

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

Order Instituting Rulemaking to Consider	)	Rulemaking No. 08-01-025 (Filed January 21, 2008)
Annual Revisions to Local Procurement	)	
Obligations and Refinements to the Resource	)	
Adequacy Program	)	

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**REPLY COMMENTS OF  
THE CALIFORNIA WIND ENERGY ASSOCIATION,  
THE AMERICAN WIND ENERGY ASSOCIATION,  
AND THE SOLAR ALLIANCE**

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On Behalf of  
**THE CALIFORNIA WIND ENERGY ASSOCIATION,  
AMERICAN WIND ENERGY ASSOCIATION, AND  
THE SOLAR ALLIANCE**

February 27, 2009

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Pursuant to the schedule established in this proceeding by the Presiding Administrative Law Judge, the California Wind Energy Association (CalWEA), American Wind Energy Association (AWEA), and the Solar Alliance respectfully submit these reply comments on the “counting rules” to be used to determine the resource adequacy (RA) value of intermittent renewable resources, including California’s significant wind and solar resources.

All parties to this case appear to agree that determining the RA counting rules for intermittent renewables is an issue of critical importance. California is poised to adopt a statutory goal of 33% renewable generation by 2020, as a key element in the state’s plan to reduce its greenhouse gas emissions to 1990 levels by 2020. Much of this renewable generation will be intermittent wind and solar resources. Given the magnitude of this commitment, the state needs to plan carefully, using the best available tools, for how it will integrate these resources reliably into the grid, at the least cost to ratepayers. This will not be “business as usual,” and the state should not assume that the grid will be operated in the same way that it has been historically.

This case presents two different visions for ensuring reliable operation of the grid with

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significant amounts of intermittent renewables. One is “business as usual”: the California Independent System Operator (CAISO) and parties with significant interests in existing fossil generation (Dynegy, Southern California Edison [SCE], and San Diego Gas & Electric [SDG&E]) propose to treat wind and solar essentially as energy-only resources, giving them an RA capacity value that is just a small fraction of their nameplate capacity. The CAISO *et al.* would give RA value to wind and solar projects only to the extent that they operate like a standard fossil resource, capable of producing a pre-defined amount of power in 70% or 80% of hours. This would result in the utilities procuring substantial additional dispatchable fossil generation to back up wind and solar, so that the CAISO can continue to operate the grid under its “business as usual” practices, that is, with virtually all of its needs met through dispatchable fossil generation, as has been utility practice for decades.

Under the approach of the CAISO and its “business as usual” supporters, the grid in California would provide reliable service – but at what cost? In picking a counting rule for intermittent renewables, the Commission must confront the cost issue – do ratepayers need to pay for the additional back-up fossil generation that would be required if only minimal amounts of wind and solar resources are counted toward meeting RA needs? CalWEA, AWEA, and the Solar Alliance appreciate that the ratepayer advocates in this case, the Division of Ratepayer Advocates (DRA) and the Utility Reform Network (TURN), are questioning whether treating intermittent renewables as almost-energy-only resources makes sense in a world of 33% renewables. In their opening comments, DRA and TURN have urged the Commission either to address this issue with a more sophisticated analytic tool (DRA) or to wait until more definitive studies of this complex problem are available (TURN).

The second vision of grid operations presented in this case – the one that CalWEA, AWEA, and the Solar Alliance support – is one that recognizes the aggregate value, the full diversity, of all intermittent resources, both wind and solar. The CAISO and the other “business as usual” proponents of a fossil-based system ask the Commission to consider how to ensure grid

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reliability at times other than “when the wind blows or the sun shines.”<sup>1</sup> Given the state’s commitment to renewable resources, CalWEA, AWEA, and the Solar Alliance believe that the Commission needs to ask more sophisticated questions, such as “when the wind is not blowing, is the sun shining?” and “when the sun is not shining, is the wind blowing?” Unfortunately, last year the consideration of the RA counting rule for intermittent renewables in Phase 1 focused almost exclusively on wind generation. Indeed, the assertion of the CAISO *et al.* that there is a problem with the current counting rule for intermittents is based entirely on the Energy Division’s *2007 Resource Adequacy Report*, in which the Energy Division looked only at wind generation and did not consider solar at all, and the CAISO’s historical experience with 2,700 MW of wind but very little solar on its system.<sup>2</sup> This year, the record in Phase 2 makes clear that solar resources will be a major element in meeting both the 20% and 33% goals for renewable generation in California. For example, LSA’s opening comments note that 5 GW of solar capacity is under development in California with the potential to come on-line in the next several years.<sup>3</sup> The Commission also should be aware that roughly one-half of this capacity will be solar photovoltaic (PV) technologies:

