

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 TRACK 2 WORKSHOP, ISSUES, AND PROPOSALS**

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For: CENTER FOR ENERGY EFFICIENCY AND RENEWABLE TECHNOLOGIES

Dated: JUNE 29, 2016

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The Center for Energy Efficiency and Renewable Technologies (CEERT) respectfully submits these Comments on Track 2 Workshop (April 5, 2016), issues, and proposals. These Comments are timely filed and served pursuant to the Commission’s Rules of Practice and Procedure, the Assigned Commissioner and Administrative Law Judge’s (ALJ’s) Phase 2 Scoping Memo and Ruling issued on December 23, 2015 (Phase 2 Scoping Memo); and the ALJ’s Email Ruling changing the Track 2 schedule issued on April 29, 2016 (April 29 ALJ’s Ruling), as confirmed by the ALJ’s Email Ruling of June 1, 2016 (June 1 ALJ’s Ruling).

**I.
OVERVIEW**

By Decision (D.)14-06-050, issued in the predecessor Resource Adequacy (RA) Rulemaking (R.11-10-023), the Commission adopted an “*interim* ‘flexible capacity’ framework for 2015 through 2017.”¹ D.14-06-050 further contemplated “that the interim framework will evolve based on analysis of data gleaned from the first years of the obligation.”²

The Phase 2 Scoping Memo issued in this proceeding established Track 2 (anticipated late 2016 decision) with a primary focus of adopting a “durable flexible capacity requirement [FCR] program,” as part of the “evolution of the FCR program” anticipated by D.14-06-050 and

¹ D.14-06-050, at p. 2; emphasis added.

² *Id.*, at p. 19.

with the Track 2 Decision “potentially” serving as the “the first major step in that process of evolution.”³ The Phase 2 Scoping Memo further sought “to provide regulatory certainty for market participants” by limiting frequent changes to the FCR program and product design by addressing “the long-term role of flexible capacity procurement requirements in meeting the goals of the RA program” and, in turn, defining the “flexible capacity product(s) and process for setting FCRs to remain constant beginning with RA compliance year 2018.”⁴

To date, the process for examining changes to the “interim” FCR Program has included initial comments in February 2016 on the question of “what reliability need(s) must FCRs be designed to meet,”⁵ a Workshop held on April 5, 2016 (April 5 Workshop); and a Report on the April 5 Workshop prepared and filed by the Energy Division on June 1, 2016 (ED June 1 Workshop Report). During the April 5 Workshop, presentations were made by Energy Division Staff, the California Independent System Operator (CAISO), Southern California Edison Company (SCE), California Energy Storage Alliance (CESA), the Joint Demand Response (DR) Parties, Pacific Gas and Electric Company (PG&E), NRG, Wellhead, and the E3 consulting group on five (5) topic areas.⁶ Those topics included the operational needs that Flexible RA requirement should be designed to address (Topic 1); other operational needs that may need to be addressed through capacity products (Topic 2); unbundling Net Qualifying Capacity (NQC) and Effective Flexible Capacity (EFC) (Topic 3); grid needs anticipated in 2020 and 2022 (Topic 4); and revision to Maximum Cumulative Capacity (MCC) “buckets,” including proposals for a 2-hour MCC bucket (Topic 5).⁷

³ Phase 2 Scoping Memo, at p. 3.

⁴ Phase 2 Scoping Memo, at p. 4.

⁵ Phase 2 Scoping Memo, at p. 4.

⁶ Energy Division (ED) June 1 Workshop Report.

⁷ Because the ED June 1 Workshop Report did not include page numbers, references to that document will be by Topic number.

By the April 29 ALJ's Ruling, as reconfirmed by the June 1 ALJ's Ruling, parties have been given the opportunity to comment and offer proposals today on the April 5 Workshop, the Energy Division June 1 Workshop Report, and Track 2 issues. In doing so, parties may include procedural and/or substantive proposals in their comments and may address Track 2 issues "broadly" in their comments, including offering "recommendations for the direction that the development of Flexible Resource Adequacy requirements should take, and the priority among topics."⁸

CEERT has reviewed the above record to date on Track 2 issues, including the status of the "interim" FCR Program and proposed "improvements" to those calculations and requirements.⁹ 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 2015,¹⁰ 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, and as explained further herein, 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 have 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

⁸ June 1 ALJ's Email Ruling.

⁹ ED June 1 Workshop Report, Topic 1.

¹⁰ R.14-10-010 (RA) CEERT Comments Pursuant to ALJ's Ruling of December 12, 2014 (January 15, 2015), at pp. 1-8.

before a “durable” flexibility metric can be adopted. Only with this information can an informed decision be made on the next critical step.

