September 19, 2016

Clerk of the Board
California Air Resources Board
1001 I. Street
Sacramento, California 95812
Via Electronic Submission

California ISO
P.O. Box 639014
Folsom, CA 95630
InitiativeComments@caiso.com

Re: Sierra Club Comments on Greenhouse Gas Accounting in an Integrated Market

Sierra Club hereby submits these comments to the California Air Resources Board ("CARB") in response to the staff report on the "Proposed Amendments to the Regulation for Mandatory Reporting of Greenhouse Gas Emissions," issued July 19, 2016.[1] Sierra Club also submits these comments to the California Independent System Operator ("CAISO") as part of the stakeholder process to consider greenhouse gas ("GHG") compliance issues in an integrated regional energy market.[2]

These comments address CARB's proposed amendments to the GHG reporting requirements in the energy imbalance market ("EIM"). As staff noted, the current tracking and reporting of GHG emissions in the EIM does not ensure a full accounting of GHG emissions associated with electricity generated to serve California load. Resolving this issue with respect to the EIM is critical to ensuring the integrity of California's carbon trading system. Potential solutions also have implications for the proposed day-ahead energy market, and therefore Sierra Club is also providing these comments to CAISO to address the issue of how to ensure that compliance with California's laws and regulations is maintained in a proposed regional day-ahead energy market.

Sierra Club recognizes the potential environmental value of better coordination through a regional system operator ("RSO") in the West. As Sierra Club has stated in past comments, a properly constructed regional energy market may reduce curtailment of California's renewable resources, accelerate the development of additional renewable generation, decrease regional GHG emissions, and allow a more efficient commitment of energy resources in California and throughout

[1] https://www.arb.ca.gov/regact/2016/ghg2016/ghg2016.htm
[2] https://www.caiso.com/informed/Pages/StakeholderProcesses/RegionalIntegrationCaliforniaGreenhouseGasCompliance.aspx

the region. Some of these benefits appear to be occurring right now within the EIM. According to a counter-factual analysis provided by CAISO, the net GHG impact of the EIM is a reduction in regional GHG emissions.[3]

While the observed decline in net GHG emissions in the West is a positive development, it is important to understand that those beneficial reductions are the result of clean California exports displacing dirtier out-of-state generation, both from coal and natural gas. However, imports into California are having the reverse effect: the EIM is creating a net increase in GHG emissions due to an increase in coal and natural gas generation during periods of import. Understanding this dynamic during the periods when California is importing power from the EIM is critically important to maintaining the integrity of California's GHG regulations and to ensuring that any potential day-ahead energy market properly accounts for and regulates GHG emissions that are caused by California electricity consumption. It is also crucial for ensuring that the price signals in the EIM market accurately reflect the emissions characteristics of the resources actually serving that market, so that price signals associated with California's clean air rules actually support cleaner sources of generation as intended.

I. LEAKAGE IS OCCURRING THROUGH THE EIM

CAISO's analysis of GHG emissions in the EIM suggests that there is a net climate benefit from the market due to California exports displacing out of state fossil generation. However, from a policy standpoint, the EIM's impact on GHG emissions must be considered in two parts: (1) during periods of export from California, and (2) during periods of import into California. Under the first condition, during periods of export, CARB appears to be properly accounting for the energy generated within the system because those resources are either non-emitting, such as California solar, or their GHG emissions have already been identified and incorporated into their cost of production as in-state generation with a compliance obligation.

In contrast, during periods of import, there is a distortion in the market occurring due to the failure of the EIM's GHG bid adder regulation. The GHG adder in the EIM was conceived to provide a mechanism that would allow California to identify out-of-state sources of GHG emissions that are attributable to California consumption, and to require those sources to obtain carbon allowances. However, determining when an out-of-state resource provides energy to California in the multi-state market is complicated; when CAISO directs a resource to provide or withhold imbalance energy, there is no clear path between the resource providing the energy and the load served. The GHG adder mechanism attempted to address this problem by allowing "bid adders" for out-of-state resources that *might* be subject to GHG charges if their energy is sold into the California market. If the energy is "deemed" to be sold into California, the energy is dispatched at a higher price that covers the bid adders and the sellers' GHG compliance obligation. If it is "deemed" to be for out-of-state use, it is dispatched without consideration of the bid adder.