- SCE has proposed their 250 MW utility-owned, distributed solar PV program to serve their RPS targets, a proposal now in front of the Commission for approval;<sup>4</sup>
- Similarly, SDG&E has proposed a program of approximately 80 MW of utility-owned and competitively-provided distributed solar to contribute to their RPS targets;<sup>5</sup>
- Last August PG&E announced procurement of 800 MW of central station PV as part of their RPS procurement plans;<sup>6</sup>

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<sup>1</sup> CAISO Opening Comments, at 9.

<sup>2</sup> CAISO Opening Comments, at 13.

<sup>3</sup> LSA Opening Comments, at 5.

<sup>4</sup> *See*, generally, A. 08-03-015.

<sup>5</sup> *See*, generally, A. 08-07-017.

<sup>6</sup> *See* PG&E’s August 14, 2008 news release on Sunpower and Optisolar contracts, at [http://www.pge.com/about/news/mediarelations/newsreleases/q3\\_2008/080814.shtml](http://www.pge.com/about/news/mediarelations/newsreleases/q3_2008/080814.shtml).

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- LADWP has announced plans to develop more than 800 MW of both utility-owned PV and competitively provided solar generation to complement their Senate Bill 1 program.<sup>7</sup>
- And most recently, on February 24, 2009, PG&E announced plans to build 250 MW of PV capacity in its service territory and to purchase the output of another 250 MW.<sup>8</sup>

In total, the four largest utilities in the state, less than two years after the launch of the California Solar Initiative (CSI), have committed to add more than 2.5 GW of PV to their systems, in addition to the 3 MW of behind-the-meter PV to be installed under the CSI. As a result, the Commission needs to consider the implications for the RA value of intermittent renewables of large quantities of both wind and solar on the California grid.

In fact, wind and solar are highly complementary resources. In the critical late-afternoon hours on summer days, when demands and the risk of lost load are the highest, wind generation increases at the same time that solar output declines as the sun drops lower in the sky. The current counting rule incorporates this diversity, by setting the NQC at the average of wind and solar output across the entire peak period. Yes, wind output is below average in some peak hours in the early-to-mid afternoon, but these are the hours when solar generation is above average. The roles of wind and solar then reverse in the late afternoon, with wind generation increasing to above average levels as evening approaches and solar production declines. The record in this case shows clearly that a key weakness of the CAISO *et al.*'s exceedence approach is the difficulty of modifying the method to incorporate the diversity of intermittent renewable resources. Last year, in Phase 1 CalWEA observed that the CAISO's original exceedence proposal failed to reflect the diversity of wind projects within a wind resource area (WRA) and between WRAs. The CAISO responded by modifying its proposal to incorporate diversity within WRAs.<sup>9</sup> This year, the record shows that there is also significant diversity across intermittent renewable technologies, i.e. between wind and solar. In the CalWEA / AWEA / the

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<sup>7</sup> For a summary of LADWP's solar programs, see [http://www.ladwpnews.com/posted/1475/Measure\\_B\\_Fact\\_Sheet.255027.pdf](http://www.ladwpnews.com/posted/1475/Measure_B_Fact_Sheet.255027.pdf).

<sup>8</sup> See PG&E's press release announcing this program, at [http://www.pge.com/about/news/mediarelations/newsreleases/q1\\_2009/090224.shtml](http://www.pge.com/about/news/mediarelations/newsreleases/q1_2009/090224.shtml).

<sup>9</sup> CAISO Opening Comments, at 29-30.

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Solar Alliance opening comments, the CEC's new analysis of combining Tehachapi wind projects with the nearby Daggett solar units was discussed. When nearby wind and solar generation are combined, a 70% exceedence approach produces RA NQC values during the critical summer months that are within 17% of the NQC values produced by the current counting rule.<sup>10</sup> Of course, even after combining wind and solar, the exceedence approach understates the contribution to reliability of these resources, because in 70% of hours their combined output will exceed the NQC values. In other words, even using the CAISO's own standard (70% exceedence), combined wind and solar output in 70% of summer peak hours is 83% or higher of the average on-peak output of wind and solar combined. In our view, this result shows decisively that there is little difference between the current counting rules and an exceedence method, if the latter method fully captures the anticipated diversity of the state's intermittent renewable resources, both wind and solar.

