

Comments of Powerex Corp. on Real-Time Market Neutrality Issue Paper and Straw Proposal

Submitted by	Company	Date Submitted
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Powerex appreciates the opportunity to comment on the April 25, 2019 Real-Time Market Neutrality Settlement Issue Paper and Straw Proposal and related stakeholder discussion (“Issue Paper”).

Powerex believes that the potential problems with the current settlement processes go well beyond the narrow technical issue described in the Issue Paper. Powerex’s own examination of these concerns is still ongoing, but it preliminarily indicates that the settlement issues may be resulting in at least the following unintentional yet highly problematic outcomes:

1. ***GHG compensation for resource output that is “deemed delivered” to serve load in California is entirely clawed back by erroneous neutrality charges.*** The claw back of payments, at the GHG shadow price, completely negates the intended compensation to sellers outside of California for being deemed delivered to serve California load, and for accepting the CARB reporting and compliance obligation for such activity. This settlement issue also fully negates the intended GHG-related incentives for participation by non-emitting resources. Powerex notes that this issue is newly identified and independent of the “secondary dispatch” issues that have been under discussion amongst stakeholders since 2016.
2. ***California’s GHG shadow price is erroneously included in the transfer price for all EIM transfers into an EIM Entity (i.e., EIM imports), including EIM transfers entirely outside of California.*** This is in direct conflict with the intended market design and policy of applying California’s cap-and-trade program only in connection to serving load within California. This error results in EIM Entities outside of California paying the GHG shadow price on imports, including for supply generated outside of California. Powerex again notes this is a newly identified problem, independent of the prior “secondary dispatch” concerns raised in previous forums.
3. ***For 5-minute EIM transfers to and from the CAISO BAA, compensation for providing intra-hour flexibility to the CAISO BAA is clawed back by neutrality charges, resulting in incorrect settlement based on hourly average flows.*** This results in EIM Entities outside of the CAISO BAA that are providing intra-hour flexibility to the CAISO BAA not receiving compensation for this increasingly valuable service.

4. **The distribution of uplift to EIM Entities is applied in a manner that results in an incorrect shifting of uplift from EIM Entities that generally export to EIM Entities that generally import.**

The above four settlement issues clearly extend beyond the technical details of the settlement functions, and go to the fundamental issue of whether EIM Entities are being paid and charged in a manner that is consistent with the core design of the EIM and the intended limited application of California's GHG cap-and-trade program. It is also unclear how long these problematic outcomes have been occurring; some may date back to the start of the EIM in 2014. Given the potential financial magnitude of the settlement issues that have become apparent—and the potential risk for additional problems being created — it would be regrettable if the complexity of the settlements process, or a rush to implement quick fixes, were to stand in the way of the comprehensive stakeholder engagement and review that these issues appear to require.

Powerex therefore urges the CAISO to reconsider its proposal to quickly implement changes to key settlements processes, and instead engage stakeholders in a series of technical workshops to:

1. Comprehensively identify all settlement issues that appear contrary to the expected compensation or charges for products and services transacted in the EIM;
2. Identify whether the root cause lies in market design, tariff development, business practice manuals, or the particular implementation of processes;
3. Quantify the aggregate financial impact of each issue on each EIM participant/entity;
4. Identify the extent to which retroactive corrections are appropriate and the available approaches to achieve this;
5. Develop solutions that address the identified issues and result in financial settlement going forward that is consistent with the intended market design; and
6. Explore new measures to effectively monitor the performance of EIM settlements and to more promptly identify issues impacting EIM participants/entities going forward.

To be clear, Powerex is not opposed to the expedited implementation of *interim* changes that can prevent continued distortions and limit further harm to EIM participants. But Powerex believes it is premature to proceed immediately to considering long-term changes without first facilitating a comprehensive understanding of the existing problems, their root causes, and their historical impacts. While we view these issues as both complex and challenging, Powerex is optimistic that durable solutions can be developed with sufficient collaboration and commitment from CAISO and its stakeholders.

