

**Comments of Powerex Corp. on
Energy Imbalance Market
Year 1 Enhancements
Draft Final Proposal**

Submitted by	Company	Date Submitted
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Powerex appreciates this opportunity to provide comments on the CAISO’s February 11, 2015 EIM Phase 1 Enhancements Draft Final Proposal. The Draft Final Proposal contains several specific proposed EIM design changes intended to address FERC compliance requirements; commitments made by the CAISO during the original EIM stakeholder process; and other areas the CAISO has identified during EIM implementation as requiring design changes. Powerex provides detailed comments herein on CAISO’s proposed carbon “flag,” its proposed treatment of failed imports, and its decision to treat base schedules as financially binding at T-20.

At this juncture, however, Powerex believes that several over-arching issues require urgent attention and merit examination in this proceeding, which is rightly aimed at making the “enhancing” changes necessary to achieve the proper functioning of the EIM. In Powerex’s view, these threshold issues substantially impact any evaluation of the specific “enhancements” proposed in the Draft Final Proposal. These threshold issues at present greatly impair the ability of the EIM to deliver promised incremental reliability and efficiency benefits, undermine broad regional support and participation, and create harmful unintended consequences to PacifiCorp’s transmission customers.

Specifically, and as a preface to its discrete comments on the specific CAISO “enhancement” proposals, Powerex provides overarching comments to encourage the broadening of CAISO’s “Year 1” stakeholder dialogue to address the following deficiencies in the current EIM design:

1. **Resource Sufficiency** - The CAISO has designed and implemented its EIM in a manner that results in capacity and flexibility leaning through enabling a “go short” strategy, undermining reliability and efficiency.
2. **Free Export Transmission** - The CAISO has designed and implemented its EIM in a manner that results in non-reciprocal, free transmission access by CAISO load to external transmission systems, resulting in inequitable cost shifting inconsistent with well-established cost causation and “user pays” principles.
3. **Congestion Rent Confiscation** – The CAISO has designed and implemented its EIM in a manner that confiscates the value of congested transmission facilities from PacifiCorp’s

Firm OATT customers, and is seeking to expand on this confiscation approach with its proposed Phase 1 EIM enhancements.

4. **Governance** – The CAISO’s approach to designing and implementing certain key elements of its EIM has reinforced, as opposed to help alleviate, pre-existing governance concerns with the CAISO, discouraging broad participation and thus hampering the realization of reliability and efficiency benefits from an intra-hour centralized market.
5. **Benefit Analysis** – The CAISO’s benefit analysis does not represent an objective analysis of the current incremental benefits (and unintended costs) of its EIM implementation.

Powerex strongly urges the CAISO to include each of these important topics in the current EIM Year 1 Enhancements stakeholder process and to commit sufficient time to engage in meaningful dialogue with stakeholders.

I. KEY ISSUES THAT MUST BE ADDRESSED TO ACHIEVE THE PROPER FUNCTIONING OF AN EIM

A properly designed EIM has the potential to provide a wide range of reliability and efficiency enhancing benefits. These potential benefits leverage centralized visibility and automated dispatch to:

- enhance reliability through improved situational awareness;
- capture the benefits of inter-BAA diversity in intra-hour imbalances from both an energy and capacity perspective;
- achieve least-cost dispatch of participating resources to both meet net imbalance needs and to capture additional economic displacement opportunities; and
- allow for more efficient use of the transmission system.

Achieving these reliability and efficiency benefits requires a carefully crafted and robust market design – one that has broad appeal to maximize participation both by BAAs and by resources, yet also avoids unnecessary inconsistency with existing wholesale electricity markets and existing uses of the transmission system. Powerex identifies and discusses five key issues that it believes are currently undermining the proper functioning, and hence the delivery of potential benefits, of the CAISO’s EIM.

A. Resource Sufficiency

The CAISO has designed and implemented its EIM in a manner that results in capacity and flexibility leaning through design features that enable a “go short” strategy, undermining reliability and efficiency.