Other studies of integrating large amounts of renewables into the California grid also have demonstrated the importance of considering the complementary nature of wind and solar. In 2007, the CEC completed a major study of integrating up to 33% renewables into the California grid. This work, the Intermittency Analysis Project (IAP Study), included scenarios with up to 12,500 MW of wind capacity and 2,600 MW of solar generation.<sup>11</sup> **Figure 1** is taken from the IAP Study and illustrates how the sum of the average wind and solar profiles in July combine to serve a much more uniform portion of overall loads. As stated in the IAP Study, "wind and solar tend to complement each other with the result of largely maintaining the load alone shape at a reduced MW level."<sup>12</sup> The IAP researchers found that the impacts of the combination of intermittent wind and solar generation in 2010 on load following and regulation requirements generally were modest. For example, the impact of wind and solar resources on load following were less than the impact due to load growth. Regulation requirements in 2010 would increase by just 3% to 7% as a result of new intermittent generation, according to the IAP

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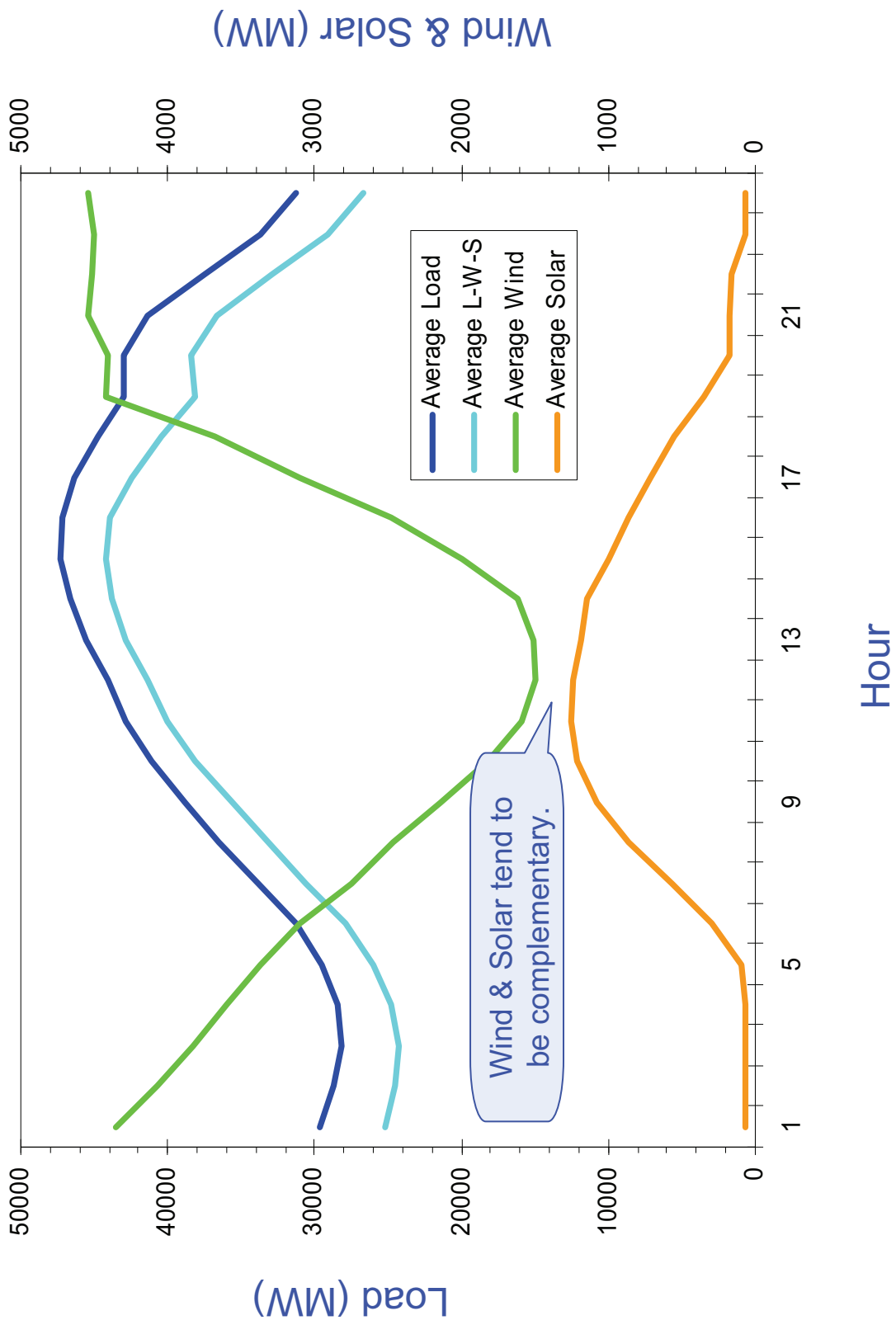
<sup>10</sup> CalWEA / AWEA / the Solar Alliance Opening Comments, at 10-11 and Figure 2.

