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**Comments of Calpine Corporation on the Commissioner Workshop on Renewable Progress, Challenges, and Opportunities**

*Additional submitted attachment is included below.*

**BEFORE THE CALIFORNIA ENERGY COMMISSION**

In the Matter of,

*2015 Integrated Energy Policy Report (2015  
IEPR)*

Docket No. 15-IEPR-06

Re: Renewable Progress, Challenges  
and Opportunities

**COMMENTS OF CALPINE CORPORATION ON  
THE COMMISSIONER WORKSHOP ON RENEWABLE PROGRESS,  
CHALLENGES, AND OPPORTUNITIES**

May 26, 2015

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## BEFORE THE CALIFORNIA ENERGY COMMISSION

In the Matter of,

*2015 Integrated Energy Policy Report (2015 IEPR)*

Docket No. 15-IEPR-06

Re: Renewable Progress, Challenges  
and Opportunities

### COMMENTS OF CALPINE CORPORATION ON THE COMMISSIONER WORKSHOP ON RENEWABLE PROGRESS, CHALLENGES, AND OPPORTUNITIES

Pursuant to the *Notice of Commissioner Workshop on Renewable Progress, Challenges, and Opportunities*, dated April 29, 2015, Calpine Corporation (“Calpine”) respectfully submits the following written comments.

#### A. **BACKGROUND**

Calpine owns and operates 725 megawatts (“MW”) of geothermal generation at the Geysers. The Geysers is the world’s largest geothermal resource dedicated to electricity production. In contrast to the common perception that geothermal resources are inflexible, the Geysers have significant flexibility and Calpine thus routinely offers the California Independent System Operator Corporation (“CAISO”) the capability to economically curtail hundreds of MW of the Geysers’ output. In addition, Calpine recently received a grant from the California Energy Commission (“CEC”) to explore potential approaches to further increase the Geysers’ operational flexibility.<sup>1</sup>

Calpine also has a significant portfolio of natural-gas fired generation in California, including approximately 500 MW of combustion turbines (“CTs”) as well as 4,500 MW of Combined-Cycle Gas Turbines (“CCGTs”). The CTs are capable of starting and increasing their

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<sup>1</sup> See [http://www.energy.ca.gov/contracts/PON-13-303\\_NOPA.pdf](http://www.energy.ca.gov/contracts/PON-13-303_NOPA.pdf).

output quickly to meet large ramps associated with increasing penetrations of renewables without exacerbating overgeneration problems. The CCGTs are not as flexible as the CTs but can operate at significantly better heat rates. Relatively low cost upgrades are available that could make the CCGTs significantly more operationally flexible.<sup>2</sup>

## **B. COMMENTS ON WORKSHOP TOPICS**

Calpine offers comments on three of the general topics addressed during the workshop: (1) expanding the Renewables Portfolio Standard (“RPS”) in its current form; (2) developing new procurement practices to meet a higher RPS; and (3) potential solutions to the operational challenges associated with higher penetrations of renewables.

### **1. Expanding the Current form of the RPS.**

Calpine fully supports the Governor’s goal of reducing greenhouse gas (“GHG”) emissions 40 percent below 1990 levels by 2030 and 80 percent below 1990 levels by 2050. Given the success of the RPS program to date, California’s relatively clean in-state energy supply portfolio,<sup>3</sup> and the looming operational challenges associated with integrating even higher penetrations of renewables, Calpine believes that, before the current form of the RPS program is expanded, its cost effectiveness should be compared to other potential GHG reduction measures.

For example, it could be more efficient and cost effective to meet GHG goals by further electrifying the transportation sector rather than increasing energy efficiency or procuring more renewable energy. As the efficacy of each of these potential GHG reduction measures is better

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<sup>2</sup> Calpine described these potential upgrades in previous comments filed in the California Public Utilities Commission’s RA proceeding. *See e.g.*, <http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M064/K207/64207304.PDF> (in particular, the Attachment entitled “CCGT Technology and Operational Flexibility”).