A critical element of EIM design is *resource sufficiency*. Resource sufficiency, in the context of an EIM, refers to the requirement that each participating BAA comes to the EIM in each operating hour with sufficient energy, capacity, and flexibility to meet its share of imbalances under the full range of potential intra-hour operating conditions.¹ Resource sufficiency ensures that reliability can be confidently maintained *independent of* the level of voluntary resource participation in the EIM. With each participating BAA fully resource sufficient ahead of the operating hour, a properly designed EIM is then able to deliver broad efficiency-enhancing benefits by netting imbalances across BAAs and serving this net requirement at least cost through the centralized, automated dispatch of all participating resources.

It has become increasingly clear, however, that the CAISO's version of an EIM attempts to "go further" in reducing the costs of meeting net intra-hour imbalances. Both the CAISO's public filings and related documents, as well as public data available on the first three months of EIM operations, clearly illustrate that the CAISO's EIM implementation enables EIM BAAs to "go short" the commitment of sufficient flexible capacity reserves ahead of EIM operation each hour. As a result the committed resources made available for dispatch in the EIM have *not* been able to meet the full range of imbalance requirements.

Powerex has no doubt that a BA can save money by reducing the amount of flexible capacity reserves procured and/or committed to a level *below* that which is necessary to meet the full range of potential intra-hour imbalances. CAISO's current design facilitates such behavior: where an EIM Entity BAA is able to fully pass through the EIM energy prices to its transmission customers, it has little financial incentive to commit adequate levels of capacity. But it is entirely inaccurate to label the cost savings from such excessive reductions in flexible capacity reserves—that is, the cost savings from deliberate resource insufficiency—as an efficiency benefit of the EIM. They are not. Rather, these cost savings reflect:

1. an economic tradeoff by the EIM Entity BAA between lower flexible capacity commitment costs in exchange for increased reliability risk through the deliberate "leaning" on being able to procure last-minute energy from uncommitted resources (either through voluntary offers in the EIM or through out-of-market purchases by the grid operator from neighboring BAAs), which may or may not sufficiently materialize to maintain reliability.
2. an inappropriate "leaning" by EIM Entity BAAs—without appropriate compensation—on the flexible generation resource investments of other entities, upon which the EIM Entity BAA ultimately relies to maintain reliability.

¹ These imbalances include normal intra-hour variations in load and variable energy resource output, as well as deviations in net interchange.

In Powerex's view, the CAISO's approach to resource sufficiency must be changed in order for the EIM to achieve its intended reliability and efficiency enhancing benefits. It simply isn't credible to claim that an EIM that *relies on* voluntary EIM offers or last-minute out-of-market purchases to keep the lights on is not sacrificing reliability. The four-fold increase in emergency e-Tags in PacifiCorp BAAs year-over-year in the opening months of operation provides compelling evidence of the increased reliability risk that is already occurring. Further, the CAISO DMM's publicly filed reports document numerous days where EIM resource insufficiency manifested itself in a shortfall in capacity and/or flexibility to meet normal intra-hour imbalances such as load variations, VER fluctuations, and deviations in interchange. This evidence further highlights the systemic EIM resource insufficiency occurring in the PacifiCorp BAAs since the EIM began operation.

It also is not credible to claim that it is *more* efficient, from a societal perspective, to scramble to meet intra-hour capacity and flexibility needs through the last-minute commitment of generation resources, including through out-of-market actions, than it is to properly commit flexible generation resources in an efficient manner in both the day ahead and real-time timeframes, ahead of the EIM. Quite simply, "going short" flexible capacity reserves *reduces* overall grid reliability and the overall efficiency of generation commitments, but it does save money for the EIM Entity BAA that leans on its neighbors, especially if it is shielded from the consequences of its actions, including the escalation of energy prices in the EIM.

Powerex urges the CAISO to change its approach to resource sufficiency and:

1. Fully recognize that the EIM has been materially resource insufficient since go-live and commit to identifying and implementing the steps necessary to ensure resource sufficiency going forward.
2. Increase transparency into the resource insufficiency challenges in the PacifiCorp BAAs since go-live by publicly posting hourly information on:
 - a. maximum BAA imbalances (excluding out-of-market actions);
 - b. flexible reserve quantities required by CAISO for each PacifiCorp BAA;
 - c. flexible reserve quantities actually carried in each PacifiCorp BAA; and
 - d. flexible reserve quantities that failed to perform when called upon in each PacifiCorp BAA.
3. Engage in meaningful dialogue with stakeholders on robust measures to ensure resource sufficiency in the EIM.