This process of "deeming" energy flows is severely flawed because it is divorced from the actual energy production and emissions to the atmosphere that are due to redispatch through

[3] http://www.caiso.com/Documents/EIMGreenhouseGasCounter-FactualComparison-PreliminaryResults_Jan-Jun_2016_.pdf

the EIM. CAISO and CARB conducted a workshop on June 24, 2016 to address significant shortcoming in the GHG adder mechanism. CARB raised the concern that, "EIM optimization results may not in all cases report full GHG burden experienced by the atmosphere as a consequence of electricity consumed in CA."[4] CAISO further explained how the mechanism may be failing: "Least cost dispatch can have effect [sic] of sending low emitting resources to CAISO, while not accounting for secondary dispatch of other resource [sic] to serve external demand."[5] In fact, while the ISO's counter-factual analysis shows that the vast majority of redispatch to meet EIM imports in the period January-June 2016 came from gas-fired generation, the EIM MWh imported into California during the same period were about 65% "deemed" to come from non-emitting resources.[6]

This type of resource shuffling[7] could similarly undermine the effect of state environmental policies in a regional market. For example, coal plants may dispatch more frequently within the region as a result of the opportunity to serve California load, but may avoid compliance with California's GHG rules by replacing low emitting resources that are nominally redirected to serve California load. California would be "served" by the low-emitting resources, but the increased emissions to the atmosphere would reflect a physical increase in fossil unit dispatch.

The failure of the GHG adder mechanism in the EIM is concerning. Even though the overall effect of imports and exports in the EIM appears at this time to be a net reduction in GHGs, California's GHG regulations do not, and should not, consider such system-wide netting effects in its carbon allowance market. To the contrary, AB 32 expressly directs CARB to minimize "leakage," which is precisely what is occurring in the EIM during periods of import.[8] This leakage means that California ratepayers are inadvertently and perversely supporting higher-emitting resources through the state's clean-air rules. The problem of leakage is likely to grow as the EIM expands, and it could become a much larger problem in a full day-ahead regional market. There are unintended consequences of this regulatory failure:

- Out-of-state fossil resources are receiving a windfall due to higher energy prices. The CAISO's accounting system credits imports of lower marginal cost clean energy into California when these resources would have otherwise dispatched to serve out-of-state load but for the EIM. As a result, overall energy prices and output are increased for fossil resources outside of California, giving these resources a competitive advantage.

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[4] CARB, "Mandatory GHG Reporting and Cap-and-Trade Program Workshop," June 24, 2016, p.9.http://www.arb.ca.gov/cc/capandtrade/meetings/062416/arb_and_caiso_staff_presentations_updated.pdf

[5] *Id*. at p.11

[6] See "MonthlyEIM_Transfer_ISO_Imbalances_MWh.xlsx.", available at http://www.caiso.com/informed/Pages/EIMOverview/Default.aspx.

[7] The resource shuffling appears at this point to be an inadvertent result of EIM rules, rather than a purposeful manipulation of the market by generators.

[8] Health and Safety Code § 38562(b)(8).

- The price of carbon allowances is artificially suppressed by fictitious imports of non-emitting energy resources into the market. As a result of cheaper carbon allowances, in-state sources from all sectors – not just energy – that have their own compliance obligation may increase emissions because such emissions will have a lower compliance cost.

- The price signal to support investment in new out-of-state zero-emissions resources is severely muted because the additional demand for these resources in California is being met through reshuffling of existing resources, with no emissions benefit, rather than through the development of new clean resources.

If and when the CAISO expands to include out-of-state entities in its simultaneous optimal dispatch process, these problems associated with the enforcement of California's GHG laws will be magnified. An expanded RSO would require accounting for emissions from a much larger quantity of energy—many times larger than EIM transactions— that are sold into California but dispatched as undifferentiated energy into the regional pool. At the same time, in a multi-state RSO, California's ability to regulate such emissions from power plants outside the state will be constrained by federal law.[9] These issues should therefore be resolved with specific plans for how GHG accounting will be implemented in both the current EIM and any expanded RSO configuration before such expansion occurs.

II. POTENTIAL SOLUTIONS TO GHG LEAKAGE IN A REGIONAL MARKET

There are various proposed responses to address the leakage occurring in the EIM market. Of the proposed solutions, Sierra Club recommends that CARB focus on the following core principles when determining optimal amendments to its GHG regulations:

- The GHG regulations must create a clear short-term price signal that allows consumers and/or the market to select clean generating resources over fossil generating resources.

