

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

Order Instituting Rulemaking to Oversee the
Resource Adequacy Program, Consider
Program Refinements, and Establish Annual
Local Procurement Obligations

R.11-10-023
(Filed October 20, 2011)

**INFORMAL COMMENTS OF PACIFIC GAS AND ELECTRIC
COMPANY (U 39 E) ON THE ENERGY DIVISION'S SEPTEMBER 13,
2013, DRAFT STAFF PROPOSAL ON QUALIFYING CAPACITY AND
EFFECTIVE FLEXIBLE CAPACITY CALCULATION
METHODOLOGIES FOR ENERGY STORAGE AND SUPPLY-SIDE
DEMAND RESPONSE RESOURCES**

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Pursuant to the schedule set forth in the September 13, 2013, e-mail from the California Public Utilities Commission's (CPUC or Commission) Energy Division, Pacific Gas and Electric Company (PG&E) provides these informal comments on the September 13, 2013, Draft Staff Proposal on Qualifying Capacity and Effective Flexible Capacity Calculation Methodologies for Energy Storage and Supply-Side Demand Response Resources (Draft Staff Proposal).^{1/}

I. INTRODUCTION AND SUMMARY OF RECOMMENDATIONS

PG&E appreciates this opportunity to provide comments on the Draft Staff Proposal following the October 15, 2013, Resource Adequacy (RA) proceeding workshop. PG&E generally shares the concerns brought up by the California Independent System Operator (CAISO)^{2/} and other parties at the workshop regarding consideration, timing, and potential implementation of new calculation methodologies for Qualifying Capacity (QC) and Effective Flexible Capacity (EFC) for RA purposes.

Some parties expressed concern that proposed Effective Load Carrying Capability (ELCC) and Effective Ramping Capability (ERC) approaches may not be ready for “prime time,” and should be thoroughly vetted with stakeholders before being considered for implementation. Considering these reasonable reactions by parties to what could be a major paradigm shift in how resources are valued for reliability, PG&E supports a “go slow” approach in which modeling the ELCC for wind and solar resources is given first priority, and consideration of the ELCC approach for demand response (DR) and energy storage (ES) resources is given second priority and addressed only once the ELCC approach for wind and solar has been well vetted, implemented, and demonstrated as an effective approach for valuing

^{1/} The August 2, 2013, Phase 3 Scoping Memo And Ruling Of Assigned Commissioner And Administrative Law Judge (ALJ) set a date of September 24, 2013, for informal comments to the Energy Division on their proposal for qualifying capacity and effective flexible capacity for energy storage and demand response. In a September 17, 2013, e-mail, the assigned ALJ confirmed the revised date of October 22, 2013, for informal comments regarding this Energy Division proposal.

^{2/} See CAISO presentation titled “Using ELCC to Calculate Net Qualifying Capacity and Effective Flexible Capacity for DR and Storage Resources.” Presented by Karl Meeusen, Ph.D., at the October 15, 2013, RA workshop.

the reliability benefits of a resource.

PG&E also shares the concerns of other parties regarding the lack of demonstration of the ERC approach in any real world situation. Given the additional challenges and complexities of implementing an unproven methodology, PG&E recommends that consideration of the ERC approach be given considerably less priority relative to consideration of the ELCC approach, with much time permitted to thoroughly research and vet the ERC approach.

In short, PG&E makes the following recommendations in these comments:

1. PG&E conceptually supports the move toward probabilistic modeling approaches, such as ELCC, for use in the RA framework.
2. A substantial effort will be required to develop an accepted ELCC methodology to determine the QC for various types of resources.
3. For 2015 RA compliance, PG&E recommends focusing on developing the ELCC methodology for determining QC for wind and solar resources.
4. Defining the appropriate data inputs and assumptions for the ELCC methodology approach for wind and solar is an important first step.
5. It is premature to attempt to develop an ELCC methodology for determining the QC for ES and DR resources for the 2015 RA compliance year.
6. It is premature to implement an ERC methodology to calculate the EFC for any resources for the 2015 RA compliance year.
7. A timeline must be established and adhered to, as Energy Division has proposed, if ELCC is to be considered to calculate the QC of wind and solar resources for the 2015 RA compliance year.
8. The current method for calculating the QC of ES and DR resources should be used for the 2015 RA compliance year.