B. Free Export Transmission

The CAISO has designed and implemented its EIM in a manner that provides non-reciprocal, free transmission access by CAISO load to external transmission systems, resulting in inequitable cost shifting inconsistent with well-established cost causation and “user pays” principles.

In an effort to achieve maximum dispatch efficiency of all participating resources, the CAISO’s current EIM design seeks to eliminate transmission “hurdle rates” by requiring all participating transmission providers to waive incremental transmission charges that would otherwise apply under existing transmission tariffs to inter-BAA transactions. This is achieved through an EIM transmission design element characterized as “reciprocity”—in which each participating transmission provider agrees to waive normally applicable incremental transmission charges for export (and wheel-through) transactions if they occur in the EIM. The argument presented by CAISO is that, by eliminating transmission charges on exports (and wheel-through) transactions in the EIM, dispatch efficiency may be enhanced, as economic transactions will no longer be potentially “blocked” by the inclusion of incremental transmission charges into generator’s offer prices.

The potential benefits resulting from the CAISO’s reciprocity approach come with an accompanying cost. In particular, it achieves potentially more efficient generation dispatch (to the extent EIM transactions would otherwise not occur) by shifting the allocation of transmission costs away from EIM transactions and onto transactions that occur outside of the EIM. Across the region, there is a wide range of views amongst stakeholders as to whether it is indeed an acceptable trade-off to exempt inter-BAA imbalance energy transactions from otherwise applicable transmission charges in exchange for potentially improved intra-hour dispatch efficiency. Comments submitted in the CAISO’s original EIM stakeholder process and the FERC EIM-related filing processes reflected this wide range of views.

But while industry views may differ on the appropriateness of providing free transmission use for genuinely *reciprocal* imbalance transactions—that is, flows that are generally offsetting and not systematically in one direction or another—actual experience in the EIM has been that these inter-BAA transfers are not “reciprocal” at all. Quite notably, EIM Transfers in the EIM have been systematically skewed in the direction of PacifiCorp exports serving CAISO load. This has resulted in a highly *non-reciprocal* outcome whereby CAISO load received more than six times the quantity of free transmission service (on PacifiCorp’s system) that PacifiCorp’s EIM transmission customers receive (on the CAISO’s transmission system). Moreover, these predominant EIM flows from PacifiCorp to CAISO are not just reflective of imbalance energy transactions, but also represent normal economic displacement activities—that is, transactions that could have otherwise been achieved outside of the EIM (where transmission charges *would* have applied). Thus the “free transmission” approach proposed and implemented by the CAISO has resulted in much more than merely waiving transmission charges for flows associated with

unpredictable energy imbalances, it has also resulted in affording CAISO's load free use of PacifiCorp's transmission system for the highly systematic imports occurring through the EIM.

This non-reciprocal outcome should not be surprising. The CAISO is a large net importer of power from adjacent regions (which typically have lower marginal cost resources). In fact, it should be expected that any market design that affords free export transmission service will be highly beneficial to loads in the large importing BAAs. But, it should also not be surprising that BAAs or transmission providers that are significant exporters may not be supportive of an EIM design that gives export transmission service away for free, resulting in an inequitable allocation of the embedded costs of the applicable transmission systems.

Powerex urges the CAISO to revisit the transmission service requirements and charges that apply to EIM use of transmission systems, and to address the non-reciprocal and highly inequitable cost shifting that has occurred since the EIM went live. Specifically, Powerex recommends that the CAISO consider implementing a new transmission charge on the *non-reciprocal quantity* of EIM Transfers that occurs each day between and among EIM BAAs. By focusing on the net daily quantity of EIM Transfers between adjacent BAAs, the "offsetting" transfers will continue to be exempt from transmission charges, but the non-offsetting transfers would bear an appropriate share of the embedded costs of the exporting transmission system. The charges for these net EIM Transfers should be calculated using the rate that would otherwise apply under the applicable transmission provider's tariff (*i.e.*, the PacifiCorp hourly non-firm transmission rate). This cost would then be recovered as uplift to all load in the importing BAA, as these are the customers benefitting from use of the exporting BAA's transmission system. Recovering the transmission costs from load also ensures that dispatch decisions are not distorted, as might be the case if the costs were recovered from generators.

