

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)

**COMMENTS OF THE
CENTER FOR ENERGY EFFICIENCY AND RENEWABLE TECHNOLOGIES
ON STUDY PLANS FOR FLEXIBLE CAPACITY REQUIREMENTS TOPICS**

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For: CENTER FOR ENERGY EFFICIENCY AND RENEWABLE TECHNOLOGIES

Dated: September 23, 2016

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The Center for Energy Efficiency and Renewable Technologies (CEERT) respectfully submits these Comments on the Study Plans for Flexible Capacity Requirements (FCR) Topics. These Comments are timely filed and served pursuant to the Commission’s Rules of Practice and Procedure and, the Assigned Commissioner and Administrative Law Judge’s (ALJ’s) Phase 3 Scoping Memo and Ruling issued on September 13, 2016 (Phase 3 Scoping Memo).

I.

**CONSISTENT WITH CEERT’S PREVIOUS RECOMMENDATIONS, THE
PHASE 3 FCR SCOPING MEMO CORRECTLY RECOGNIZES THE NEED FOR
ADDITIONAL DATA TO RESOLVE ITS SCOPING AND GUIDING QUESTIONS.**

By the Phase 3 Scoping Memo, the Commission has combined “issues previously scoped for Phase 2, Track 2[,] with additional issues for a planned resolution in June 2017” in a new Phase 3,¹ and will now address “local and flexible RA requirements for 2018, a durable form of FCR, multi-year RA requirements, and Effective Load Carrying Capacity (ELCC) of wind and solar resources” in Phase 3.² With respect to the “Scoping Questions” related to a “durable” FCR “structure” that were originally to be decided in a “late” 2016 Decision as Phase 2, Track 2,

¹ Phase 3 Scoping Memo, at p. 2.

² Id.

the Phase 3 Scoping Memo now includes those questions for resolution in the June 2017 Decision.³

In support of this step, even though acknowledging that these FCR Scoping Questions have already been the subject of a previous Workshop and Comments, the Phase 3 Scoping Memo concludes:

“Several parties have suggested that additional data is needed before we resolve these questions. We agree that the record to date is insufficient for a satisfactory resolution of the issues in scope.”⁴

In addition, to “more explicitly guide the efforts of parties and our advisory Staff to inform the Commission” on these issues, the Phase 3 Scoping Memo also poses additional “Guiding Questions.”⁵

In its Comments on Track 2 issues filed on June 29, 2016 (CEERT June 29 Comments), CEERT was, in fact, among those “parties” that found the transparent record to support a durable (or even sustain an interim) FCR structure had not been developed. Thus, CEERT stated:

“It is CEERT’s position that the data, reporting, and analysis needed to move the current ‘interim’ FCR Program to a ‘durable’ program, which CEERT first identified in Comments filed in this proceeding in January 2015 [footnote omitted], still have not been undertaken or presented, and, in turn, the actual outcome or operation of even the ‘interim’ FCR Program remains non-transparent. [¶] In these circumstances, . . . CEERT does not believe that the Commission can move forward to approve any ‘durable’ FCR Program unless and until the *transparent* reporting and data collection first identified by CEERT in January 2015 has been completed. A rigorous examination of the ‘flexibility’ experience from the ground up, based on recent experience both here and elsewhere in the world where organized markets are grappling with similar issues of high penetrations of Variable Energy Resources (VERS), is necessary before a ‘durable’ flexibility metric can be adopted. Only with this information can an informed decision be made on the next critical step.”⁶

³ Phase 3 Scoping Memo, at p. 2.

⁴ *Id.*, at p. 4.

⁵ *Id.*

⁶ CEERT June 29 Comments, at pp. 3-4; also citing to: CEERT Comments Pursuant to ALJ’s Ruling of December 12, 2014 (January 15, 2015), at pp. 1-8.

Given this position, CEERT clearly appreciates and supports the Commission’s decision in the Phase 3 Scoping Memo to embark on a more meaningful data collection and analytical approach before adopting a “durable” FCR structure. However, while the “Guiding Questions” and proposed approach for doing so recognizes the existing insufficiencies in the “record to date for a satisfactory resolution of the [FCR] issues in scope,”⁷ CEERT believes that its June 29 Track 2 proposals are still needed to ensure that the *correct* data is collected and that the right approach is taken in “Study Plans on FCR Topics.”

II. INFORMATION AND ANALYSIS TO BE INCLUDED IN THE STUDY PLANS ON FCR TOPICS.

A. The Study Plans on FCR Topics Should Include the Process and Analytical Recommendations Made by CEERT in its June 29 Comments.

The initial “comment” opportunity in Phase 3 (due today) is described in its adopted schedule as “Study Plans for FCR Topics.”⁸ According to the Phase 3 Scoping Memo:

“For the Study Plans on FCR Topics, we request the parties propose ideas on how to inform the Commission’s understanding of the guiding and scoping questions above. We encourage parties to propose plans for their own analytic work or research, either individually or as a group. Further, parties may pose suggestions for Staff analysis or research. Finally, parties may present information or analysis directly in response to the questions.”⁹

As stated above, CEERT has long recommended the need for additional, transparent data gathering to support FCRs. CEERT’s June 29 Comments confirmed that the “record to date” is “insufficient,” even to support the ongoing reliance on the “interim” FCR methodology.¹⁰

⁷ Phase 3 Scoping Memo, at p. 4.