I. These Settlement Problems Raise New, Distinct Issues Regarding Charges And Compensation For Products And Services In The Western EIM

Based on its review to date, Powerex believes there may be multiple and significant problems in the financial settlement of EIM activity. Powerex appreciates CAISO raising awareness of some of these problems through the Issue Paper. However, the Issue Paper provides the

misimpression that these problems relate to a very narrow issue, limited only to the calculation of relatively obscure “neutrality” charges. This terminology belies the fact that the real problem appears to be that EIM Entities are not being paid what they understood they would be paid for EIM products and services, and/or that EIM Entities are not being charged what they understood they would be charged.

Several of the problems discussed in the Issue Paper arise because the settlements process fails to correctly recognize the value of EIM activity such as GHG emissions or intra-hour flexibility, or both. If the value of an EIM import transfer is overstated in the settlements evaluation process, for instance, then the importing EIM Entity may erroneously appear to have been charged too little, triggering the application of additional uplift charges to that entity. Conversely, a participating resource may provide intra-hour flexibility by supplying highly variable quantities of exports, but if the value of these exports is understated in the settlements evaluation process, then the EIM Entity may erroneously appear to have been overpaid, triggering charges that claw back substantial portions of that revenue. Similar problems appear to exist regarding the treatment of GHG costs, resulting in the compensation to resources that are deemed delivered to California effectively being clawed back at the EIM Entity level as a result of erroneous settlement charges. In addition, EIM Entities that receive EIM import transfers are erroneously charged for California’s GHG shadow price costs in the settlements process as the EIM Entity level, despite not being part of California’s cap-and-trade program.

Powerex believes that the consequences of the problems described in the Issue Paper must not be viewed as only a back-office settlements concern. Despite the potentially unfamiliar jargon, this is not about faulty meter readings or the mishandling of particular billing determinants. Instead, what appears to be occurring is that the financial settlement process fundamentally mis-values the products and services transacted in the EIM, the result of which is to negate key pricing and associated incentives intended in the design of the EIM.

It should be emphasized that the compensation-related problems raised in the Issue Paper are new and completely distinct from other EIM-related issues that have been addressed in recent stakeholder initiatives. For instance, in 2018 the CAISO concluded a stakeholder process and implemented enhancements related to the attribution of GHG emissions in the EIM market solution. While aspects of the present “Real-Time Market Neutrality” stakeholder process also relate broadly to the handling of GHG in the EIM, this inquiry has nothing to do with *how* the optimal dispatch of EIM resources or *how* the market solution (i.e. dispatches and prices) are determined. Rather, this stakeholder process addresses whether the financial settlements—the amounts ultimately paid or received by participants—are consistent with that market solution, however it may have been reached.

II. This Stakeholder Process Should Provide A Comprehensive Examination Of Key Compensation Issues And Careful Consideration Of Long-Term Solutions

Powerex emphasizes that the foregoing is based on its understanding of the information in the Issue Paper and presentation, and from its own research. Powerex’s understanding of these issues continues to evolve, as it expects is the case for other EIM Entities and stakeholders. For

this reason, as discussed further below, Powerex believes that much more detailed discussions and analyses are necessary in order to properly understand the scope of the potential errors in the current financial settlement of EIM activity. In particular, Powerex believes EIM participants and stakeholders must have clarity regarding the magnitude of the impact of each category of error. It is undeniable that these errors have the potential to create “winners and losers,” and the sums at issue may be very substantial, particularly given that some of these problems may well have been occurring since the start of the Western EIM in 2014.

Powerex also believes it is inappropriate to pre-judge, at this early stage, the availability of corrective measures to address past inaccuracies. To the extent significant inequities have resulted from issues in the settlement process, it seems inappropriate to categorically refuse to consider correcting these inequities.

An important part of any examination of the problems will also be to identify how the errors came into existence. At one end of the spectrum, it may be that settlements accurately implemented what was believed to be an appropriate design, but that ultimately turned out to have unintended adverse consequences. It is also possible that the tariff language did not fully reflect the intended market design; or that business practice manuals did not fully reflect the tariff language; or even that the actual systems that were put in place were not entirely consistent with the procedures outlined in the tariff and business practice manuals. Based on statements expressed at the stakeholder call, the origins of the issues may inform the extent to which retroactive corrections are permitted, or perhaps even required.