<sup>11</sup> The final IAP Study is available at [http://www.energy.ca.gov/pier/final\\_project\\_reports/CEC-500-2007-081.html](http://www.energy.ca.gov/pier/final_project_reports/CEC-500-2007-081.html).

<sup>12</sup> IAP Study, at Appendix B, page 23.

**Figure 1**

# Temporal Pattern: July 2003 Average Day



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results. In the long-term procurement plan hearings in R. 06-02-013, the CEC's witness on renewable issues, Ms. Raitt, summarized the results of the IAP's work:

These findings showed that even with 33 percent renewables (with over 12 GW of wind in CA ISO area) at the hourly level there were no significant operational problems observed. In all scenarios studied, during summer peak conditions, the statewide electrical system had sufficient flexibility and adequate resources with 20 percent and 33 percent renewables. Where intermittency does have some noticeable impact was during off-peak and morning load rise conditions. These impacts though small were quantified in the study and suggested mitigation options were provided.<sup>13</sup>

The results of the IAP strongly suggest that California can achieve its ambitious goals for renewable development without the need to install substantial amounts of back-up generation, even with a very significant penetration of intermittent renewables, including large amounts of both wind and solar resources.

As noted above, ultimately this is a ratepayer issue. CalWEA / AWEA / the Solar Alliance would like to respond to several of the CAISO's criticisms of our analysis of the cost impacts of the CAISO's exceedence proposal. First, the CAISO states, without citation, that "CalWEA appears to assume that any alternative counting methodology will count wind resources as having zero capacity value for RA purposes."<sup>14</sup> CalWEA / AWEA / the Solar Alliance have never stated this, except with respect to Dynegy's 97% exceedence proposal, which Dynegy admitted at the workshop would result in wind NQCs of zero. To set the record straight, **Table 1** shows the results of the CEC's analysis of the current counting rules and the CAISO's 70% exceedence proposal, expressed as a percentage of wind nameplate capacity.<sup>15</sup>

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<sup>13</sup> R. 06-02-013, CEC / Raitt, Exhibit 63e, at 22 (emphasis added).

<sup>14</sup> CAISO Opening Comments, at 39.

<sup>15</sup> As noted in our January 15 proposal, there is some uncertainty about the accuracy of the CEC's data on the nameplate capacity of 2005 - 2007 intermittent resources. For some WRAs, the maximum generation in 2005 - 2007 is significantly less than the reported nameplate capacity, which suggests that some of the generation included in the reported nameplate capacity was not operational. For the purpose of calculating the NQCs as a percentage of nameplate, we have used the lower of the reported nameplate capacity or the maximum generation in each WRA.

**Table 1****Wind RA Capacity Expressed as Percent of Nameplate Capacity****Current RA Counting Rule (NQC in MW or as % of Nameplate)**

Month	San					Total	% of Nameplate
	Altamont	Livermore- Pancheco- Tracy	Gorgonio- Palm Springs	Solano	Tehachapi- Mohave		
1	4	9	81	6	118	219	13%
2	4	9	103	7	138	262	16%
3	14	36	183	10	180	422	25%
4	17	45	190	26	193	471	28%
5	33	80	199	48	218	579	35%
6	34	84	211	48	214	591	35%
7	34	85	129	51	148	446	27%
8	23	57	115	36	123	354	21%
9	25	61	144	34	126	390	23%
10	13	34	134	20	168	368	22%
11	6	9	88	17	152	273	16%
12	4	5	65	17	155	247	15%
Annual (Jan-Dec)						385	23%
Summer (May-Oct)						455	27%