<sup>3</sup> According to the California Air Resources Board (“CARB”), in-state generation accounted for approximately 11 percent of California’s GHG emissions in 2012, the most recent year for which complete data are available. *See* [http://www.arb.ca.gov/cc/inventory/inventory\\_current.htm](http://www.arb.ca.gov/cc/inventory/inventory_current.htm).

understood, the specific goals for each measure should be recalibrated periodically. The upcoming development of the next CARB scoping plan is a natural venue for the analysis of such tradeoffs.

## **2. Developing New Procurement Practices to Meet a Higher RPS.**

Calpine has advocated consistently that the Investor Owned Utilities' ("IOUs") RPS procurement practices have failed to fully consider the benefits of different renewable technologies and have focused almost exclusively on cost. Consequently, recent IOU procurement has favored one technology – solar photovoltaic ("PV") – as its cost has declined dramatically. With respect to benefits, the IOUs have tended to over-estimate both the capacity and energy value of solar PV by failing to account for the diminishing capacity and energy value of solar PV as its penetration increases. In addition, the IOUs have ignored the integration costs associated with solar PV.

The CPUC has taken several recent steps to improve its oversight of the IOUs' RPS procurement, and the RPS process must continue to be improved to encourage more balanced and accurate procurement decisions. Until last year, the CPUC prohibited the IOUs from considering integration costs in their RPS procurement. While a CPUC decision last year allows the IOUs to consider the integration costs of wind and solar in their RPS procurement, the current integration cost estimates that the IOUs currently use are simply placeholders.<sup>4</sup> A

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<sup>4</sup> See Section 6.3 of the *Decision Conditionally Accepting 2014 Renewables Portfolio Standard Procurement Plans and an Off-Year Supplement to 2013 Integrated Resource Plan*, available at: <http://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M143/K313/143313500.PDF>.

specific process has been established within the Long-Term Planning and Procurement (“LTPP”) proceeding to estimate more robust estimates of integration costs.<sup>5</sup>

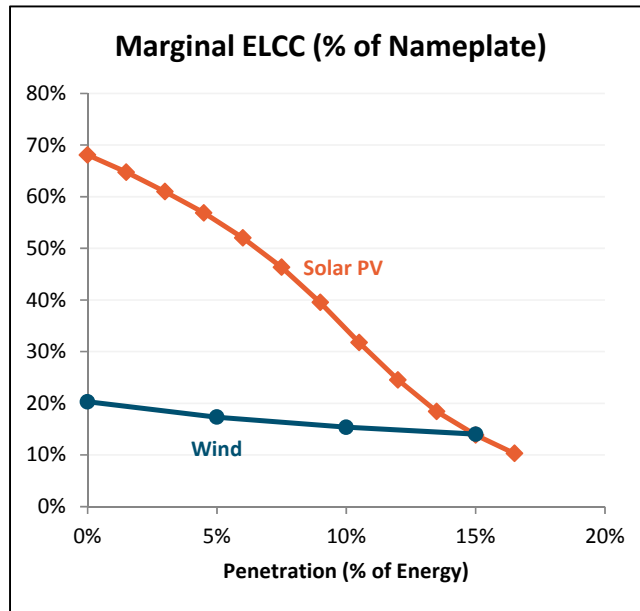
The failure of the IOUs to account for the declining capacity value of solar PV at high penetrations is partly due to the CPUC’s failure to implement the Effective Load Carrying Capability (“ELCC”) methodology for determining the capacity value of wind and solar. ELCC is a specific methodology for determining how wind and solar contribute towards resource adequacy (“RA”) requirements. ELCC explicitly accounts for the fact that as more of a particular technology is added to a system, the hours of highest system stress tend to shift away from the hours when that technology generates (*e.g.*, as the system becomes saturated with solar PV, the hours of highest system stress tend to shift to the late afternoon and early evening hours when solar PV is less readily available). Because the capacity value of an intermittent resource depends on the coincidence of its output with the hours of highest system stress, as this coincidence declines, so too does the capacity value of the intermittent resource.