⁸ *Id.*, at p. 8.

⁹ *Id.*, at pp. 8-9.

¹⁰ CEERT June 29 Comments, at pp. 3-4.

Thus, in its June 29 Comments, CEERT identified the following three shortcomings in continuing to use the current Effective Flexible Capacity, “EFC” = Pmax – Pmin, and the year ahead procurement in conjunction with regular Resource Adequacy of EFC equal to the monthly maximum predicted three hour ramp as follows:

“First, no other region anywhere in the world facing comparable penetrations of VERS, not isolated islands such as Hawaii or Ireland; large, diverse organized markets such as ERCOT; nor the European Union have adopted either this metric or this procurement strategy. Second, no public forensic analysis has been conducted to determine whether this metric and procurement strategy have ‘worked’ in the sense that explicit forward procurement of flexibility defined in this manner has made a real difference in market performance or reliability as compared to other potential mechanisms to ensure adequate flexibility in the hands of the grid operator. [¶] Third, no public record exists of the current or potential future supply curve or costs to procure that supply. Indeed, at the time of the original Joint Parties’ Proposal [as the basis of the interim FCR], the issue was as much about providing *revenue* adequacy to an aging gas fleet in danger of disorderly retirement (the so-called ‘missing money’ problem) as it was about providing an explicit reliability tool to the CAISO to ensure adequate real time flexibility. There has not been any public analysis as to whether even this somewhat problematic objective has been met.”¹¹

In addition, CEERT stated that “no presentation at the April 5 Workshop was definitive in stating that the current EFC framework was either necessary or sufficient to ensure enough flexibility to reliably and economically operate the grid with high penetration of VERS.”¹² Based on that Workshop, CEERT also urged that the focus on short term (1-2 hour) ramping products should be *instead of*, not in addition to, a three hour product.

In addition, CEERT identified “several advantages” to relying on short duration bi-directional flexibility, rather than three hour up-ramping products, the result of which “is significantly lower costs, renewable curtailment, and GHG emissions,”¹³ as follows:

¹¹ CEERT June 29 Comments, at pp. 4-5; emphasis original.

¹² *Id.*, at pp. 5-6.

¹³ *Id.*, at pp. 7-8.

- Increases the supply of EFC from most gas fired units by ~40% by avoiding the Pmin discount.
- Avoids the midday renewable curtailment on light load days by not idling gas plants at Pmin when not required to serve load.
- Significantly expands the supply of EFC from preferred resources, including dispatched wind and solar and demand response.
- Allows supplying reserves from relatively short duration battery storage dramatically lowering storage costs, avoiding most of the round trip efficiency losses and adverse life cycle impacts of using batteries to supply long duration ramping.
- Allows cutting total procurement of EFC roughly in half.¹⁴

CEERT provided analysis and citation to several modeling efforts that supported these conclusions and that should be accounted for in the “Study Plans for FCR Topics.”¹⁵

By these Comments, CEERT renews its call for the following information and record development to take place to provide “a ground-up comprehensive reassessment of the fundamental definition of flexibility as $EFC = P_{max} \text{ minus } P_{min}$, with advanced procurement against the maximum predicted monthly three hour ramp.”¹⁶ Specifically:

- Southern California Edison Company (SCE) should be directed to conduct modeling of the inverse of what it conducted for the April 5 Workshop. Thus, rather than model whether a resource portfolio procured to satisfy the maximum three hour ramp also satisfied shorter duration needs, SCE should conduct modeling where the procurement targets short term (~1 hr) flexibility plus staggered commitment of the existing gas fleet satisfies the “total mileage” requirement.

¹⁴ CEERT June 29 Comments, at p. 7.

¹⁵ See, e.g., Western Interconnection Flexibility Assessment, Final Report, Energy and Environmental Economics, December 2015; Low Carbon Grid Study: Analysis of a 50% Emission Reduction in California, National Renewable Energy Laboratory, January 2016 (<http://lowcarbongrid2030.org>).

¹⁶ CEERT June 29 Comments, at p. 9.

- CAISO should provide a complete forensic analysis of 2015 and the winter/spring of 2016 flexibility experience including the following:
 - ✓ Accuracy of the year ahead estimates of maximum monthly three hour ramp
 - ✓ Deployment of flexible resources to meet actual ramps to respond to the following questions: Were the resources deployed those under a Must Offer Obligation or “volunteers”? What percentage is deployed for three hours or more vs. less than three hours? What was the size and composition of the “must-take baseload” energy during curtailment events?
 - ✓ Average capacity factor of the gas fleet once committed and deployed to serve the afternoon ramp
 - ✓ Deployment and efficacy of flexibility “products” other than FRACMOO.
- Energy Division should make their annual “Resource Adequacy” report of aggregate costs and supply curves for System, Local and Flexible RA. This would be the first public data on the cost of the FRACMOO paradigm.¹⁷

It is not clear to CEERT whether all of this information will be part of the reporting that is already contemplated by the Phase 3 Scoping Memo. However, CEERT believes that its recommended approach above should be part of the “Study Plans for FCR Topics,” especially to achieve the “ground-up re-assessment” of the current EFC approach. It also remains CEERT’s hope that this record-building will include workshops that include input from “outside experts who are able to provide information on how and how well other organized markets are dealing with similar issues.”¹⁸

¹⁷ CEERT June 29 Comments, at pp. 9-10.