II. PG&E CONCEPTUALLY SUPPORTS THE MOVE TOWARD PROBABILISTIC MODELING APPROACHES, SUCH AS EFFECTIVE LOAD CARRYING CAPABILITY, FOR USE IN THE RESOURCE ADEQUACY FRAMEWORK

It is reasonable to pursue the use of probabilistic modeling approaches such as the calculation of the ELCC of various types of resources to derive their QC for the following reasons:

- ELCC mirrors the stochastic approaches that may be applied in future long-term procurement plan (LTPP) cycles;
- ELCC has the potential to better capture the effects of load and weather variability; and
- ELCC provides a direct measure of a resource type's contribution to system reliability given the configuration of the system and the other resources connected to it.

A. A Substantial Effort Will Be Required To Develop An Accepted ELCC Methodology To Determine the QC For Various Types Of Resources

The effort that will be necessary to use ELCC to calculate QC for various types of resources should not be underestimated. A significant commitment of time and resources will be involved to enable the Commission to use ELCC to calculate the QC for just wind and solar resources in time for 2015 RA compliance. The new ELCC model, how it is used, and the thousands of assumptions that are needed to feed it would need to be vetted in time for a June 2014 ELCC decision. The appendix to these comments lists just a few of the implementation questions that would have to be addressed if the Commission pursues this approach.

B. For 2015 RA Compliance, PG&E Recommends Focusing On Developing The ELCC Methodology For Determining QC For Wind And Solar Resources

In light of these significant challenges, PG&E recommends that the Energy Division focus on implementing the ELCC methodology for QC of wind and solar resources for the 2015 RA compliance year. Developing the methodology for wind and solar resources should be the first priority, before applying it to other types of resources, because: a) using the ELCC methodology to determine the QC for wind and solar resources is required by State mandate; b) there is some familiarity in the industry with using the ELCC methodology for wind and solar resources; and c) applying the ELCC methodology to determine the QC for resources other than wind and solar is likely to be more complicated.

Solar and wind resources are simpler to model because they are treated as fixed profiles, meaning that the state of the resource in a given moment is not dependent on its previous state. For use-limited resources, such as ES and DR, there is an added complication of the prior state of the resource needing to be taken into consideration. This may be particularly challenging for ES

resources given the limited amount of ES operational history.

Development of the ELCC methodology to determine the QC for wind and solar will allow Energy Division and parties to gain a better understanding of the ELCC modeling tools, their capabilities, and how to best use them to measure the contribution of resources to meet the system's reliability requirements.

C. Defining The Appropriate Data Inputs And Assumptions For The ELCC Methodology Approach for Wind and Solar Is An Important First Step

PG&E agrees with the CAISO's recommendation in its October 15 RA workshop presentation that more discussion of the core ELCC modeling assumptions is needed.^{3/} The Energy Division recognizes the importance of first defining the data and assumptions to be used in the analysis, as well. The Energy Division's presentation at the workshop provided an overview of data inputs and proposed sources, and indicated that in November an additional RA workshop would be held to review the proposed modeling assumptions with stakeholders.^{4/}

It is important to resolve issues surrounding data and assumptions prior to moving forward with analysis. Stakeholders should have the opportunity to weigh in on these issues before analysis is completed. Therefore, PG&E recommends that the Energy Division provide an opportunity for stakeholders to provide comments and reply comments following the November RA workshop on ELCC assumptions.

In general, PG&E supports the following principles for data inputs and assumptions and appreciates future opportunities to further comment on these issues. The inputs and assumptions should be based on public data if at all possible, and also should mirror the data and assumptions used in the LTPP proceeding to the extent feasible.

