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Re: Sierra Club Comments on Greenhouse Gas Workshop

Sierra Club hereby submits these comments on the California Independent System Operator's ("CAISO") October 13, 2016 workshop on greenhouse gas emissions and accounting in the energy imbalance market ("EIM") and proposed day-ahead regional market.

Sierra Club appreciates the work performed by CAISO staff to address the difficult problem of greenhouse gas ("GHG") emissions due to secondary dispatch in the EIM. During the workshop on October 13, CAISO presented a clear and informative discussion about the challenges and potential options available to address the problem of unaccounted for GHG emissions that are caused by California's electricity consumption in the EIM. This problem will increase substantially if a regional day-ahead market is formed. It is therefore critical to adequately address the problem before moving ahead with a full regional market.

The problem of GHG leakage in the EIM market is the result of different carbon regulatory regimes inside and outside of California. The EIM's original solution to this problem involved the addition of a "GHG hurdle" for all fossil fuel power generation that CAISO deemed delivered into California. The intent of the hurdle rate was to impose and assign an AB32 required compliance cost and responsibility to GHG emitting generation dispatched to serve California load. However, in solving for the least-cost dispatch in the EIM, the CAISO's algorithm has been observed to redirect clean resources from load outside the state to California load, and then backfilling those resources with fossil resources. The result is an overall increase in GHG emissions in the region due to California's consumption during periods of electricity import.[1] This unintended increase in GHG emissions is known as "leakage." Leakage is a reduction in emissions of GHGs within the state that is offset by an increase in emissions of GHGs outside the state. California law requires the California Air Resources Board ("CARB") to implement measures to reduce leakage.

I. CAISO'S PROPOSED MEASURES TO MINIMIZE LEAKAGE ARE NOT FEASIBLE

Unfortunately, there is no adequate solution to mitigate leakage in the EIM that CAISO has identified at this time. As discussed in more detail below, each of the three options identified

[1] During periods of export, California's clean generation has been observed to displace out-of-state fossil generation. The GHG leakage problems discussed in these comments therefore apply only during periods of import to California.

by CAISO is fatally flawed. Sierra Club cannot endorse any of the options proposed by CARB to address the EIM. This problem becomes even more concerning as stakeholders consider the proposed establishment of a day-ahead market. The experience with the EIM and the leakage already occurring in that market indicates that a day-ahead market will also experience leakage, but to a far greater degree given the greater impact of scheduling the day-ahead market. The inability to solve the GHG leakage problem appears to be an unavoidable consequence of establishing an open market with different carbon price regulations. Sierra Club therefore continues to oppose the establishment of a multi-state a day-ahead market as currently proposed with PacifiCorp because of the severe threat that PacifiCorp's coal fleet will substantially benefit from California consumption and increase GHG emissions across the region.

Option 1 discussed during the workshop would allow CAISO to effectively dismiss or ignore the out-of-state increase in GHGs by crediting out-of-state emissions decreases caused by the export of clean generation from California during periods of export. CARB correctly concluded that the proposal in Option 1 to allow intertemporal netting of secondary dispatch emissions with credits from instate renewable generation is not compatible with California law.

Option 2 would more directly determine which resources are supplying California in response to EIM dispatch signals by performing two dispatch calculations for each five-minute period: one with and one without EIM imports to California. While this approach would be the best-fit to account for out-of-state GHG emissions attributable to California consumption, CAISO concluded that running two complete dispatch models is technically infeasible for the 5-minute EIM dispatch given the already tightly packed analysis and validation necessary to ensure system reliability and the accuracy of price signals in the 5-minute period.

Sierra Club notes that Option 2, while infeasible for the 5-minute market, should be considered in a potential day-ahead market. Numerous other participants on the October 13 call noted that this second approach, which is the most direct and accurate way to account for the impact of the regional dispatch, may be feasible for the day-ahead market. While CAISO's concerns about the importance of consistency between the two markets is noted, Sierra Club agrees with the notion that there may be a reasonable, "simplified" way of ensuring this consistency while still getting the benefit of accurate accounting for GHGs associated with electricity imports to California. However, this approach should be fully developed and modeled to ensure that it will function as intended before the California Legislature authorizes CAISO to expand into a regional market.

Option 3 appears to be CAISO's preferred approach. This approach would involve the imposition of a hurdle rate on imports to California from "residual" dispatch. This hurdle rate would presumably be designed to represent the average cost of emissions from "unspecified" resources outside the system; however, CAISO noted that the process for determining the residual rate remains unknown. The revenue would be allocated to the California load serving entities or another entity that would incur a compliance obligations. That entity would then use the residual rate revenue to purchase and retire allowances using the same "unspecified" emission rate.