Only once CAISO and stakeholders have comprehensively examined the performance of the EIM settlements processes to date can durable improvements be explored. It will be counterproductive to implement changes quickly if those changes either fail to address the current problems or create new problems along the way. But ensuring proposed changes are carefully evaluated requires investing time, not only to examine potential solutions, but for all stakeholders to understand what can be complex processes and how they impact compensation for EIM activity.

For these reasons, Powerex urges CAISO to reconsider its timetable for stakeholder engagement. Powerex recommends that CAISO instead facilitate a series of technical workshops to provide more detailed explanation and analysis of the issues identified, including quantifying the financial impact on each EIM Entity to date. After the completion of these workshops, CAISO will be in a better position to develop a revised issue paper or straw proposal that begins to lay out potential solutions. To the extent that CAISO and stakeholders identify certain flaws early in the process that can and should be suspended by expedited interim measures, Powerex fully supports doing so, even as the development of long-term changes continues on a necessarily longer timeline.

Appendix: Detailed Review of Settlements Issues

The Issue Paper largely focuses on only one issue, which is the manner in which EIM transfers affect the allocation of charges necessary to maintain revenue neutrality. In the stakeholder call on the Issue Paper, CAISO also addressed a further problem, related to the price used to value EIM transfers, and whether or not this price should include the GHG shadow price associated with compliance with California’s cap-and-trade program.

While Powerex agrees that the issues identified by CAISO are problematic, Powerex’s ongoing review of its own settlement records leads it to believe that the extent of the flaws with the current EIM settlements process is more extensive. This appendix summarizes Powerex’s understanding and preliminary observations regarding specific issues it has identified.

A. GHG Compensation Is Negated by Settlement Errors

One of the most concerning problems is that GHG compensation appears to be clawed back and negated in the settlements process. This appears to occur because payments of the GHG shadow price to resources deemed to serve California load can erroneously lead to a lack of neutrality under the current process. On the stakeholder call, CAISO stated that this is not the case. However, the particular example discussed by CAISO represents a specific circumstance in which the quantity of GHG attribution coincidentally happens to match the quantity of aggregate EIM transfers out. There is nothing in the EIM solution algorithm to require such an outcome, and real-world examples show this is frequently not the case.

Consider a simple example in which an EIM Entity has 100 MW of incremental generation, 100 MW of GHG attribution (*i.e.*, deemed deliveries to California), and 100 MW of negative real-time load imbalance. There are no net EIM transfers into or out of the EIM Entity in this example, even though 100 MW of output was deemed delivered to California.

Powerex understands that the revenue neutrality assessment would proceed as follows:

	MW		Price, \$/MWh	\$	
Load	-100		LMP at DLAP	\$6	\$600
Gen	100		LMP at Gen Node	\$6	(\$600)
GHG	100		GHG Shadow Price	\$4	(\$400)
Transfer	0		SMEC	\$10	\$0
Net					(\$400)

In other words, the current settlement process would conclude that the aggregate compensation paid to generators—consisting of both GHG compensation and energy compensation at the local LMP—was “excessive,” and would therefore apply a charge to reduce that compensation. And since the amounts paid by load and to generators for energy are offsetting (since the LMP is the same), the revenue that is negated by the settlement charge is the revenue paid for GHG attribution.