^{3/} See slide 2 of CAISO presentation titled "Using ELCC to Calculate Net Qualifying Capacity and Effective Flexible Capacity for DR and Storage Resources." Presented by Karl Meeusen, Ph.D., at the October 15, 2013, RA workshop.

^{4/} See slides 16-18 of Energy Division presentation titled "Introduction to Energy Division Probabilistic Reliability Modeling Project." Presented by Donald Brooks at the October 15, 2013, RA workshop.

D. It Is Premature To Attempt To Develop An ELCC Methodology For Determining The QC For ES And DR Resources For The 2015 RA Compliance Year

For the same reasons stated in section II.B above, it is premature to implement an ELCC methodology for determining the QC for DR and ES for the 2015 RA compliance year. If the ELCC approach is successfully implemented for determining the QC of wind and solar, then the Commission can consider pursuing the ELCC approach for DR and ES for later years. The appendix to these comments lists just a few of the questions that would need to be resolved in order to use ELCC to compute the QC for DR and ES resources.

E. It Is Premature To Implement An ERC Methodology To Calculate The EFC For Any Resources For The 2015 RA Compliance Year

PG&E also conceptually supports using a probabilistic modeling approach to calculate the amount a resource contributes to flexibility and ramping needs. However, the ERC approach is a relatively new concept with no application in the real world that PG&E is aware of. There is no standard modeling technique for this approach, and there is much uncertainty about how this methodology would work. At this point, PG&E has not formed an opinion on whether the modeling tool that the Energy Division has discussed using for this approach, SERVVM, can be used effectively and accurately to assess the EFC of various types of resources.

Therefore, efforts should continue to develop the ERC methodology to calculate EFC, but it should be recognized that even under the most optimistic scenario these efforts will not enable parties to use this methodology to calculate EFC for any resource type for the 2015 RA compliance year.

III. A TIMELINE MUST BE ESTABLISHED AND ADHERED TO, AS ENERGY DIVISION HAS PROPOSED, IF ELCC IS TO BE CONSIDERED TO CALCULATE THE QUALIFYING CAPACITY OF WIND AND SOLAR RESOURCES FOR THE 2015 RESOURCE ADEQUACY COMPLIANCE YEAR

Stakeholders must have sufficient time (i.e., several months) to review and vet the assumptions and analysis proposed by the Energy Division, as well as the results, prior to adoption of the ELCC methodology for wind and solar. PG&E supports the timeline presented

by the Energy Division at the October 15 RA workshop for implementing ELCC to calculate the QC for wind and solar resources for the 2015 RA compliance year. For the reasons stated above, it would not be realistic to use ELCC to calculate the QC for DR and ES consistent with this timeline.

The timeline presented by Energy Division for an ELCC evaluation is summarized below:^{5/}

- **November 2013** – Workshop to review modeling assumptions
- **December 2013** – Issuance of Energy Division proposal on ELCC for wind and solar generators
- **January 2014** – Two workshops followed by formal comments and replies
- **March 2014** – Workshop to discuss study results
- **May 2014** – Proposed decision

PG&E offers a few additional recommendations regarding Energy Division’s proposed timeline for study process and stakeholder review:

- The November workshop should also provide additional detail on the proposed methodology for ELCC for wind and solar resources as well as the building of the base case in SERVVM. PG&E would appreciate the questions raised in the appendix of these comments being addressed in that workshop.
- As proposed earlier in these comments, stakeholders should be provided the opportunity to provide comments and reply comments following the November RA workshop on ELCC assumptions and methodology.
- Materials should be made available prior to the November workshop detailing the proposed data inputs, assumptions, and methodology in order to provide parties the opportunity to provide thoughtful, prepared feedback at the workshop.

^{5/} See slide 6 of Energy Division presentation titled “Introduction to Energy Division Probabilistic Reliability Modeling Project.” Presented by Donald Brooks at the October 15, 2013, RA workshop.

- Study results should be provided in January prior to the holding of workshops.

