

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

Order Instituting Rulemaking to Develop  
An Electricity Integrated Resource Planning  
Framework and to Coordinate and Refine  
Long-Term Procurement Planning  
Requirements.

Rulemaking 16-02-007  
(Filed February 11, 2016)

**COMMENTS OF THE CALIFORNIA INDEPENDENT SYSTEM OPERATOR  
CORPORATION**

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**I. Introduction**

Pursuant to the Joint Administrative Law Judges' Ruling Seeking Input on Report and Next Steps for Development of Renewables Integration Cost Adder (Ruling), the California Independent System Operator Corporation (CAISO) provides comments in response to specific questions posed in the Ruling. The Ruling requests input on the April 4, 2016 Renewables Integration Cost Adder (RICA) Report filed by Southern California Edison Company (SCE) in Rulemaking 16-02-007.

**II. Discussion**

In general, the CAISO agrees with SCE's concerns regarding the reliability of the RICA study results and the difficulty in isolating the variable cost component of integrating renewable resources. The CAISO provides additional detail in response the questions posed in the Ruling.

***Q1. Do you agree with the primary conclusion of SCE's report that the results of this study (calculations of variable integration costs), as calculated using the tools and methodology described in the report, are unreliable? Explain why or why not.***

Yes, because the study methodology is not designed correctly and some critical study inputs are incorrect. The CAISO details its concerns regarding both methodology and inputs below.

**Q2. Do you agree with SCE's conclusion of four major lessons learned from this study:**

**a. The database should be designed for the purpose of the study;**

No, the database does not necessarily need to be designed specifically for the RICA study. The model used in the long-term procurement plan (LTPP) model should be sufficient with minor refinements.

**b. The methodology should be designed with the confines of the model in mind;**

The CAISO disagrees with this statement. Instead, the methodology needs to be defined to correctly reflect the purpose of the study first. The database should serve the purpose of the study.

**c. Uncertainty in the modeling approach should be considered; and**

If the methodology is defined correctly, uncertainty should not affect the results (see discussion below).

**d. A better understanding of reserve requirements and their relationship with increasing renewable penetration is needed.**

The CAISO agrees with this statement. For the purpose of this study and the development of the integration cost adder, it is important that reserve requirements reflect the impact of increasing renewable generation. As noted in the CAISO's June 26, 2015 comments, regulation and load-following requirements calculated for the RICA study do not correctly reflect the impact of increasing renewable penetration.

**Q3. Do you agree with the report's description of how uncertainty in the total production simulation costs and the calculated "difference of differences" masks the variable integration cost being measured? Explain why or why not. Are there other sources of uncertainty that should be considered, and if yes, how?**

The "difference of differences" methodology used in the RICA study is not correctly defined to determine integration costs. It is inappropriate to focus only on the variable cost the renewable causes, but ignore the value that renewable resources bring to the system (and ultimately to customers). Both components should be considered in the simulation. Considering both the cost and benefits of incremental renewable resources,

system production costs will decrease, as has been shown in other studies.<sup>1</sup> Without including other cost components, such as fixed cost, etc., the renewable integration cost adder will be negative.

The CAISO agrees with SCE's recommendation that "the Commission consider a more comprehensive approach that includes fixed and other cost components along with variable costs that factor into integrating incremental renewable resources into the system. The variable cost component is only one piece of the entire cost of integrating renewables. In general, the value and cost components associated with integrating renewables are intertwined and difficult to separate (e.g. energy value, curtailment costs from over-supply and/or inflexibility, penalty costs, and integration costs). Based on a literature review of past RICA studies, calculating the components through a siloed approach has proven difficult with no consistency in methodologies."<sup>2</sup>

The CAISO also notes that the RICA study methodology adds 1000 MW of renewable resources to determine integration costs. The CAISO believes that studying marginal incremental additions in this manner will not accurately reflect the integration costs that will occur in moving from a 33% renewable portfolio standard (RPS) to the 50% RPS. The model should focus on the total integration costs incurred in moving to a new 50% RPS. For example, if a 50% RPS portfolio has 5000 MW of new solar capacity and 3000 MW of new wind capacity compared to the 33% RPS base portfolio, the solar integration cost adder should be calculated using 5000 MW incremental while maintaining the 3000 MW of new wind capacity as a part of the basis. Similarly, the wind integration cost adder should be calculated based on 3000 MW incremental in the new portfolio while using the 5000 MW of new solar as a part of the basis.

***Q4. The RICA methodology modeled a "counterfactual" electric system by removing operating constraints for all flexible generation as well as flexible reserve commitment requirements attributed to wind and solar generation. The methodology then used a***

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<sup>1</sup> A CAISO Bulk Energy Storage Case Study –for the CPUC/CEC Joint Workshop on Bulk Energy Storage, November 20, 2015 at [http://docketpublic.energy.ca.gov/PublicDocuments/15-MISC-05/TN206656\\_20151117T120924\\_Bulk\\_Storage\\_Workshop\\_ISO\\_Presentation.pdf](http://docketpublic.energy.ca.gov/PublicDocuments/15-MISC-05/TN206656_20151117T120924_Bulk_Storage_Workshop_ISO_Presentation.pdf) and the CAISO 2015-2016 Transmission Plan at <http://www.caiso.com/Documents/Board-Approved2015-2016TransmissionPlan.pdf>, Section 3.5

<sup>2</sup> SCE's April 4, 2016 Renewable Integration Cost Adder Report, p. 4-5.