- The GHG regulations must create a clear and predictable long-term price signal that will support investment in clean energy resources throughout the region, with the confidence that the California's willingness to pay for these resources will not be subverted by accounting gimmicks.

- CARB and CAISO must work together on an accounting system that maintains the integrity and effectiveness of California's existing GHG regulations.

- The solution(s) should be workable in both the EIM and the potential day-ahead regional market.

[9] *See* Carlson, Anne and William Boyd, "Evaluation of Jurisdictional and Constitutional Issues Arising from CAISO Expansion to include PacifiCorp Assets," Aug. 1, 2016, available at: http://www.caiso.com/Documents/LegalEvaluationOfISOExpansion.pdf

- The solution should be scalable so that it can accommodate the expansion to more balancing authorities and more states in the region for both the EIM and the potential day-ahead market.

With these core principles in mind, Sierra Club addresses various alternatives.

A. Uniform Carbon Adder in the Dispatch

The distortions in the EIM that are resulting in unaccounted for secondary dispatch of high-GHG resources are the result of having a single market with varying GHG price signals in that market. While all resources within the market receive the same energy clearing price, along with a locational component that reflects physical constraints on the system, a two-tiered, non-physical system of carbon price and no-carbon price will inevitably create distortions such as those evidenced in the EIM. As the market continues to grow, it is likely, if not inevitable, that additional tiers will be necessary as different states pursue different carbon pricing policies. The simplest method to avoid these distortions is to remove multi-tier carbon pricing within the market.

A uniform carbon adder, implemented by the regional operator, has been suggested in other regional markets as a method of meeting state carbon policies in a just and reasonable manner.[10] The broad concept would be to incorporate each specific generating source's carbon emissions profile into the dispatch algorithm for the market. For example, each generating resource in the market would be assigned a ton per megawatt hour ("ton/MWh") profile based on unit-specific emission rates. The clearing price in the market would be the combination of the locational energy price plus the carbon price. This would allow the dispatch algorithm to optimize the entire system based on both energy and carbon prices, which sends a consistent price signal to generators regardless of where they originate from or where they dispatch to. Generators would be paid the clearing price times their electrical output, less the dollar-per-ton carbon price times their actual emissions.

CAISO (or the RSO in a multi-state regional market) would collect the difference between the clearing price and the amount paid to carbon-emitting resources, which would create a pool of money based on a uniform carbon price for all power dispatched anywhere in the system. CAISO could then distribute the money collected from the uniform carbon price in a manner that respected each state's climate policies. In other words, CAISO could remit the collected carbon proceeds back to the purchasers in each state based on the tons/MWh attributable to the power delivered to each state. Each state could then apply their own carbon regulations to the utilities or other purchasers in their own jurisdiction in accordance with state policies.

California could implement its carbon policy by assigning a compliance obligation to its own utilities based on their consumption of carbon emitting resources in the market. Those utilities would be responsible for a compliance obligation, but they would remain whole because

[10] *See, e.g.*, NEPOOL, *Integrating Markets and Public Policy (IMAPP) Solution Ideas Day*, August 11, 2016. Available at: http://nepool.com/uploads/IMAPP_20160811_Final_Notice.pdf

they would have already been compensated by the CAISO for the cost of carbon delivered to them. In contrast, states without carbon policies could simply direct their utilities to refund the carbon proceeds to ratepayers in order to offset the increase in the market clearing price for energy. As long as generators are prevented from manipulating their energy bids to offset their carbon prices, the appropriate price signal would be sent to all dispatch in the system. This method of applying a uniform carbon price would be relatively simple to administer, and it would eliminate leakage in the system.

B. Assigning GHG Costs Only to California Purchasers

CARB's proposed amendments contemplate a solution that would assign the costs of GHG emissions due to secondary dispatch to purchases inside California. This method would first identify all of the unaccounted for out-of-state GHG emissions in the EIM (i.e. secondary dispatch emissions). Purchasers in California, such as California's utilities, would then be assessed a cost based on the total unaccounted for GHG emissions in the market. This solution would address the issue of price suppression in California's carbon allowance market because it would account for and assign costs to the out-of-state emissions that currently are not being tracked. This would reduce or eliminate the effect of suppressing carbon allowance prices due to flooding the market with non-emitting resources.

