BEFORE THE
PUBLIC UTILITIES COMMISSION
OF THE STATE OF CALIFORNIA

Order Instituting Rulemaking to Consider Annual Revisions to Local Procurement Obligations and Refinements to the Resource Adequacy Program	**)**	**R.08-01-025**

PHASE 2 JOINT PROPOSAL OF THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR CORPORATION, SOUTHERN CALIFORNIA EDISON COMPANY AND SAN DIEGO GAS AND ELECTRIC COMPANY REGARDING CALCULATION OF QUALIFYING CAPACITY FOR WIND AND SOLAR RESOURCES

Pursuant to the Administrative Law Judge's October 30, 2008 Ruling Adopting Dates Certain For, And Making Changes To the Phase 2 Schedule, the California Independent System Operator Corporation ("CAISO"), Southern California Edison Company ("SCE") and San Diego Gas and Electric Company ("SDG&E") (referred to collectively as "Joint Proponents") hereby submit the following joint proposal on an issue identified during Phase 2 -- calculation of Qualifying Capacity ("QC") for wind and solar resources.

I. INTRODUCTION AND OVERVIEW

As California increasingly relies on wind and solar resources to meet Renewable Portfolio Standard requirements and energy production needs, it becomes even more critical for purposes of maintaining reliability that the QC counting conventions accurately reflect a dependable level of ***generation*** that will be available during the peak load hours because intermittent resources cannot be dispatched. From an operational standpoint, the Joint Proponents have observed that the current methodology, and intermittent resource QCs

resulting from this methodology, significantly overstate the dependable level of generation that is actually available during peak load hours. Therefore, it is essential that the California Public Utilities Commission ("Commission") implement a new methodology to determine the QC of intermittent resources that more accurately reflects the actual operational performance from these resources during peak load periods. Specifically, the current methodology should be changed to better reflect the level of generation that can be depended on to support reliable operation of the grid during peak load, as set forth below.

II. CALCULATION OF QUALIFYING CAPACITY FOR WIND AND SOLAR RESOURCES

As noted by Commission staff in the 2007 Resource Adequacy ("RA") Report, the QC counting conventions are "intended to reflect the expected capacity value that will be available to the CAISO during periods of system peak demand."[1] Joint Proponents believe that dependable generation for intermittent resources is equivalent to expected capacity value during system peak demand because these resources cannot be dispatched. Consistent with this concept, Joint Proponents agree that there are two essential principles that should generally guide any revisions to the Commission's QC methodology for intermittent resources:

- First, the QCs determined for RA resources should provide the CAISO with a high level of assurance that the RA capacity is actually available to meet peak demand, which is consistent with the primary objective of the RA program. Thus, the methodology

[1] See Page 17, section 4.1 of the 2007 RA Report. The 2007 RA Report can be accessed through the following link: http://docs.cpuc.ca.gov/PUBLISHED/REPORT/81717.htm.

for assessing the QC of wind and solar resources should reflect the actual generation of such resources available to serve load during the appropriate peak periods.

- Second, the QC methodology must be scalable to accommodate the expected increase in capacity from wind resources. In other words, the methodology must be capable of adjustment to account for the wide variation in output and produce greater confidence in predicting actual production during peak hours (as the quantity of installed capacity from wind resources becomes a more significant proportion of California's overall generating capacity).

In its 2007 RA Report, the Energy Division provided data demonstrating that the current methodology for determining wind resources' QC (three-year historical average of hourly production during Standard Offer 1 ("SO1") peak hours) overstates the available capacity during peak demand periods. This finding is consistent with the CAISO's operational experience**.** Recognizing that an improvement in the current counting rules is needed, the CAISO has been working with stakeholders to finalize a proposal for Commission consideration. The CAISO, SCE and SDG&E have developed this joint proposal based on the aforementioned key principles.

A. Proposed Methodology for Counting Wind and Solar Resources with Three Years of Operating Data

This proposal focuses on establishing an appropriate level of confidence that intermittent RA resources will be generating at or above their RA capacity value during the peak demand period. To achieve this level of confidence, this

proposal uses a probability-based approach, referred to as an exceedence method, to calculate the QC value and thus set a level of confidence that the expected output will be achieved. The proposed methodology takes the historical output for each intermittent resource during a specified group of five hours within each day during that month. The specified group of five load hours is established such that the peak load hour always falls within that five-hour range, regardless of season, and the specific hours depend upon the month for which the QC is being calculated. These hours will be predefined (*ex ante*) as follows:

Jan-Mar., Nov. and Dec.	HE17-HE21 (4:00 p.m. to 9:00 p.m.)
April-Oct.	HE14-HE18 (1:00 p.m. to 6:00 p.m.)