IV. THE CURRENT METHOD FOR CALCULATING THE QUALIFYING CAPACITY OF ENERGY STORAGE AND DEMAND RESPONSE RESOURCES SHOULD BE USED FOR THE 2015 RESOURCE ADEQUACY COMPLIANCE YEAR

A. Current Counting Methods Should Be Used For 2015 For DR And ES

It is prudent for the Energy Division to include a back-up plan should ELCC modeling not be complete in time for the 2015 RA compliance year. Developing an ELCC approach for DR and ES will necessitate developing a comprehensive set of assumptions for availability and duration, as well as a well-vetted base case that has been used to successfully assess wind and solar ELCC. The current RA counting rules for DR and ES QC should be used until the Energy Division and parties are able to develop and agree upon a detailed alternative methodology such as the ELCC approach.

The current system and local RA counting rules for DR are outlined in the current QC manual and are based on the DR Load Impact Protocols (LIPs).^{6/} Energy storage resources would have to meet the current system and local RA counting rules for dispatchable resources as defined in the current QC manual.

B. PG&E Does Not Oppose A “Test Event” In Connection With DR

Further, PG&E is not opposed to the use of a test event in addition to the LIPs but recommends that a test event be conducted no sooner than August 31 for a summer DR resource and February 28 for a winter DR resource. Most summer DR is dispatched by August 31 so it is likely that a regular DR event will have occurred by then. PG&E has little experience with winter DR, but a February 28 cutoff date before conducting a test event, coming two months before the end of the season, would at least be an approach consistent with using August 31 in the summer.

^{6/} “Qualifying Capacity Methodology Manual.” Located at: http://www.cpuc.ca.gov/PUC/energy/Procurement/RA/ra_compliance_materials.htm. See document titled “Adopted QC methodology manual.”

C. The QC Manual Should Be Modified To Explicitly Reflect The Already Adopted Requirement That RA Facilities Must Be Capable Of Operating Four Hours At A Time For Three Consecutive Days

The Draft Staff Proposal correctly states that, “[c]urrently, System and Local RA rules require that facilities be capable of operating for four hours at a time and for three consecutive days in order to be eligible to receive a QC.”^{7/} This requirement was set by a prior RA decision,^{8/} but is not explicitly noted in the CPUC’s QC manual. Given the importance of this requirement, and the fact that it has been brought up in the Draft Staff Proposal, PG&E recommends that the QC manual be updated to include this requirement.

V. RESPONSES TO ENERGY DIVISION QUESTIONS NOTED IN THE PROPOSAL

1. What do parties think about Energy Division’s recommended approach for conducting these calculations [for ES and DR] through extension of the ELCC modeling currently under development for wind and solar resources in compliance with the Senate Bill 1x2?

Per the reasons stated above, the recommended approach for ES and DR is premature for 2015 RA compliance year implementation.

2. What are parties’ opinions on:

a) The proposed similarities between QC and EFC calculation methodologies;

The methodologies presented for calculating QC and EFC are analogous in the sense that they both rely on ratios (ELCC and ERC respectively), which, when multiplied by a nameplate capacity, result in the QC and EFC. However, ELCC and ERC are very different metrics and are at very different stages of acceptance and use as planning criteria. Therefore, it is premature to implement the ERC methodology to calculate the EFC for any resource for the 2015 RA compliance year. Further, all parties, including

^{7/} “Qualifying Capacity and Effective Flexible Capacity Calculation Methodologies for Energy Storage and Demand Response Resources,” Draft Staff Proposal, California Public Utilities Commission – Energy Division, Resource Adequacy Proceeding R.11-10-023, September 13, 2013, p. 5.

^{8/} Decision 04-10-035, Ordering Paragraph (OP) 1 and Conclusion of Law 17, pp. 54-57, and reaffirmed in Decision 05-10-042, OP 1 and Conclusion of Law 16, pp. 104-105.

