRs, the initial set of which are due to the Commission on December 16, NRG respectfully urges the Commission and CAISO to develop a dependable way to provide parties with timely access to such historical data. Further, to support party analyses, parties also should be provided with time-granular data projected for forward time frames.

IV. CONCLUSION

NRG respectfully submits these responses and asks that the Commission consider them as it moves forward with this proceeding.

Respectfully submitted,

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