The specified hours reflect the times when the CAISO has typically experienced the system coincident peak demand during each of the months. Consistent with today's counting methodology this proposal uses a three-year average of data to create each resource's monthly QC value.

Two fundamental approaches for determining the QC of wind and solar resources were discussed during Phase 1 of this proceeding: (1) a strict averaging methodology; or (2) an exceedence factor methodology. An averaging methodology takes the average of historical wind production during a given set of hours (*e.g.*, peak load hours). An exceedence approach uses historical wind production over a given number of hours (*e.g.*, peak load hours) to determine the minimum amount of capacity a wind unit generated during those hours (*e.g.*, a 30

MW nameplate wind generator produced at least 4 MW for 80% of the peak load hours).

Joint Proponents believe that the use of a strict averaging methodology (*e.g.*, determining QC based on the average output of wind resources during select hours over a three-year time period) does not adequately address the very large variances – both positive and negative – between the average historical output and actual output during peak periods.[2] That variability can have a significant impact on system operations, particularly during peak load periods. On the other hand, an exceedence factor approach explicitly takes into account such variances and thus results in a QC that is more closely correlated to dependable output during peak periods. Indeed, the exceedence factor approach will ensure that the actual output of intermittent resources during peak hours will meet their QC at least a certain percentage of the time (e.g., 80% of the time). Solar resources typically do not experience the same magnitude of variances as wind, but the use of an exceedence factor approach for solar resources will still be consistent with determining the dependable output of solar resources.

Therefore, Joint Proponents recommend that an exceedence methodology be implemented to determine the QC for wind and solar resources. The QC for each wind or solar resource would be determined for each month based on three years of historical generation over the peak hours defined above. This

[2] *See, e.g.*, 2007 RA Report, at 20 (Figure 3), comparing actual output to the QC of wind resources under the current averaging methodology. As the RA Report observes, "it is evident that daily production deviates broadly, in both directions, from the established QC." *Id.* at 20.

generation data would be ranked, and an appropriate exceedence factor would be applied to determine the QC. For example, if the exceedence factor were 80%, the QC would be equal to the minimum output achieved by the resource for at least 80% of the hours in the data set of historical generation for each month. While actual generation of the intermittent resource during a given hour of the day may be greater than the exceedence factor QC, this capacity may not be dependably relied upon to meet peak load requirements.

For wind areas that contain more than one wind resource, Joint Proponents propose that a diversification benefit be applied to each wind resource's QC. The diversification benefit is a result of multiple wind resources offsetting the generation variability of a single resource so that the QC value for the wind area will equal or exceed the sum of individual wind resource QCs at a given exceedence level. Capturing this benefit is reasonable because the CAISO will receive energy from all wind resources within a wind area simultaneously without constraints. However, due to constraints across various congestion paths with the CAISO control area, Joint Proponents do not recommend extending diversification benefits across multiple wind areas.[3] Section B below illustrates the calculation and application of the diversification benefit.

The selection of the exceedence level should be consistent with the RA program's goal of ensuring that resources will be available when needed during peak demand. For example, an exceedence level as low as 50% does not

[3] The proposed wind areas are described in section C of this proposal.

conform to this standard because the expected output would be below the RA value 50% of the operational hours.

Joint Proponents recommend as an ultimate goal the use of an 80% exceedence factor, which is the same level used for hydroelectric power generation resources. For hydroelectric power generation resources, the 80% exceedence factor equates to expectation that the resource will meet its RA capacity for the given month in four out of five years. For the intermittent resources that are the subject of this proposal, the 80% exceedence factor equates to the expectation that the given resource will meet or exceed its RA capacity in four out of the five peak load hours.

While Joint Proponents support an ultimate goal of 80%, we realize that this may be best accomplished using a phase-in approach. Accordingly, the Joint Proponents are open to increasing the exceedence factor over time to facilitate the transition from the current QC values for wind and solar generation as wind and solar resources become a larger portion of the RA resource fleet. We recommend that specific criteria be established up front that determine the "step-ups" during the transition. For example, we believe there is merit in establishing that the ultimate goal exceedence value (80% in our proposal) be in place at the time that wind and solar resources reach twice their current level of approximately 3,000 MW. Joint Proponents believe that there should be a floor for the initial level of the exceedence factor. Joint Proponents propose that the starting point be set at an exceedence level of 70%. This level supports the RA program's goal that capacity be available to serve peak load, while recognizing

that some transition to an 80% exceedence might be appropriate.