This third option has the advantage of being reasonably simple to implement algorithmically, and it would likely diminish the opportunity for high-emissions resources

outside of California to take advantage of the higher-priced electricity market in California. This approach would reduce the advantage that out-of-state fossil generators have over in-state fossil generators, which are subject to California's emissions laws and therefore reflect GHG costs in their energy bids. However, this approach has a number of serious flaws that make it an unacceptable option.

1. Use of an "unspecified" emission rate for all imports into California fails to send an appropriate price signal that would discourage high emitting resources. Because all resources importing into California would face the same hurdle rate, there would be no change in the secondary dispatch of fossil resources that is currently occurring outside of California. The failure to provide a price signal to out-of-state dispatch means that the increase in out-of-state emissions would not be reduced. Instead, Californians would simply pay more overall for power in order to generate enough revenue to retire the necessary compliance allowances.

2. Setting the residual rate is problematic. If the hurdle rate were set to reflect an emission rate typical of the gas units that are often on the margin, then higher emitting units such as coal would still gain inflated revenues at California ratepayers' expense without paying for their full emissions. If the hurdle rate reflected coal-unit emissions, it would unreasonably disadvantage lower-emitting resources outside California by effectively charging them for a higher emission rate. This approach also has the potential to discriminate between identical resources, selling into the same market, from inside and outside of California in a way that would hinder market efficiency and perhaps violate the commerce clause of the constitution.

3. Unscheduled low- or zero-carbon imports would be harmed. Hydropower resources that can respond to EIM market opportunities would be unreasonably penalized with a hurdle rate that is meant to account for carbon emissions.

4. California ratepayers would be harmed. Imposing a hurdle rate for imports would increase California LMPs, on average, whether or not imports represented high-carbon resources. This price increase would come without a corresponding climate benefit because, as discussed above, the hurdle rate would not change the incentive of higher emitting resources to dispatch outside of California.

5. The hurdle rate approach may diminish the signal for investment in low-carbon resources outside the state. Depending on the details of implementation, intermittent resources that cannot be scheduled may not be able to avoid the hurdle rate for imports and would harm the economics of renewable energy investment designed for export to California.

II. CAISO SHOULD CONTINUE TO ENGAGE STAKEHOLDERS BEFORE PRESENTING A FINAL PROPOSAL

The dispatch examples presented by CAISO were too lacking in detail to fully address these and many other concerns about CAISO's "Option 3" residual rate approach. To investigate the dynamics and impacts of such an approach, it would be necessary to review examples that tabulate the cost and revenue impacts on various market participants (i.e., generators and LSEs, as well as demonstrating revenue neutrality for the market operator) and to simulate the impact on various types of resources: those that can be scheduled vs. those that cannot; zero-, low-, and

high emitting resources inside and outside the state; and resources outside the state that do or do not elect to participate in the California market.

CAISO should also ensure that its examples are optimized and that the output levels, line flows, and prices are correctly calculated. CAISO provided revised examples after the workshop, but revised examples still have ambiguous and apparently anomalous calculations in certain areas, including cases where the LMP would be calculated differently for an incremental versus a decremental MW. It is impossible to fully evaluate and understand these examples while they contain errors and so little detail. Once these errors are rectified and the examples include more detailed information, the corrected examples are likely to illustrate the shortcomings listed above.

III. CONCLUSION

Overall, Sierra Club understands that it is difficult to reconcile fundamentally incompatible policy environments into a consistent, integrated and optimized dispatch algorithm that preserves intended investment signals, yielding least-cost benefits to ratepayers while upholding California's and other states' environmental laws and policies. At the same time, it is not reasonable or acceptable to circumvent California's environmental policies in the name of short-term efficiency or analytical simplicity. Prior to pursuing a multi-state regional day-ahead market, a solution must be found that reflects Californians' desire to support low-carbon resources with their electricity dollars while yielding the regional benefits of greater cooperation with our neighbors. At this time, however, there is no acceptable solution. CAISO must therefore continue to work on this issue with CARB and other stakeholders.

Sierra Club looks forward to continuing to work with the CAISO and other stakeholders to find the best solutions for maximizing market efficiency and ratepayer benefits while respecting California's environmental laws. Sierra Club reiterates its position and concern that the proposed day-ahead regional market must not move forward unless and until the issue of leakage can be resolved.

Sincerely,

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