As has been extensively discussed in other forums, the attribution of GHG emissions to resources outside of California occurs separately from the determination of net EIM transfers out or to an

EIM Entity. The attribution of GHG can also bear no relation to the quantity of incremental energy produced as a result of EIM dispatch. The example below shows a scenario in which load and generation are exactly the same as the base schedule quantity—and hence there is no EIM settlement for imbalances—but the generation resource is attributed 50 MW of GHG emissions to serve California load.¹ Powerex understands the neutrality assessment in this case would proceed as follows:

	MW	Price, \$/MWh	\$	\$
Load	0	LMP at DLAP	\$6	\$0
Gen	0	LMP at Gen Node	\$6	\$0
GHG	50	GHG Shadow Price	\$4	(\$200)
Transfer Out (In)	0	SMEC	\$10	\$0
Net				(\$200)

Powerex believes this example makes it clear that, all else equal, GHG compensation to resources deemed delivered to California has a direct one-to-one impact on the determination of revenue neutrality under the current settlement procedures, and hence this incremental compensation is fully and entirely negated. If this understanding is correct, it would imply that the market design under which the EIM sought to compensate non-California resources for accepting the reporting and compliance obligations associated with electricity imports into California has been completely undermined, potentially since the very beginning of the EIM in 2014. Powerex believes it is imperative that this issue be fully examined by CAISO and stakeholders.

B. All EIM Transfers, including EIM Transfers Occurring Entirely Outside Of California, Are Valued Including California GHG Shadow Price Costs

In the stakeholder call, CAISO presented a slide stating that GHG compensation does not cause revenue non-neutrality.² The example presented by CAISO reflects a special circumstance in which the erroneous treatment of GHG compensation is exactly (but coincidentally) offset by a second error, which is the use of the system marginal energy price (“SMEC”), which includes the GHG shadow price, to value EIM transfers.

In CAISO’s example, an EIM Entity (“BAA1”) has 30 MW of negative load imbalance, 40 MW of positive generation imbalance, and 10 MW of GHG attribution. Under these assumptions, Powerex understands that the neutrality assessment would proceed as follows, which matches CAISO’s presentation:

¹ Even with the GHG enhancements implemented in November 2018, a resource may be attributed GHG emissions up to its unloaded “headroom,” even if it is not dispatched above its base schedule. A 200 MW resource with a 120 MW base schedule, for instance, could still be attributed up to 80 MW of GHG emissions even if it is dispatched to 120 MW in the EIM.

² Presentation, at 14.

	MW	Price, \$/MWh		\$
Load	-30	LMP at DLAP	\$6	\$180
Gen	40	LMP at Gen Node	\$6	(\$240)
GHG	10	GHG Shadow Price	\$4	(\$40)
Transfer Out (In)	10	SMEC	\$10	\$100
Net				\$0

Importantly, this example includes the value of the EIM transfer based on the SMEC, which *includes the value* of the GHG shadow price. It is only because the quantity of the EIM transfer exactly matches the quantity of GHG attribution that the revenues and credits associated with the GHG shadow price net to zero.

Rather than demonstrate that GHG attribution does not erroneously lead to non-neutrality under the current approach, CAISO's example highlights that there are actually multiple different errors in the current settlement process. At times, the errors partially offset each other, but such coincidences should provide no comfort.

The current approach of valuing EIM transfers based on the SMEC leads to additional problems. For instance, consider the above example, but with no GHG attribution to the generation resource. Powerex understands the evaluation of revenue neutrality would proceed as follows:

	MW	Price, \$/MWh		\$
Load	-30	LMP at DLAP	\$6	\$180
Gen	40	LMP at Gen Node	\$6	(\$240)
GHG	0	GHG Shadow Price	\$4	\$0
Transfer Out (In)	10	SMEC	\$10	\$100
Net				\$40

In other words, in this example the EIM Entity would appear to be owed an additional \$40 in compensation. This \$40 is equal to the EIM transfer out (10 MW) multiplied by the GHG shadow price (\$4/MWh) embedded in the SMEC. The effect of this current approach is to compensate all EIM transfers from an EIM Entity for the GHG shadow price, *regardless* of whether the export served California load, and *regardless* of the GHG emissions of the resources. That is, all EIM exports are currently compensated as if they were from non-emitting resources.