Joint Proponents further recommend that the exceedence value be established ahead of the actual year that the MW threshold is reached (based on the forecast date that such amount of resources are expected to come online) so that there is not a wait for the actual MW to materialize and a year lag in catching up to that level of MW exposure. Bear in mind that under the current RA counting rules for wind and solar resources -- with only about 3,000 MW of these resources currently online -- the risk exposure of being wrong on the counting methodology is only on the order of several hundred MW (about the size of one generating plant). However, with 7,000 MW or more of wind and solar resources expected to be online in the near future, the risk exposure grows significantly, and could result shortfalls equivalent to several generating plants if the counting methodology continues to be inaccurate. That is why it is imperative to implement more accurate counting rules for intermittent resources.

Joint Proponents are open to working with stakeholders in the upcoming RA workshops to define a transition plan.

B. Steps and Data Needed to Implement Proposed Methodology

Below are the steps that would be undertaken to implement the methodology proposed by Joint Proponents. The following load and generation data would be used to perform the analysis:

1. The previous three years of wind generation energy production data for each wind resource for each of the six wind areas within California.[4]

[4] The proposed wind areas are described in section C of this proposal.

2. For each month of the 12 months of the past three years, the individual generation output (and wind areas) for the five hours of each day, depending upon which month's data was being collected, as noted below.

Jan–Mar, Nov and Dec	HE17-HE21 (4:00 p.m.-9:00 p.m.)
Apr–Oct	HE14-HE18 (1:00 p.m.-6:00 p.m.)

Using the data above, the following would be determined for each resource and the six wind areas within California:

1. The actual wind generation energy production by resource and wind area for each of the days in each month using the actual energy production during the respective five hours of each day, depending upon the month (as described above).
2. For each wind area and for each wind resource within that wind area, the hourly integrated generation that corresponds to the five peak hours of each day of the month. A set of about 450 data points (5 peak hours * 30 days per month * 3 years of data) will be collected for each wind area and each wind resource within that wind area. For each wind resource, the MW value corresponding to the chosen exceedence level will be the Initial QC. For each wind area, the MWh value corresponding to the selected exceedence level will be the Wind Area QC.
3. The Wind Area QC will be greater than the sum of the wind resource QCs within that wind area due to the diversification benefit described in

section A. The positive delta will be added to each wind resource's Initial QC on a pro rata basis. An example of this allocation is provided below:

- For a given exceedence factor, Wind Area A (containing three wind resources) has a Wind Area QC of 75 MW. Each wind resource (at the same exceedence factor) has Initial QCs as follows:

  Wind Resource 1: 30 MW Initial QC

  Wind Resource 2: 20 MW Initial QC

  Wind Resource 3: 10 MW Initial QC

- The positive delta of 15 MW (Wind Area QC minus sum of Wind Resource Initial QCs) is allocated in proportion to each wind resource's Initial QC; 7.5 MW or 50% of the positive delta is added to Wind Resource 1's Initial QC, 5 MW or 33% is added to Wind Resource 2's Initial QC and 2.5 MW or 17% is added to Wind Resource 3's Initial QC.

- The final QC for each wind resource is as follows:

  Wind Resource 1: 37.5 MW final QC

  Wind Resource 2: 25 MW final QC

  Wind Resource 3: 12.5 MW final QC

4. The resulting final QC for each wind resource (at the chosen exceedence level) would be the QC value used for the next RA compliance year.

5. QC values are calculated by the California Energy Commission ("CEC") and published on the CAISO website.

Joint Proponents believe that this proposal provides a high degree of confidence that RA resources can be relied upon during peak load hours, and is superior to the various proposals that have already been considered by the parties in Phase 1 of this proceeding. For instance, one option originally submitted by the CAISO was an averaging approach. However, after reviewing the results of that approach, Joint Proponents recognized that the average generation output, even in the peak hours, may introduce a bias into the results that affects operational reliability. In other words, the high variability of generation output from wind resources can produce average values that are considerably higher than actual production.[5] For this reason, the proposal included herein includes a confidence or exceedence level. There also has been some discussion among stakeholders about an Effective Load Carrying Capability approach, but no party has submitted a specific proposal, nor has any party described a process, timeline or entity that would do a study such that it could be integrated into the RA program.

C. Methodologies for Counting Wind and Solar Resources with Less than Three Years of Operating Data

1. Wind Resources

[5] For example: wind resources in the San Gorgonio region reflected outputs over a three-year period from 2005 to 2007of 4.9%, 2.4% and 40.4% of nameplate capacity, respectively. The three-year average would result in a QC value of 15.9%. Use of this average number as the QC number would result in an over forecast of the actual output by more than 300% for two of three years (15.9% compared to the actual output of 4.9% and 2.4%).