***“difference of differences” calculation of variable (production) cost differences between normally (flexibility-) constrained vs. counterfactual cases both with and without an added increment of wind or solar generation. Is this a viable approach for calculating variable integration costs? Why or why not?***

The two “counterfactual cases,” in which “[a]ll constraints that limit the operational flexibility of dispatchable generators are ignored,” are artificial and have little value in establishing true integration costs. Compare the RICA study methodology to the Commission’s effective load carrying capacity (ELCC) methodology. The ELCC simply compares two cases, with and without incremental renewables. The RICA study methodology should follow a similar construct in order to effectively measure the incremental impact of new renewable resources.

***Q5. Can production cost models (not necessarily only PLEXOS) in general be used to calculate variable integration costs, or are such tools fundamentally limited, for example because variable integration costs are difficult to isolate (they are intertwined with energy value, curtailment costs, penalty costs) and/or because they lack the required precision and accuracy? Why or why not?***

Yes, production cost model can be used to calculate renewable integration cost adder if the methodology is defined correctly.

***Q6. What should the Commission conclude about the calculation of variable integration cost adders for wind and solar, based on the results described within SCE’s April 4, 2016 report?***

The commission should conclude that the calculation is incomplete and the results are inappropriate to use. The Commission should continue to refine the calculation for the 2016 integrated resource plan (IRP)/LTPP cycle.

***Q7. Should the Commission continue development of methods to isolate variable integration costs? If yes, how?***

***a. Should alternative methods be developed, such as a simpler single cost differential? If yes, how? Consider that such simpler methods would need to discern energy value (production savings from using lower cost wind and solar energy to displace higher cost energy) from variable integration costs***

*(production costs from operating the system to balance the variability and uncertainty of wind and solar energy*

- b. How should any method of calculating variable integration costs based on multiple cases treat differences in constraint violations and curtailments between the cases?***

If the Commission decides to continue the calculation in the 2016 LTPP/IRP cycle, alternative methodologies must be developed. However, methodologies should not try to isolate variable integration costs. Instead, the methodologies should include energy value, fixed costs, and other relevant components in the calculation, as discussed in CAISO comments on Questions 3 & 4 above.

- Q8. Should the Commission discontinue efforts to isolate variable integration costs and instead holistically calculate renewables integration costs without separating the components (variable integration costs, curtailment, and fixed costs)? Why or why not? If the Commission seeks to calculate renewables integration costs holistically, how should such a holistic calculation be undertaken? Specify any models or methods that would be required.***

Yes. See comments on Questions 3 & 4 above.

- Q9. What future activities would you recommend the Commission undertake to further refine calculation of renewables integration costs according to the legislative requirements, considering that the result should also have a productive impact on both renewables and broader resource planning and procurement? How high a priority should it be for the Commission to undertake such activities, if any? Explain.***

No comment.

- Q10. Should the adopted interim values for the variable component of the renewables integration cost adder be retained for use in the RPS Calculator and least-cost best-fit evaluation in RPS procurement? If not, what should replace them?***

Yes, the interim values should be used until the RICA calculation is completed.

- Q11. Should renewables integration cost adders be developed for geothermal and biomass resources to reflect costs to the system for the relative inflexibility of these resources? If***

*yes, how should these adders be calculated? How should such a methodology recognize that any resources that are not infinitely flexible will likely have some “integration” costs?*

Yes, renewable integration cost adders for geothermal and biomass resources should be developed. The assumptions of flexibility of the resources should be consistent with that in the Commission’s LTPP/IRP Assumptions and Scenarios.

***Q12. Should the Commission modify its previous work to develop a renewable integration cost adder specifically targeted to inform RPS planning and procurement, and instead, inform RPS planning and procurement via a comprehensive integrated resources planning process (for example, an analysis that optimizes for reliability, low carbon emissions, and least cost across all resource types)? Why or why not?***

***a. How would such an analysis be conducted?***

The RICA should be an input or assumption into the IRP process. The Commission should develop the renewable integration cost adders to inform RPS planning and procurement.

***b. How would any resulting optimized portfolio(s) inform procurement of individual resources?***

The RICA should be used to determine relative integration costs for future RPS portfolios. The cost adder should be calculated for each future RPS portfolio separately. Each individual resource is a part of a specific portfolio and should use the integration cost adder of the portfolio.

***c. If the idea of a separate renewables integration cost adder with California-specific fixed and variable components, is no longer pursued, how would the Commission fulfill its legislative requirement to calculate renewables integration costs?***

See comments above.

***Q13. How should parties most effectively participate in any future development of integration cost analysis pursued by the Commission (e.g. small working groups, a series of workshops, collaborative effort by parties with modeling capabilities, etc.)?***

The methodology could be developed by working groups and discussed with all relevant parties in workshops.

### **III. Conclusion**

The CAISO appreciates the opportunity to submit these comments and looks forward to working with the Commission to develop a reliable and accurate renewable integration cost adder.

Respectfully submitted,

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