Powerex urges the CAISO to pursue this issue in its EIM Enhancements initiative, and to recognize the overwhelming evidence that CAISO's "reciprocity" approach has resulted in CAISO load enjoying a transmission rate "subsidy" on external transmission providers' systems. In addition, since this issue is one in which the interests of CAISO load are clearly not aligned with the interests of other (paying) transmission customers on external transmission providers' systems, Powerex urges the CAISO to further involve its Transitional Committee on this topic.

C. Congestion Rent Confiscation

The CAISO has designed and implemented its EIM in a manner that confiscates the value of congested transmission facilities away from PacifiCorp's Firm OATT customers, and it is seeking to expand on this confiscation approach with its proposed enhancements.

While the above comments focus on the inequitable allocation of the *embedded costs* of non-CAISO transmission facilities used in the EIM, the allocation of the *benefits* of the transmission facilities used in the EIM also raises significant fairness and efficiency concerns. More

specifically, there are both existing and proposed EIM market design elements that inappropriately confiscate the *congestion value* of constrained transmission facilities away from the transmission customers that own Firm OATT rights on those facilities, inconsistent with foundational cost causation market design principles.

It is widely accepted (by industry economists, transmission providers and FERC) that the benefits of the transmission system should flow to the entities that fund the underlying facilities. One of the primary economic benefits of transmission facilities is the “congestion value” that arises in wholesale electricity markets—which is the value associated with the delivery of wholesale electricity products from lower-priced resources to load in higher-priced locations on the grid, across transmission lines that are congested. A key issue then is how to design electricity markets and transmission tariffs to ensure that the entities that fund the transmission system receive the congestion value associated with use of those facilities. In organized markets, this is generally achieved through the distribution of “congestion rents”, which are financial charges collected from the parties utilizing the transmission system and distributed to the parties funding the transmission system. In the bilateral markets operating under the OATT framework, this same distribution is achieved through granting priority rights (*e.g.*, Firm transmission rights) to physically schedule deliveries “ahead of” other users (*e.g.*, transmission customers with Non-Firm transmission rights). The priority of Firm service results in competition among transmission customers to acquire those rights, particularly through long-term service commitments spanning multiple years or even decades.

One challenge in implementing an EIM “on top of” an existing OATT framework (that has granted “priority rights” to Firm OATT customers) is therefore how to accommodate the EIM’s use of the transmission system under a least-cost dispatch model, while also continuing to ensure that the congestion value in the EIM timeframe continues to be returned back to the Firm OATT customers that are funding the underlying transmission facilities.

More specifically, there are at least two specific congestion-related issues arising from the interaction of Firm OATT rights and the EIM timeframe that must be addressed:

1. When a customer seeks to use its Firm OATT rights across a congested transmission constraint (via a new or modified schedule) in the EIM timeframe, how is the Firm OATT schedule treated?
2. When a customer seeks to use its Firm OATT rights across a congested constraint to deliver energy to / from the CAISO’s organized markets in the EIM timeframe, and lower priced resources are available to support EIM Transfers with the CAISO across the same congested constraint, which delivery has priority?

Powerex believes the answers to these questions have already been determined under the OATT framework and the rights that have been awarded:

- First, use of OATT rights is permitted throughout the entire timeframe permitted by NERC and WECC rules (*i.e.*, for static schedules, up to T-20 prior to each 15-minute delivery interval, and for dynamic schedules continuously within the delivery interval).
- Second, Firm OATT rights are not directly allocated any additional financial charges related to congestion, and hence should not be exposed to any EIM-related congestion charges. The Firm OATT customer has already paid the transmission provider for this capacity to be set aside for their use on a priority basis.
- Third, when there are competing potential uses of an OATT provider’s transmission system across a constraint, use of the transmission system should be provided according to the service priority already established by that transmission provider. In the above scenarios, use of the scarce transmission capacity should be granted to the Firm OATT customer. The EIM’s and/or CAISO’s dispatch algorithm should not simply nullify the priority that has been granted under the OATT framework.