Joint Proponents propose that the current RA provisions for wind units with less than three years of operating data (copied below in section C.1.a.), be changed as follows:

- Use a wind production factor calculated on a wind area basis as described in this proposal, instead of using the wind production factor of all wind units within the Transmission Access Charge ("TAC") area; and
- Determine the production factor using the exceedence approach described above for resources with three years of operating data, instead of using the average wind production factor of all units within the area where the unit is located.

These proposed changes are discussed in section 1b below, Proposed Refinement.

a. Current RA Provisions from CPUC Decision (D. 07-06-029)

The RA provisions that are currently in the CPUC rules were established under CPUC Decision D. 07-06-029, June 21, 2007, as follows:

> *For new units: The average wind production factor of all units within the TAC area where the unit is located will be used. For example, for a new unit, if the average wind unit production as a percent of Net Dependable Capacity ("NDC") in the TAC area during June of year 1 was 23%, year 2 was 22%, and year 3 was 24%, the new unit's QC for June would be 23% of its NDC: (23 + 22 + 24) / 3 = 23%.*

For units with some operating experience, but less than 2 years of data: The average wind production factor of all units within the TAC area where the unit is located will be used in place of the missing data in the 3 year formula. For example, if the average wind unit production in the TAC area as a percent of NDC during June of year 1 was 23%, year 2 was 22%, and year 3 was 24%, and the new unit production for June was 21% of NDC for year 3, the unit's QC for June would be 22% of its NDC: (23 + 22 + 21) / 3 = 22%.

For units with at least 2 years of operating experience, but less than 3 years of data: The unit's actual operating experience will be used. In some months, the QC value will be based on 2 years of data rather than 3 years of data (as established in the counting convention).

b. Proposed Refinement

For new wind resources without three years of operating data, the QC value would be determined using "proxy" data derived on a wind area basis for the years for which actual operating data is not available. Thus, until the particular resource has three years of historic production data, the amount of capacity that a new wind resource can be counted for RA purposes would be determined by using the Wind Area QC (the calculation of which is described above in the proposal for how to treat resources with three years of operating data) of the particular wind area in which the resource is located to "fill in" the

missing years of data.

Joint Proponents propose that the CPUC establish the following six wind areas within California for purposes of this proposal:

- San Gorgonio;
- Tehachapi;
- Altamont;
- Solano;
- Pacheco Pass; and
- San Diego.

The "missing data" for a particular year for a new resource would be derived as follows. Note that a Wind Area QC value will be determined each year by the CEC and CPUC. The nameplate MW of a new resource that does not have three years of operating data would be multiplied by the following factor:

$$\text{Factor} = \frac{\text{Wind Area QC in MW}}{\text{Sum of Nameplate MW of All Wind Resources in Wind Area}}$$

Example:
Nameplate MW of all RA resources in Wind Area A = 1000 MW
CEC calculated Wind Area QC MW value = 100 MW
Factor = 100 MW/1000 MW = 10.0%
QC value for this year for a 150 MW new resource is 250 MW x 0.100 = 25 MW

2. Solar Resources

Joint Proponents propose that the exceedence methodology described above for use with wind resources that do not have three years of operating data also be used for solar resources with less than three years of operating data. However, Joint Proponents do not recommend using the wind area for determining the proxy value to use in the years where there is no actual data, but

instead recommend that the proxy be calculated using an exceedence methodology focused on the production of all solar units within the TAC area where the solar unit is located. Joint Proponents propose that this approach be used as the starting point for a methodology that would be in effect starting in 2010. However, we acknowledge that as more solar resources come on line over the next few years the methodology may need to be revisited. The TAC area is a sufficiently vast geographic area that it will capture a reasonable amount of solar resources to serve as "proxy" resources for the QC determination. At this time, given the limited number of solar resources that have come on line, there is no option comparable to a "wind area" in which like solar resources can be grouped.

III. CONCLUSION

For the foregoing reasons, Joint Proponents respectfully request that the Presiding Administrative Law Judge prepare a proposed decision for Commission consideration that incorporates the proposal articulated herein.

Respectfully submitted,

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Date: January 15, 2009

CERTIFICATE OF SERVICE

I hereby certify that on January 15, 2009. I served, by electronic mail and United States Mail, a copy of Phase 2 Joint Proposal of the California Independent System Operator Corporation, Southern California Edison Company and San Diego Gas and Electric Company Regarding Calculation of Qualifying Capacity for Wind and Solar Resources to each party in Docket No. R.08-01-025.

Executed on January 15, 2009 at Folsom, California

/s/ Anna Pascuzzo //

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