¹⁸ In its June 29 Comments, CEERT noted that these “outside experts” should include “ERCOT, which operates an energy-only plus ancillary services market (i.e. no capacity products of any kind), while concentrating on reform of traditional ancillary services to deal with the VERS issue, and France, which has operated a national grid for decades with almost nothing other than inflexible nuclear energy with a little conventional hydro for regulation plus pumped storage and demand response.” (CEERT June 29 Comments, at p. 10.)

B. CEERT's Approach to FCRs Is Consistent with the Vision Required to Meet California's Climate Change and Energy Goals.

From the beginning of the discussion of the need to proactively ensure that enough “flexibility” was available to grid operators to deal with increased net load ramps caused by the increased penetration of solar PV, the vision has been one focused on “flexible” gas plants. In that case, the “flexible” gas plants would be assumed to start up and be committed to the grid prior to the coming ramp, idled at minimum load, and then expected to provide gradually increasing output to follow the load as the sun began to travel lower in the sky and solar output decreased from a noon peak just as the routine pick up in afternoon load took place to create a “super ramp” in net load. Based on this approach, the focus was on assuring a revenue stream for these gas plants to avoid “disorderly retirement” and to address reliability concerns as energy prices declined due to the growing presence of zero marginal cost renewable energy and existing gas plants, deemed needed to “back up” variable renewables.

The original concept borrowed from the Resource Adequacy structure to define a flexibility metric focused on meeting the largest projected monthly three-hour net load ramp, then conducting a one year advanced and secret (the information was deemed to be “market sensitive”), bilateral procurement of that amount of “flexibility” under a real time must offer obligation. The belief that each unit that would supply this flexibility needed to be synchronized to the grid and bid into the energy dispatch stack of the CAISO real time market in advance of the three hour clock led to discounting of its contribution to flexibility by the unit's minimum load (roughly 40% of rated capacity).

Even as this original concept has morphed into a complex, confusing tariff that has been amended to accommodate resources with characteristics other than the proverbial combined cycle gas plant (i.e., hydro and other use limited resources), the basic construct remains. This

construct is not only expensive as it requires significant out-of-market payments to keep all of the old gas plants hanging on, but is inconsistent with the long term vision of a carbon free grid. The heat rate and thus emissions profile of combined cycle gas plants are terrible at minimum load, and there are both Greenhouse Gas (GHG) and criteria pollutant emissions penalties associated with ramping rather than simply running the plant flat at maximum load.

One is reminded of the old saw that if your only tool is a hammer, all solutions look like a nail. With only a touch of irony, CEERT would point to the commercialization of lightweight, compact, but powerful and long lasting, cordless hand power tools powered by lithium ion batteries that have allowed the screw to replace the nail as the construction fastener of choice. As California's gas fleet turns over from the long start, slow ramping coastal steam plants to modern flexible turbine based machines, the gas unit commitment decision can be made much closer to real time, and there is no need to have all of the units lined up and in the dispatch stack prior to the long afternoon ramp.

Thus, there is no need to discount "flexibility" by the minimum load of each unit, and there is no need to make each resource meet the entire three-hour ramp. Furthermore, there are a myriad of non-fossil sources of flexibility available to the CAISO real time dispatch stack today – especially if that flexibility does not need to be available every day for at least three hours. Specifically, the following resources are now available to provide "flexibility" without combustion (with its accompanying high variable cost and emissions): Better use of existing hydro resources, especially those not currently under control of CAISO scheduling coordinators, such as the extensive fleet of resources controlled by the Department of Water Resources; batteries, both large and small and new and/or refurbished; bulk pumped storage; more efficient real time trades between balancing authorities facilitated by the emerging Energy Imbalance

Market; regionalization of the grid to share flexibility across geographic boundaries; and even third generation solar thermal plants like the new Crescent Dunes project in Tonopah, Nevada.

Lining up all of these potential “non-conventional” resources to take over the lead role of gas plants operated inefficiently to provide flexibility will take time and some money. The grid must be kept reliable in the meantime. What is important in this proceeding is to not pour cement around the short term expediency of making these gas plants operate in a way they were never designed to do simply by the way the metric of flexibility is defined and the manner in which it is procured.

As these new carbon free flexible choices are developed, the gas fleet can be relegated to a duty it can perform very well – operating flat out at maximum efficiency but intermittently to supply energy when the sun is not shining and the wind is not blowing. This approach is one CEERT’s process and analytical recommendations above will foster and those recommendations should be adopted in “studying” flexible capacity requirements going forward.

Respectfully submitted,

September 23, 2016

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On Behalf of CEERT

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