The CPUC also has significantly revamped the RPS Calculator. The RPS Calculator is a tool used to develop portfolios of renewables for long-term planning in both the LTPP proceeding and the CAISO’s Transmission Planning Process. The RPS Calculator selects portfolios using its own simplified valuation methodology. While the methodology is not used directly in procurement, it informs the CPUC’s oversight of the IOUs’ procurement. The following figure from the CPUC’s RPS workshop<sup>6</sup> shows results from the RPS Calculator on the ELCC/capacity value of solar PV as its penetration increases.

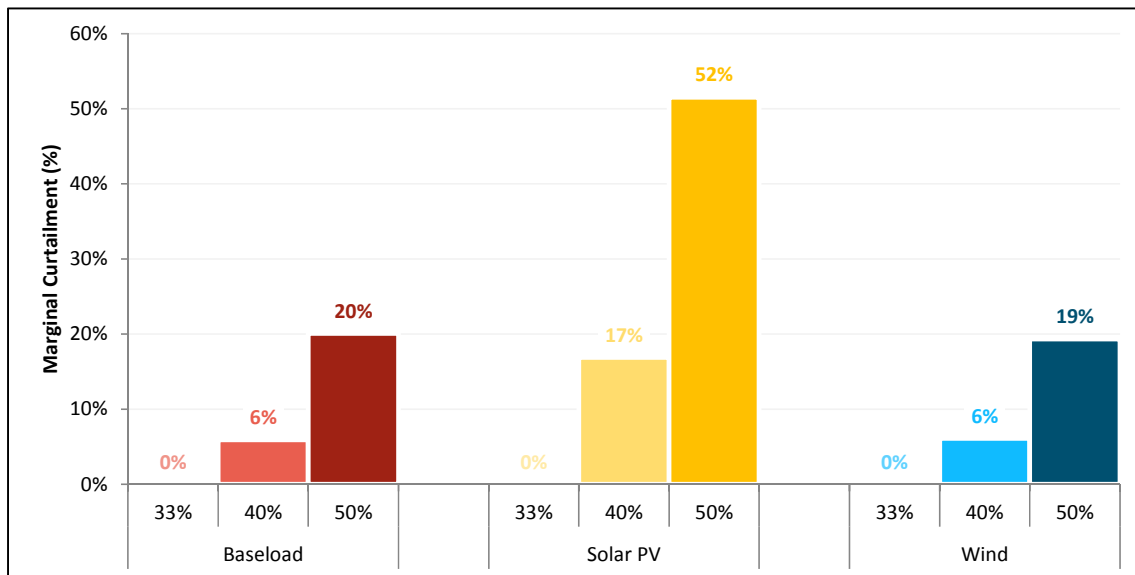
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<sup>5</sup> See *Administrative Law Judge’s Ruling Directing Southern California Edison Company to Perform Production Cost Simulations for the Interim Variable Integration Cost Adder*, available at: <http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M148/K824/148824405.PDF>.

<sup>6</sup> See Slide 11 of [http://www.cpuc.ca.gov/NR/rdonlyres/FF3EC176-3674-4DE8-ADB5-575322AA34AA/0/RPSCalcWkshp\\_0203ResourceValuation.pptx](http://www.cpuc.ca.gov/NR/rdonlyres/FF3EC176-3674-4DE8-ADB5-575322AA34AA/0/RPSCalcWkshp_0203ResourceValuation.pptx).