II.
**A TRANSPARENT RECORD ON THE OPERATION AND OUTCOME OF THE
“INTERIM” FCR PROGRAM STILL DOES NOT EXIST AND MUST BE DEVELOPED
BEFORE ANY “DURABLE” FCR PROGRAM CAN BE ADOPTED.**

The April 5 Workshop marked a milestone in the long debate over the need for new ancillary service products to provide “flexibility” to the grid operator. Specifically, this debate began in October 2012 with the “Resource Adequacy and Flexible Capacity Procurement Joint Parties’ Proposal” (Joint Parties’ Proposal) served by the California Independent System Operator (CAISO), Southern California Edison Company (SCE), and San Diego Gas and Electric Company (SDG&E) in the predecessor RA Rulemaking (R.11-10-023).¹¹

The April 5 Workshop provided the first serious discussion since that time about a flexibility metric other than Effective Flexible Capacity, “EFC” = $P_{max} - P_{min}$, and the year ahead procurement in conjunction with regular Resource Adequacy of EFC equal to the monthly maximum predicted three hour ramp. Under that approach, winning resources are required to submit economic bids into the CAISO real time markets under a must offer obligation in order to qualify for these “Flexible RA” payments.

The April 5 Workshop discussions were significant for the following three reasons. 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

¹¹ D.13-06-024, at p. 14.

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, 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.

In this regard, "an interim 'flexible capacity' framework as an additional component of Resource Adequacy (RA) requirements" was first adopted in D.13-06-024 based on the Joint Parties' Proposal, as modified, but was not to start until 2015 since no compelling need was found to adopt a flexible capacity requirement for the 2014 RA year.¹² In D.14-06-050, the Commission adopted "an interim 'flexible capacity' framework for 2015 through 2017," "as anticipated by D.13-06-024," but with flexible capacity requirements actually adopted for Commission-jurisdictional Load Serving Entities (LSEs).¹³

That *interim* framework is, therefore, still in place today, even as the clamor for developing a "durable" Flexible Resource Adequacy product grows. The time is, therefore, now to review recent experience, both here and elsewhere around the world, before casting the current EFC paradigm in stone.

In that regard, 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. The party closest to making

¹² D.13-06-024, at pp. 2-3, 43.

¹³ D.13-06-024, at pp. 2-3; D.14-06-050, at p. 2.

such an assertion was SCE whose modeling showed that procurement of “generic” three-hour net load ramp flexible resources was almost always sufficient to provide operational flexibility for the grid operator at penetration of VERs incrementally higher than today.¹⁴ However, no attempt was made to speculate what would be sufficient at VER penetration levels expected as the State approaches the Senate Bill (SB) 350 (Stats. 2015; Ch. 547) 50 percent renewable procurement target by 2030,¹⁵ much less the VER penetration levels that might be expected to meet either the need for or the efficacy of shorter duration flexible products.

For example, the CAISO stated that “the ‘three hour ramping’ need is now mostly made up of large one hour ramps.”¹⁶ The Joint DR Parties stated that “most DR resources are currently only dispatched for 1-2 hours, suggesting that they are meeting a shorter duration need.”¹⁷ E3 presented modeling data that showed “that a two-hour capacity product would provide a significant share of the capacity value provided by the current [three-hour] standard capacity product.”¹⁸ NRG supported this observation.¹⁹ The modeling conducted by Wellhead emphasized the need for short duration ramping products.²⁰

Although no party at the April 5 Workshop presented data, CEERT believes that this focus on short term (1-2 hour) ramping products should be *instead of*, not in addition to, a three hour product. Using that approach, the “total mileage” concept advanced by the CAISO can then be fulfilled,²¹ not by long ramping products that are started and idled at Pmin to be slow ramped over several hours, but by staggered commitment of quick start units that are ramped as quickly

¹⁴ ED June 1 Workshop Report, Topic 1.

¹⁵ SB 350 (Stats. 2015; Ch. 547), Section 2(1); Public Utilities (PU) Code §§399.11(a); 399.15(b)(2)(B).

¹⁶ ED June 1 Workshop Report, Topic 1.

¹⁷ Id., Topic 5.

¹⁸ Id., Topic 5.

¹⁹ Id., Topic 5.

²⁰ Id., Topic 4.