Powerex believes there are at least two possible ways for the design of the EIM to be consistent with the existing service priority under the OATT framework:

1. **Respect Firm OATT Priority and Transmission Charges Already Incurred** - Ensure the EIM respects both the priority of, and payment for, Firm OATT rights, by:
 - a. exempting Firm OATT schedules submitted within the EIM timeframe from any congestion charges in the EIM; and
 - b. ensure the CAISO’s dispatch algorithms do not result in the “by-pass” of an offer associated with Firm OATT rights on a constrained path that is otherwise economic, in order to select a lower-priced offer across the same path that is associated with lower-priority (or no) transmission service.
2. **Convert Firm OATT Rights into an Allocation Right to EIM Congestion Rents** – Distribute the EIM congestion rents across constrained paths to customers with unused Firm OATT rights across the applicable constraint. With this distribution of congestion rents, the EIM is then able to (i) ignore OATT transmission priority in its dispatch algorithms, and (ii) settle all physical schedules submitted or modified in the EIM timeframe as “imbalances,” and do so without creating inequitable outcomes or unintended inefficient incentives. Critically, the *net* financial result of this approach is that the use of Firm OATT transmission in the EIM timeframe receives no net incremental settlement costs (*i.e.* congestion rents collected would fully offset EIM charges applied). Firm OATT customers would also receive the congestion rents collected in the EIM associated with use of their Firm transmission rights by other customers, particularly if they are “stepped ahead of” in the CAISO’s dispatch algorithms.

Unfortunately, the CAISO (and PacifiCorp) have followed a very troubling hybrid approach that (1) does not respect OATT priority in dispatch and EIM settlements, but also (2) does not return the congestion value to Firm OATT customers. This approach prematurely expires the *economic value of Firm OATT rights*, without compensation, to “make way” for the EIM.

At present, and continuing under CAISO’s currently proposed “Enhancements”, the economic value of Firm OATT rights is being confiscated in at least three ways:

1. By settling the use of Firm OATT rights within the EIM timeframe (through new or modified schedules) as EIM “imbalances,” resulting in EIM congestion charges being applied to the Firm OATT customer, as if the Firm OATT rights did not exist as all.
2. By permitting the CAISO’s dispatch algorithm to select resources associated with lower (or no) priority rights ahead of resources associated with Firm OATT rights across congested paths.
3. By socializing any congestion rents collected in the EIM (from Firm OATT customers simply using their existing rights, or from other customers “stepping ahead” of Firm OATT customers) broadly to all PacifiCorp load and export customers.

Powerex believes there are numerous harmful consequences to the premature expiration and confiscation of the economic value of Firm OATT rights. Powerex describes these implications in more detail in an attached appendix.

The fundamental issue that must be addressed at the outset is what appears to be the CAISO’s unwavering view that the OATT priority-based framework should simply be ignored, without regard to existing investments in Firm OATT rights, in order to “make way” for the EIM. This perspective is contrary to foundational cost causation principles that the value of transmission facilities should be distributed to those that fund them. Moreover, this viewpoint will continue to undermine participation in the CAISO’s version of an EIM, not only by transmission customers that have made significant investments in Firm OATT transmission rights, but also by transmission providers that rely on—and will continue to rely on—investments in Firm OATT transmission rights to recover the embedded cost of their existing transmission facilities and to fund the expansion of their transmission system going forward.

Powerex urges the CAISO to:

1. acknowledge that the congestion value of transmission facilities operating under an OATT framework should be distributed to Firm OATT customers;
2. recognize that its current and proposed EIM design is failing to achieve this; and

3. commit to working collaboratively with stakeholders to respect and/or convert OATT rights in the EIM timeframe rather than confiscating their value to simply “make way” for the EIM.

D. Governance

The CAISO’s approach to designing and implementing certain key elements of its EIM has reinforced, as opposed to help alleviate, pre-existing governance concerns with the CAISO, discouraging broad participation and thus hampering the realization of reliability and efficiency benefits from an intra-hour centralized market.

Since the CAISO first announced its desire to develop and operate energy imbalance markets in the Western Interconnection, it has been widely discussed that governance concerns would be a significant impediment to achieving broad participation. This is evidenced both from the numerous substantive stakeholder comments submitted in the EIM Transitional Committee’s stakeholder process on EIM governance, as well as the fact that the only entities that have thus far signed up for the CAISO’s version of an EIM are the subsidiaries of a single investor-owned utility.