While the above results in excess compensation to EIM Entities that export energy in the EIM, it also results in excess charges to EIM Entities that import energy in the EIM. Consider an EIM Entity with a 50 MW negative load imbalance, which is served by a 50 MW import from another EIM Entity. Powerex understands the evaluation of revenue neutrality would proceed as follows:

	MW	Price, \$/MWh		\$
Load	-50	LMP at DLAP	\$6	\$300
Gen	0	LMP at Gen Node	\$6	\$0
GHG	0	GHG Shadow Price	\$4	\$0
Transfer Out (In)	-50	SMEC	\$10	(\$500)
Net				(\$200)

While the EIM Entity will be charged for its 50 MW of real-time negative imbalances based on the LMP at its DLAP, which excluded the GHG shadow price, the settlements process will result in an additional charge of \$200 to the EIM Entity. The end result is that the EIM Entity will be charged the entire SMEC—including the GHG shadow price—for all of its EIM transfers in, even if the EIM Entity is outside of California and is not part of the state’s cap-and-trade program.

CAISO’s proposed solution is to apply different prices to EIM transfers depending on whether or not the transfer is with a California entity. Powerex is concerned about this approach, because the proposed solution presumes a relationship between EIM transfer quantities and the quantity of resource output deemed to serve California load, when in fact no such relationship exists in the EIM optimization. CAISO’s example of its proposed solution is reproduced below:

Financial value of EIM transfers between non-California BAAs should not include GHG cost (2 of 2)

Table 10

	BAA1	BAA2	BAA3	Total
Load	\$ 180.00	\$ 200.00	\$ 100.00	\$ 480.00
Gen	\$(300.00)	\$(100.00)	\$ (40.00)	\$(440.00)
GHG	\$ (40.00)	\$ -	\$ -	\$ (40.00)
Transfer	\$ 160.00	\$(100.00)	\$ (60.00)	\$ -
Neutrality	\$ -	\$ -	\$ -	\$ -

10 MW transfer between BAA1 and BAA2 (CA) is priced at \$10.00
10 MW transfer between BAA1 and BAA3 (Non-CA) is priced at \$6.00

No neutrality from market clearing

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In this example, the 10 MW EIM transfer out from BAA1 to the CAISO (“BAA2”) is valued at the SMEC, and the 10 MW EIM transfer out from BAA1 to another non-California BAA (“BAA3”) is valued at the SMEC minus the GHG shadow price. But this approach unravels under real-world outcomes in which the transfer to the CAISO is not the same quantity as the GHG attribution. For instance, GHG attribution could be entirely to resources located in BAA3, which receives an EIM transfer in. Powerex understands the evaluation of revenue neutrality under CAISO’s proposal would proceed as follows:

	BAA1	BAA2 (CAISO)	BAA3 (non-CA)
Load	\$180	\$200	\$100
Gen	(\$300)	(\$100)	(\$40)
GHG	\$0	\$0	(\$40)
Transfer Out (In)	\$160	(\$100)	(\$60)
Net	\$40	\$0	(\$40)

It appears that CAISO's proposal may be ineffective at addressing the existing problem. Specifically, in the example above, the additional settlement charges would lead to BAA1 being paid the GHG shadow price on all of its EIM transfers to the CAISO BAA, *regardless of the GHG attribution solution*. Additionally, it would appear to result in BAA3 being charged an amount equal to the GHG compensation to resources deemed to serve load in California. That is, GHG compensation to resources in BAA3 would ultimately be paid by BAA3 itself.

C. Powerex Agrees That The Current EIM Transfer Adjustment Is Not Appropriate

The Issue Paper describes how EIM transfers currently have the effect of “moving” neutrality adjustments from one EIM Entity to another. As CAISO expressed on the stakeholder call, it has been a longstanding principle that uplift costs are allocated to measured demand, which includes both the metered demand within a particular area as well as exports from that area, as these exports serve demand in other areas.

In the stakeholder call, CAISO presented an example showing how the current neutrality adjustment works. Notably, however, the calculation in this example makes no reference whatsoever to “metered” demand at all (nor to conventional exports scheduled bilaterally outside of the EIM). Instead, the CAISO's example calculation is based only on real-time energy imbalances, which are typically a small fraction of the total measured demand. It is apparent that this approach results in EIM transfers having an oversized impact on the shifting of neutrality adjustments between EIM Entities. While Powerex agrees that outcomes under the existing process have been problematic, it is less clear that the problem lies with the *principle* of allocating neutrality adjustments in a manner that reflects exports, but perhaps with the specific *manner* in which this longstanding principle has been implemented in the EIM.