PG&E, need additional time and experience with the SERVVM model to fully assess whether the Energy Division's approach to ERC is workable.

b) The potential for ELCC modeling to be extended to ERC modeling;

As stated above, all parties including PG&E need more time and experience using SERVVM to assess whether the ERC modeling approach is workable.

c) The role of dispatchable load;

Over-generation is an important consideration and consideration should be given on the development of dispatchable load. The value of dispatchable load should be tied to the modeling assumptions.

d) The impact of storage and supply-side DR use limitations;

PG&E supports the minimum duration, four hours at a time for three consecutive days, for which resources must operate under the proposal to ensure that they meet the reliability needs being targeted. This is consistent with current RA rules for retail DR. The Energy Division should address whether a flexible DR resource must comply with the operating requirements of non-flexible DR. PG&E is concerned that instituting such a requirement would create a significant barrier to flexible DR because then the combined operating windows of flexible and non-flexible DR would be either 7:00 a.m. to 6:00 p.m. (combining the 7:00 a.m. – 12:00 p.m. and 1:00 – 6:00 p.m. windows) or 1:00 p.m. to 8:00 p.m (combining the 1:00 – 6:00 p.m. and 3:00 p.m. to 8:00 p.m. windows).

e) Potential aggregation approaches and the appropriate level of CPUC involvement in specifying aggregation rules;

PG&E is generally supportive of aggregation, but has some concerns regarding methodology specification. For example, for individual aggregations that are small (e.g., less than 10 megawatts), the granularity may be too fine to accurately assess ELCC using this modeling approach. If the Energy Division expects supply-side DR to bid into the

CAISO market as a Proxy Demand Resource (PDR), the draft proposal should be consistent with the aggregation requirements of this resource. For instance, a PDR can consist of resources aggregated throughout a sub-Load Aggregation Point (subLAP), which is in effect a collection of Pricing Nodes (Pnodes). PDRs may also be aggregated by a Custom LAP, which is a subset of Pnodes within a subLAP. The Energy Division's proposal to require supply-side DR resources to be aggregated at the Transmission Node level is unnecessarily granular and would be a major barrier to supply-side DR. Demand response aggregators rely on a portfolio of customers to create a PDR. This portfolio allows an aggregator to spread performance risk among its constituent customers. If a PDR must be aggregated at a Transmission Node, of which there are many in a single subLAP, this will eliminate the ability of DR aggregators to spread this performance risk. PG&E recommends that the Energy Division adopt the current aggregation requirements for PDR in its proposal.

f) Assessment and use of performance data; and

PG&E supports the assessment and use of performance data to validate a resource's operating characteristics and ensure it meets its claimed RA value. The same approach currently used for QC should also be used for EFC.

g) Important considerations in the application of RA eligibility rules to storage and DR resources?

PG&E supports the minimum duration, four hours at a time for three consecutive days, for which resources must operate under the proposal to ensure resources meet the reliability needs being targeted. As stated above, the proposal should clearly state what the minimum duration and number of consecutive days that flexible DR would be required to operate as well.

3. How will this inform staff efforts in storage and DR as well as other related proceedings, for example in the development of performance testing protocols for storage?

PG&E recognizes that the study of the value of resources in the RA proceeding can help inform other proceedings.

4. To what extent should QC and EFC be based on historical performance data?

PG&E supports the use of historical performance data to the extent that such data is available, and applicable to the assessment in question.

5. How should the QC of a particular aggregated resource be quantified (e.g., by assuming the Pmax and the Pmin values or by summing shorter individual charge/discharge/call durations to create longer combined durations?)?

PG&E supports an aggregation approach given that resources are used in a manner that ensures consistency with load reductions or dispatch of resources. This may require specific rules for resources that are claimed for RA.