The governance concerns do not stem from CAISO’s pursuit of widely-shared reliability and efficiency objectives, nor from the development of a centralized dispatch. Rather, at the heart of these governance concerns is the fear that the CAISO will design and operate its markets in a manner that shifts both the costs and benefits of the region’s generation and transmission investments in favor of California.

In Powerex’s view, the CAISO had a tremendous opportunity at the outset of the EIM initiative to demonstrate that these fears were completely unfounded by designing and operating the EIM in a manner that provides an equitable distribution of the costs and benefits to all market participants, and to all regions across the west. Regrettably, several of the market design choices pursued by the CAISO provide substantial evidence that these fears were indeed well-placed.

The above discussions on resource sufficiency and on the allocation of transmission costs and benefits highlights three areas of critical regional importance where the CAISO has made market design choices that clearly favor California’s specific interests over the interests of stakeholders in other regions. Specifically, the CAISO has chosen to:

- Implement a resource sufficiency design that permits BAAs to “lean” on their neighbors’ investments in flexible generation assets. Such an approach clearly benefits those regions that are increasingly short flexible generation capacity (such as CAISO) and is contrary to the interests of ratepayers in regions that have invested in sufficient flexible generating capacity.

- Grant free use of external transmission systems for energy deliveries from EIM BAAs serving CAISO load. This undeniably shifts the burden of funding the embedded costs of external transmission facilities used in the EIM onto non-CAISO customers using the applicable transmission system for non-EIM transactions.
- Pursue the premature expiration and confiscation of the congestion value of Firm OATT rights to “make way” for the EIM, further eroding confidence that pre-existing investments in transmission external to CAISO will be respected in the CAISO’s market design choices.

In addition, the CAISO decided early in its EIM design to treat the GHG attributes of external resources in a manner that clearly favors California’s interests. Specifically, it chose to design its dispatch algorithm to “deem” that the cleanest resources dispatched in the EIM were delivered to CAISO load, while the highest carbon-intensity resources are “deemed” to serve load in regions external to CAISO.

In Powerex’s view, each of these design choices can only serve to reinforce, rather than help alleviate, the pre-existing governance concerns broadly held throughout the region. These choices also highlight that governance concerns are not just limited to the formal governance structure—which has been the focus of the governance efforts by the Transitional Committee—but extend to concerns that the specific interests of California are embedded in the existing software and processes as well as in the new market design proposals of the CAISO.

Arguably the single most important determinant of the benefits of an intra-hour imbalance energy market is the level of participation in that market, both in terms of the BAAs that elect to join the market but also in terms of the resources that actively transact in it. Thus, the governance and market design concerns expressed above directly impair achieving the potential benefits that an efficiency intra-hour market can offer. This harms at least three distinct groups of regional entities. First, it harms entities that would benefit from participating in an intra-hour market, but find the CAISO’s governance and market design concerns unacceptable, and hence do not participate. Second, it harms the entities that do elect to join the CAISO EIM, but that experience only very limited benefits due to a lack of robust participation in that market. And third, it ultimately harms the long-term interests of Californian stakeholders as well, who will be unable to benefit from increased coordination and real-time integration with the broader Western grid.

Powerex therefore strongly urges the CAISO to engage in meaningful dialogue on necessary changes to the design and governance of the EIM—and of all CAISO-operated markets—in order to represent the balanced interests of all entities and regions in the Western Interconnection. Failure to do so will continue to deter broad participation in the CAISO’s version of an EIM.

E. Benefit Analysis

The CAISO's current benefit analysis does not represent an objective analysis of the current incremental benefits (and unintended costs) of its EIM implementation.

Powerex continues to believe that a properly designed voluntary energy imbalance market can deliver substantial reliability and efficiency benefits. It is becoming increasingly clear that the CAISO's version of an EIM has thus far failed to deliver the promised incremental reliability and efficiency benefits, and that it has also resulted in several harmful unintended consequences—particularly to PacifiCorp's transmission customers.