In addition to the value of the energy actually delivered from a renewable resource, which tends to decline as the penetration of the resource's technology increases, the RPS Calculator separately estimates how much of a renewable resource's output might be curtailed. The following figure from the CPUC's RPS workshop shows estimates of such curtailment.<sup>7</sup>



<sup>7</sup> See Slide 34 of [http://www.cpuc.ca.gov/NR/ronlyres/FF3EC176-3674-4DE8-ADB5-575322AA34AA/0/RPSCalcWkshp\\_0203ResourceValuation.pptx](http://www.cpuc.ca.gov/NR/ronlyres/FF3EC176-3674-4DE8-ADB5-575322AA34AA/0/RPSCalcWkshp_0203ResourceValuation.pptx)



3. **Potential Solutions to the Operational Challenges Associated with Higher Penetrations of Renewables.**

There is great potential to improve the flexibility of the existing fleet of gas-fired generation and to preserve resources such as Combustion Turbines are already flexible. The primary obstacle to tapping this flexibility is the absence of clear incentives for companies like Calpine that own and operate these resources. Potential solutions are being examined but they have been slow to develop.

The CAISO and CPUC jointly created a new “flexible RA” requirement to encourage the procurement of operationally flexible resources to meet RA requirements and to ensure that the flexibility of such resources is made available to the CAISO through economic bids in CAISO markets. As initially defined, capacity that is capable of ramping over three hours qualifies as flexible RA. Similarly, monthly requirements for flexible RA are tied to the largest three hour “net load” ramps the CAISO expects to realize. This particular product definition has resulted in significant over-supply (i.e., the supply of potential flexible RA is approximately 2-3 times the need in any month).<sup>8</sup> Consequently, the flexible RA product as it is currently defined does not encourage flexibility. The CAISO is in the process of refining the flexible RA product definition (and potentially introducing new products), and has committed to issue a proposal this fall.<sup>9</sup>

Even if there were a more rigorous and durable flexible RA product, suppliers might be reluctant to undertake even modest investments to improve flexibility in the absence of some forward revenue certainty. The current RA market involves procurement to meet month- and

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<sup>8</sup> See e.g., Slide 19 of: [https://www.caiso.com/Documents/FlexRAPresentation\\_%20CPUC\\_Workshop03-20-2013FinalUpdated20PercentTracking.pdf](https://www.caiso.com/Documents/FlexRAPresentation_%20CPUC_Workshop03-20-2013FinalUpdated20PercentTracking.pdf).

<sup>9</sup> See e.g., Section 3 of the *Scoping Memo and Ruling of Assigned Commissioner and Administrative Law Judge*, available at: <http://docs.cpuc.ca.gov/PublishedDocs/Efile/G000/M143/K989/143989095.PDF>.

year-ahead compliance requirements. While some multi-year forward procurement to meet these shorter term compliance requirements occurs, there is no clear obligation for load-serving entities to procure capacity on a multi-year forward basis. Such multi-year forward procurement obligations might encourage the sorts of procurement that could fund flexibility upgrades. The CPUC had been considering such multi-year forward procurement obligations in the Joint Reliability Plan proceeding (R.14-02-001), but suspended their consideration until the flexible RA product definition is refined later this year in the RA proceeding.

Finally, the CPUC's LTPP proceeding might provide another avenue to spur the procurement/contracting that might encourage additional flexibility. One aspect of the LTPP involves the analysis of long-term system level capacity requirements. Historically, this analysis has focused on the need for generic capacity, but the last three cycles of LTPP have focused on renewable integration issues. In an LTPP proceeding, when a long-term system level capacity requirement is identified, it typically leads to long-term contracting by the IOUs to meet the requirement. Unfortunately, the renewable integration modeling that has been the focus of recent LTPP proceedings has been technically complex and resulted in inconclusive requirements. Consequently, a LTPP ruling last year deferred any procurement authorization based on modeling results to the next 2016 LTPP and reserved this year for simply resolving modeling methodology issues. To the extent the LTPP modeling eventually identifies additional long-term

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needs for operationally flexible resources and the IOUs hold solicitations to meet those needs, upgrades to existing gas-fired generation might participate in those solicitations and underwrite their costs through long-term contracts resulting from the solicitations.

Respectfully submitted,

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