Although the integrity of the price for carbon allowances would benefit, this solution raises some concerns. First, there would be no price signal in the market that would allow California purchasers to avoid exposure to a compliance obligation. The dispatch of high and low carbon resources would still be managed by CAISO, and the market distortions causing secondary dispatch of fossil resources outside of California would continue. In other words, a California utility would have no control over the number of allowances it would be required to purchase to offset its consumption in the EIM market. That compliance obligation would be assigned after-the-fact. It also means that out-of-state fossil generation would continue to receive a windfall by benefitting from higher out-of-state energy prices without any requirement to pay a compliance obligation to California.

The problem of a "California Purchaser" compliance obligation also becomes more problematic in an expanded day-ahead market. For example, the current plan to transform CAISO into a multi-state RSO would begin with PacifiCorp, which in 2015 generated over 60% of its power from coal. California purchases could be exposed to substantial compliance obligations in a market that integrated PacifiCorp if CARB determines that there is an increased dispatch of those coal resources anywhere in the region that is attributable to California consumption. Moreover, those California purchasers would have little or no ability to avoid purchasing coal-heavy power in such a market, and the out-of-state generators would not face any disincentive to selling high GHG resources into the market.

C. Apply the Unspecified Power GHG Rate to All Out-of-State Generation

This proposed solution would apply a uniform GHG adder to all out-of-state generation that is imported into California, regardless of the source of that generation. This method attempts to approximate the current treatment of unspecified power resources into California markets; it

also is a closer approximation to the actual GHG emissions of resources that are dispatched into the EIM. This method is problematic for several reasons.

First, this method would reduce the incentive to provide low or non-emitting resources to California. All out-of-state resources, including wind and solar, would face the same carbon price. This would provide the perverse incentive of disadvantaging non-emitting generation with a carbon price, while at the same time providing a relative advantage for coal generation because coal emits at a much higher rate than the unspecified power rate.

While this may be a palatable interim solution in the EIM, this solution would be unworkable in a day-ahead regional market. Applying a GHG cost to out-of-state renewable resources would reduce or eliminate one of the primary benefits touted by proponents of the regional market, which is the ability to acquire low-cost out-of-state renewable resources to meet California's RPS requirements. While those resources would still be available, adding a carbon price to zero emission wind from Wyoming or New Mexico would drive up the cost of those resources.

D. Require CAISO to Dispatch EIM Based Only on Incremental Out-of-State Production

In its September 9, 2016 comments to CARB, Powerex Corp. proposed a solution that would limit "deemed deliveries" in the EIM only to the incremental production from out-of-state resources.[11] Under this method, the CAISO algorithm would treat base schedules as being unavoidable for dispatch into the EIM. This method would reduce the extent of secondary dispatch in the market because it could only select clean resources for dispatch into California if those clean resources had not been previously scheduled to provide out-of-state power. Consequently, there would be smaller gaps to "backfill" with dirty power.

Although this method offers a potential solution to consider in the EIM, one which would require more analysis to understand how the market would respond, the limitation of the market to only consider incremental production would not be feasible in a day-ahead market. In contrast to the EIM, which is an optimized balancing market that only serves residuals from day-ahead commitments, the day-ahead market would schedule all of the available resources within the system and there would be no distinction between base schedules and incremental production. This method could therefore apply only to the EIM and would not address the problems of leakage that would occur in a larger day-ahead market.

[11] *Powerex Corp. Comments on Proposed Amendments to the MRR*, Sep. 9, 2016. Available at: https://www.arb.ca.gov/lispub/comm/bccommlog.php?listname=ghg2016

III. CONCLUSION

Sierra Club appreciates the opportunity to provide these comments to CARB and CAISO. The questions surrounding the proper accounting and regulation of GHGs in a multi-state energy market, including both the EIM and the proposed day-ahead market, are critical for the development of a system that will support California's climate goals. These discussions are, however, at an early stage still. None of the alternatives discussed above are perfect. Among the options discussed, Sierra Club favors the uniform carbon dispatch price because of its relative simplicity and the effectiveness of stopping leakage in the system. It is important therefore to solicit comments and ideas from other states, both on the proposals discussed above and on other proposals for regulating carbon in a multi-state RSO.

Sierra Club encourages all stakeholders to meaningfully engage in this topic so that solutions can be developed in time to inform the ongoing discussions about the proposed transition of CAISO into a multi-state RSO.

Sincerely,

Travis Ritchie
Staff Attorney
Sierra Club Environmental Law Program
2101 Webster Street, Suite 1300
Oakland, California 94612
(415) 977-5727
travis.ritchie@sierraclub.org