**CAISO/SCE/SDG&E 70% Exceedence (NQC in MW or as % of Nameplate)**

Month	San					Total	As % of Nameplate	Change vs. Current
	Altamont	Livermore- Pancheco- Tracy	Gorgonio- Palm Springs	Solano	Tehachapi- Mohave			
1	0	1	14	0	25	40	2%	
2	0	1	15	1	27	44	3%	
3	3	6	81	2	72	164	10%	
4	3	5	65	9	110	192	11%	
5	11	19	109	25	127	291	17%	
6	11	24	165	32	103	335	20%	
7	10	22	33	23	62	150	9%	
8	3	11	37	18	37	106	6%	
9	0	6	30	5	25	66	4%	
10	0	3	29	1	32	65	4%	
11	0	1	12	1	22	36	2%	
12	0	1	15	1	19	36	2%	
Annual (Jan-Dec)						127	8%	15%
Summer (May-Oct)						169	10%	17%

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This table shows clearly that the CAISO's proposal would reduce wind NQCs from 23% to 8% of nameplate on an annual basis and from 27% to 10% of nameplate during the summer months. The CAISO has not made available the results of the CEC's analysis of its 80% exceedence proposal, but we do have the results of the Energy Division's exceedence option at the 80% level. These results are shown in **Table 2**. Using the CAISO's "target" 80% exceedence, wind NQCs would drop from 23% to 3% of nameplate on an annual basis and from 27% to 4% of nameplate during the summer months. Thus, the CAISO's exceedence proposals would result in annual average wind NQCs of just 3% to 8% of nameplate capacity, compared to 23% under the current counting rule. Thus, the CAISO would have to procure replacement capacity equal to 15% to 20% of installed wind capacity.

The CAISO contests our assumption that there will be 10,000 MW of installed wind capacity in California within five years, i.e. by 2014. This projection is based on the CEC's RPS projections, which the CAISO itself cites – 7,741 MW of wind to achieve the 20% by 2010 RPS mandate and 12,667 MW of wind to reach the goal of 33% by 2020.<sup>16</sup> The midpoint of this range is 10,204 MW of wind in 2015. It is the CAISO's opinion that there will be less wind and more solar than the CEC expects. If this comes to fruition, then this should ease the CAISO's concern with intermittent renewables, as there will be more solar to compliment the state's wind resources.

The CAISO also disputes CalWEA's estimated costs of \$1,000 to \$1,500 per kW for the costs of replacement gas-fired simple-cycle (CT) or combined-cycle (CCGT) capacity. The CAISO cites a December 2007 CEC Study referenced in our comments as support for a CCGT cost of \$841 per kW.<sup>17</sup> In Resolution E-4124 (December 2008), the Commission adopted an updated CCGT capital cost of \$1,182 per kW in 2009\$.<sup>18</sup> In D. 09-01-008, issued in January 2009, the Commission approved SDG&E's procurement of the new Miramar CT at a cost of

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<sup>16</sup> CAISO Opening Comments, at 39.

<sup>17</sup> *Ibid.*, at 40.

<sup>18</sup> See Resolution E-4214, at Appendix E, Row 1.

**Table 2**

**Energy Division 80% Exceedence (NQC in MW or as % of Nameplate)**

Month	Altamont	Livermore- Pancheco- Tracy	San Gorgonio- Palm Springs	Solano	Tehachapi- Mohave	Total	As % of Nameplate	Change vs. Current
1	0	0	8	0	12	21	1%	
2	0	1	7	0	11	19	1%	
3	0	3	29	0	19	51	3%	
4	0	4	20	1	36	61	4%	
5	2	6	40	7	55	111	7%	
6	3	9	72	11	57	151	9%	
7	1	6	18	9	35	69	4%	
8	0	5	16	6	25	52	3%	
9	0	4	12	0	15	31	2%	
10	0	3	12	0	16	31	2%	
11	0	1	5	0	8	13	1%	
	0	0	5	0	7	12	1%	
Annual (Jan-Dec)						52	3%	20%
Summer (May-Oct)						74	4%	23%

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\$1,215 per kW.<sup>19</sup> CalWEA / AWEA / the Solar Alliance agree that SCE's peakers were higher in cost because they were completed quickly – that is why they represent the upper end of our range at \$1,500 per kW. We stand by our calculation of the range of replacement costs as reasonable, recent, and fully documented. If the CAISO's exceedence method causes the utilities to procure additional back-up generation for 15% to 20% of 10,000 MW of wind capacity at \$1,000 to \$1,500 per kW, the ratepayer cost would be \$1.5 to \$3.0 billion.