In addition, it is unclear from the Issue Paper or the stakeholder call whether the problem may be compounded by an unnecessarily large and/or growing reliance on neutrality accounts in the first place. It bears examining, for example, the impact of other settlements design choices that appear to be leading to large and apparently systemic revenue surpluses or deficits within the neutrality accounts of some EIM Entities. While the Issue Paper notes that there are many reasons why settlements may not be revenue neutral, including “unaccounted for energy,” no information is provided on the frequency or magnitude of these other contributing factors to non-neutrality. Are the number of factors increasing as the market evolves and the EIM expands? Are the impacts larger for certain EIM Entities than for others? Are they disproportionately larger for EIM Entities outside the CAISO BAA? Are there settlement design revisions that could be considered to reduce the need to rely on these neutrality accounts in the first place?

D. Settlement Errors Nullify Compensation For Flexible Intra-Hour Supply

The Issue Paper briefly notes that CAISO “uses the integrated hourly value for the dynamic schedules.”³ While the Issue Paper states that shifting to the use of 5-minute values will “improve the accuracy” of the EIM transfer financial value, there is a lack of substantive discussion of how the use of hourly integrated values has affected settlements of EIM activity. Based on Powerex's

³ Issue Paper at 5.

review and understanding, it appears that the effect has been to nullify compensation for EIM Entities that provide flexible intra-hour supply.

It is well known that a substantial amount of intra-hour flexibility is obtained through the EIM to meet the ramping needs experienced in the CAISO BAA, particularly during the morning and evening net load ramps. Five-minute price signals indicate the value of increasing EIM transfers to the CAISO BAA, and those higher 5-minute prices are available to EIM Entities with resources that are sufficiently flexible to respond to those prices.

The assessment for revenue neutrality, however, appears to fail to recognize that EIM transfers vary from one 5-minute interval to the next, and instead assign the financial value based on a uniform hourly average quantity. This can systematically result in EIM Entities with flexible resources that respond to higher sub-hourly prices erroneously appearing to be “overpaid,” and subsequently have their revenues clawed back via additional settlements charges.

Consider the following example of an EIM Entity that increases its EIM transfers out during the higher-priced 5-minute intervals in the second half of the hour:

Interval	LMP (\$/MWh)	EIM Transfer Out (MW)	Value (\$)
1	\$20	0	\$0
2	\$20	0	\$0
3	\$20	0	\$0
4	\$20	0	\$0
5	\$20	0	\$0
6	\$20	0	\$0
7	\$120	100	\$1,000
8	\$120	100	\$1,000
9	\$120	100	\$1,000
10	\$120	100	\$1,000
11	\$120	100	\$1,000
12	\$120	100	\$1,000
Sum		50	\$6,000

The total value of the EIM transfer, when evaluated in each 5-minute interval, is \$6,000 in this example. It is Powerex’s understanding that the assessment of revenue neutrality would proceed as follows:

	MW	Price, \$/MWh	\$
Gen	50	MW-weighted 5-min LMP at Gen Node	\$120 (\$6,000)
Transfer Out (In)	50	Simple average 5-min LMP at Gen Node	\$70 \$3,500
Net			(\$2,500)

The fact that the flexible resources were able to respond to higher 5-minute prices and thereby increase EIM transfers out results in a MW-weighted hourly average price of \$120/MWh, which is appropriately credited to the exporting EIM Entity in the settlement of instructed energy. However, the neutrality assessment applies an EIM transfer value based on the simple average LMP during

that hour, which is substantially less (*i.e.*, \$70/MWh rather than \$120/MWh) in this example. This gives the erroneous impression that the settlement is not revenue neutral, and results in a claw-back of revenues in excess of the simple average LMP.