²¹ Id., Topic 1.

as possible to full load where fuel efficiency is highest. Thus, carbon emissions are minimized, and renewable curtailment is significantly reduced due to the lack of gas units idling at Pmin waiting for dispatch instructions to begin slow upward ramping

This observation is supported by the parties' expression of need for downward ramping capability even during the long slow ramp up in the afternoon.²² Down ramps are required to make room for the quick ramp up by the staggered started units and their rush to full load to serve the general trend for up ramping to satisfy the total mileage over several hours. The operating paradigm then becomes a smaller quantity of short duration, bi-directional quick ramping units plus a larger quantity of quick sure-start "inflexible" units for which their "EFC" is calculated without subtraction of their Pmin. This paradigm is significantly different from the conventional wisdom of a large quantity of long duration (three plus hours) flexible units, all synchronizing to the grid early in the midday and all ramping together as the afternoon unfolds.

Relying on short duration bi-directional flexibility, rather than three hour up-ramping products has several advantages. Specifically, that approach:

- 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.

²² See, e.g., CAISO (ED June 1 Workshop Report, Topic 1).

The result is significantly lower costs, renewable curtailment, and GHG emissions. The premium then shifts from requiring large new fossil plants to supply flexibility to procuring flexible bi-directional carbon free resources with low losses, such as hydro and CSP with storage, and cheaper short duration battery installations. These resources are complemented by a few large bulk storage pumped hydro facilities to shift load from late afternoon peaks to midday troughs and provide synchronous generation for frequency response and transient stability and gas units with quick start capability and low forced outage rates. Removing institutional barriers such as engaging the Department of Water Resources extremely flexible hydro system²³ and renegotiating renewable resource contracts to provide dispatchability rather than curtailment become critical elements of a strategy to provide a cost-effective, reliable grid for the high penetration of VERS demanded by the State's pursuit of a low carbon grid.

This vision is supported by the findings of broader modeling efforts of high penetrations of VERS such as the Energy and Environmental Economics Western Interconnection Flexibility Assessment, which found that “fast ramping flexible gas resources have a comparatively limited impact on operations, displacing less efficient gas generation resources but effecting minimal changes in [renewable] curtailment.”²⁴ Further, the Low Carbon Grid Study found that when the grid was otherwise optimally configured for flexibility, the combined cycle gas fleet operated at an average capacity factor of 88% of full load and rarely supplied upward operating reserves by idling at Pmin.²⁵

²³ The ~2500 MW of flexible, dispatchable hydro system plus the very significant demand response potential of the large N-S water transfer pumps over the Tehachapi area are physically capable of supplying over one-third of the total state need for “flexibility” at very low marginal cost.

²⁴ Western Interconnection Flexibility Assessment, Final Report, Energy and Environmental Economics, December 2015, at p.233.

²⁵ Low Carbon Grid Study: Analysis of a 50% Emission Reduction in California, National Renewable Energy Laboratory, January 2016, at p.31 (<http://lowcarbongrid2030.org>). The Low Carbon Grid Study has been cited as one of the studies that will be considered in assessing “resource optimization” in the

It is this vision that only dimly appeared out of the fog of competing Flexible Resource Adequacy proposals at the April 5 Workshop. CEERT strongly believes that this opportunity to confirm these “suspicions” and pursue these leads must be seized this summer by doing a ground-up comprehensive reassessment of the fundamental definition of flexibility as $EFC = P_{max} - P_{min}$, with advanced procurement against the maximum predicted monthly three hour ramp.

To further this inquiry, CEERT proposes that the Commission direct that the following additional analysis, combined with a series of Workshops, are required:

- 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.
- 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.

The Workshops should provide invitations to outside experts who are able to provide information on how and how well other organized markets are dealing with similar issues. Of particular interest would be 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.

III. CONCLUSION

The 2012 Joint Parties’ Proposal achieved its purpose. It was a reasonable idea at the time that has allowed the State to practice procurement and operation of new flexibility products, while providing a potential new revenue stream to an aging gas fleet faced with “disorderly retirement” at a time when the reliability issues were minimal and the procurement costs were manageable.

Since that time, both California and the rest of the world have had four years of practice and a renewed commitment to press forward to a low carbon future. The future path of California’s gas fleet is much clearer, if not totally settled, and the time is rapidly approaching where both costs and consequences are about to become significant.

In these circumstances and at this juncture, CEERT believes that this Commission, the parties, and the State can and must now assess and undertake 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 VERs before adopting a “durable” flexibility metric. There is reasonably persuasive evidence that the $EFC = P_{max} - P_{min}$ over a three hour period is not the best metric. The appropriate revisions to the flexibility metric are not crystal clear, but, with the needed information being provided, there is the time to make an informed decision on the next critical step.

Respectfully submitted,

June 29, 2016

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