The CAISO also asserts that, if a new counting rule significantly de-rates the state's wind and solar resources, it will not have to procure new CT or CCGT units as replacement capacity, because "the CAISO's 2008 Summer Assessment showed a 23.9% planning reserve margin," and thus the state has plenty of existing capacity available that can be contracted to meet RA needs.<sup>20</sup> Assuming that this is true, then the state has adequate resources to take the time to study this complex issue further before changing the RA rules. California can study this issue using more sophisticated analytic tools, as DRA and TURN recommend, and can consider fully the impacts and synergies of the major increase in solar generation that is now anticipated. If intermittent renewables cause the CAISO to have to procure non-RA resources in some months, as the CAISO posits, that will not endanger reliability, given the favorable resource balance – and will provide important empirical data to inform the Commission's future consideration of this issue. From a ratepayer perspective, the occasional procurement of non-RA capacity in some months will be less expensive than the CAISO's proposed substantial and permanent de-rating of intermittent renewables by 15% to 30% of their nameplate on an annual basis, a de-rating that would require a significant amount of replacement capacity to be purchased in all months of every year.

PG&E also urges the Commission to reject the exceedence method proposed by the CAISO, SCE, and SDG&E. PG&E's Opening Comments succinctly summarize the problems with the exceedence methods:

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<sup>19</sup> See D. 09-01-008, at 1 and 7.

<sup>20</sup> CAISO Opening Comments, at 35.

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PG&E rejects exceedance approaches because they are not based on any well-defined theory of reliability and fail to account for the correlation between intermittent generation and load within the broad set of hours over which the proposed exceedance methodologies calculate exceedance. In addition, the non-linearity of exceedance methodologies complicates aggregation and introduces the need for complex and *ad hoc* diversity adjustments.<sup>21</sup>

PG&E also agrees with CalWEA / AWEA / the Solar Alliance that the counting rule for intermittent renewables should be based on an averaging approach that approximates the results of a more sophisticated reliability analysis, such as one using the Effective Load Carrying Capacity (ELCC) method.<sup>22</sup> Yet PG&E ignores the fact that the existing counting rule does just that, as shown in Table 2 of our January 15 proposal. Instead, PG&E proposes to rely on the average output in just a few extreme peak hours, with the result that its NQC results are volatile and erratic, and can change significantly from year to year as one year is added to the rolling three-year average and another is dropped.

Finally, as a matter of due process and fundamental fairness, CalWEA / AWEA / the Solar Alliance ask the Commission to consider only those proposals for which a complete set of CEC analyses showing the resulting wind and solar NQCs have been made public for review by the parties. For example, the CAISO provided on February 11 only the analyses associated with its 70% exceedance proposal; thus, the Commission should not consider the CAISO's 80% exceedance proposal, for which no analysis is available. Similarly, PG&E's Opening Comments state, at page 13, that "PG&E prefers some of the approaches that it presented at the January workshop," rather than the CEC analysis that was supposed to represent PG&E's proposal. What is the exact approach that PG&E recommends? The Commission should not approve an RA counting rule for which there is not a definitive set of NQC results.

In conclusion, CalWEA, AWEA, and the Solar Alliance continue to believe that the existing RA counting rules best reflect the most sophisticated analyses of renewables integration

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<sup>21</sup> PG&E Opening Comments, at 12.

<sup>22</sup> *Ibid.*, at 13.

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that have been performed to date, and also best capture the diversity of the state's wind and solar resources during critical peak periods. The existing rules are consistent with the best practices of the other major control areas in the U.S. The peak period over which wind and solar output is averaged is broad enough to produce stable, consistent results. The current counting rules should be retained until future studies using "best practices" methods indicate that there is a need to change the RA metrics for intermittent renewables.

CalWEA, AWEA, and the Solar Alliance appreciate the Commission's attention to these reply comments.

Respectfully submitted,

/ s / R. Thomas Beach

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On Behalf of  
**THE CALIFORNIA WIND ENERGY ASSOCIATION,  
AMERICAN WIND ENERGY ASSOCIATION, AND  
THE SOLAR ALLIANCE**

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## CERTIFICATE OF SERVICE

I hereby certify that I have this day caused to be served a copy of the foregoing document, **Reply Comments of the California Wind Energy Association, the American Wind Energy Association, and the Solar Alliance**, by Electronic Mail where possible and First-Class Mail where not, on all known parties to R. 08-01-025, named on the service list attached to the original certificate of this document pursuant to the Commission's Rules of Practice and Procedure.

I declare under penalty of perjury that the foregoing is true and correct.

Executed at Berkeley, California, Tuesday, February 27, 2009.

/s/ Christa Goldblatt

Christa Goldblatt

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