Respectfully Submitted,

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APPENDIX

Examples Of Implementation Questions For Use Of ELCC To Calculate QC For Wind And Solar Resources

- What data inputs and assumptions should be used?
- What is the standard used to measure loss of load expectation? Will the planning reserve margin be revisited?
- Should average or incremental ELCC values be used to determine the QC of a resource type and does this vary for existing versus new resources?^{1/}
- How should diversity benefits, if any, be allocated among resources?
 - To the extent that certain resources (e.g, wind and solar) are complimentary, the ELCC value of the combined resources, and therefore the QC that would be calculated for the combined resources, will be higher than the sum of the QC that would be calculated for the individual resources. This is the “diversity benefit.”
- How often should the ELCC and, consequently, the QC be calculated?
 - PG&E recommends an approach in which the ELCC is calculated through 2017 based on assumed penetration of each resource type through that year. In 2016, further analysis can be used to develop a 2020 case that assumes the penetration of each resource type through that year. This is a reasonable plan given the potential for major shifts in the recent portfolio expected in those timeframes due to expected new resources coming online and scheduled once-through cooling plant retirements.
- Should there be “changed generation mix” or “changed load” triggers to recalculate the QC using the ELCC approach?
 - A significant change in the overall resource mix, or a significant change in load, can have a significant effect on the ELCC value calculated for a resource type.
- Questions relating to load, wind and solar generation profiles, and other input assumptions:
 - Should ELCC calculations to determine QC be based on public information?

^{1/} This relates to the issues brought up by the CAISO in slide 3 of their presentation titled “Using ELCC to Calculate Net Qualifying Capacity and Effective Flexible Capacity for DR and Storage Resources.” Presented by Karl Meeusen, Ph.D., at the October 15, 2013 RA workshop.

- Should the ELCC analysis to calculate QC leverage the planning assumptions developed in the LTPP proceeding or should it be based on other assumptions?

Some Outstanding Implementation Issues For Using ELCC To Calculate QC For DR And ES

Resources

Demand Response

- It is unclear how a testing requirement with an ex ante analysis to determine the QC would be incorporated into an ELCC approach for DR. An ex ante analysis, by definition, is conducted prior to a DR event. Therefore, it would be highly improbable that a test event of a DR resource would match its ex ante analysis.
- The RA value of supply-side DR should not be calculated in a manner different than retail DR. There is no demonstrated difference in the ability of either type of DR to provide load reduction.
- The ED should provide more detail about the “simplified Load Impact Protocol” that would be used to determine the P_{\max} and P_{\min} of a DR resource. It is not clear what exactly is being referred to, where documentation on it is located, and when it was approved by the Commission. As a general principle, the same approach to calculate the RA value of a DR resource regardless of whether the demand response provider is an investor-owned utility (IOU) or a third party.
- The RA value of DR programs is currently calculated by an ex ante analysis based on a 1-in-2 weather year. Would the adjustments to the “simplified Load Impact Protocol” analysis of the ex post performance also be based on a 1-in-2 year weather year? How would the ex post analysis be adjusted for the time of day, weather, and time of year?
- In verifying the P_{\max} and P_{\min} of a DR resource that has been calculated using the “simplified Load Impact Protocol”, will the Commission modify it as it currently does to the IOUs’ ex ante load impacts? If so, the process should be transparent and predictable.
- Would a DR resource be required to re-test when the participating customers change? This can conceivably happen on a monthly or even daily basis. Would the DR resource be re-tested if it changes in size over the course of a year?
- It is not clear how the Energy Division would use aggregated statewide DR data as a proxy for DR performance. Demand response programs can vary by utility, climate zone and time of year. In some instances, different models and methodologies are used by the IOUs to determine load impacts.

Energy Storage

- The methodology for counting energy storage must ensure that there is no double counting if a negative P_{min} is taken into consideration. Using a negative P_{min} implies that there is a smooth transition from charge to discharge, which may not be true.
- How would ES resources of different duration and other operating characteristics be treated? Would the ELCC be calculated differently for ES resources with different operational characteristics (e.g., a 15-minute duration resource compared to a resource with a 4-hour duration)?
- Current testing of resources for RA purposes is typically short duration. Given that a storage resource may be able to sustain a certain level for one hour, but not for four hours, testing to determine a storage resources' QC value should be based on the minimum continuous generation over a period of four hours.