In Powerex's view, CAISO's recently published EIM benefits analysis contains substantial overstatements of the benefits of the EIM to date, while also avoiding examination of the loss in efficiency from some of the harmful impacts to existing wholesale energy markets and transmission use. Rather, the analysis appears to largely focus on a calculation of the gross benefits of electricity flows in the EIM relative to an unrealistic counterfactual scenario.

For example, in Powerex's view, it is likely that there has been little, if any, *incremental* benefit associated with transfers between PacifiCorp's BAAs and the CAISO. This is primarily because PacifiCorp already had the full ability to participate in CAISO's sub-hourly markets without joining the EIM. Quite simply, EIM Transfers to and from the CAISO depend upon PacifiCorp donating up to 421 MW of COI transmission for exclusive EIM use. It is undisputed that these transmission rights could have been used by PacifiCorp Energy to efficiently deliver energy (and other products) to and from the CAISO in the CAISO's day ahead and real-time markets. Yet CAISO's analysis of EIM benefits assumes that, but for the EIM, there would have been no such transfers whatsoever. In other words, the "EIM benefits" are really the economic benefit of using transmission rights that could just as well have been used without joining the EIM at all. Additionally, the CAISO analysis does not examine the opportunity costs associated with PacifiCorp's "donation" arrangement of transmission rights on the COI to support EIM Transfers. Setting aside these rights for the exclusive potential use of EIM Transfers implies *not* using those same transmission rights for other transactions, yet CAISO's analysis does not consider such alternative uses at all. An accurate analysis of the incremental benefits of EIM Transfers must compare the benefits of EIM Transfers relative to the most efficient alternative outcome that could have occurred absent the EIM. The CAISO simply has not done this analysis.

Upon closer examination of EIM activities within the PacifiCorp BAAs, it is also unclear whether the EIM has provided any *incremental* efficiency or reliability gains. This is primarily because the CAISO is generally dispatching the very same generation units and transmission transfer capability over which PacifiCorp already had central visibility and dispatch prior to the

EIM. (In fact, as has been reported elsewhere, not even all of PacifiCorp's generation units actually participate in the EIM, leaving the EIM with a smaller pool of resources than was available to PacifiCorp prior to the EIM.) To date, there has not been *any* participation in the EIM from third party resources² within the PacifiCorp BAAs and participation by external resources is not permitted on the PacifiCorp interties. Thus, it is unclear how any incremental efficiency benefits have been achieved simply through improved dispatch of PacifiCorp's own generation fleet, particularly considering that PacifiCorp has its own highly capable operational staff with many years of valuable experience centrally dispatching its own generation and transmission. CAISO's benefits analysis does not explain how it simulated how PacifiCorp's generating resources would have been dispatched absent the EIM, nor has it separated the benefits identified with this activity separately from the benefits of EIM Transfers. Powerex encourages the CAISO to provide greater insights into the specific efficiency and reliability benefits calculations.

While Powerex believes it is questionable whether the EIM has provided significant incremental efficiency and reliability benefits, Powerex does not doubt that the EIM has conferred significant economic benefits to some entities. For example, it is likely that providing free PacifiCorp transmission service for EIM Transfers serving CAISO load has lowered the cost of meeting demand in the CAISO footprint. But as previously described, this is not an efficiency benefit, but rather a subsidy from the remaining PacifiCorp transmission customers who must fund the embedded and ongoing costs of the facilities used to facilitate these transfers in the EIM. Similarly, Powerex does not doubt that PacifiCorp has saved money by "going short" sufficient flexible capacity reserves to meet its imbalance energy obligations. But this, too, is not an efficiency benefit. Rather, this benefit has manifested itself in a dramatic rise in the costs of imbalance energy prices for PacifiCorp's transmission customers (and led to the suppression of energy prices through the CAISO's repeated efforts to set aside key tariff provisions related to LMP price formation).

Moreover, CAISO's benefit analysis does not examine the substantial evidence of the costs associated with harmful unintended consequences to existing wholesale energy markets and transmission use. For example, despite the EIM having repeatedly been portrayed as voluntary, transmission customers that have variable load and/or variable energy resources have now become captive customers of the EIM for their intra-hour balancing needs. This is because the current EIM design treats the use of OATT rights after T-57, including use to facilitate the self-supply of load and VER intra-hour variations, as EIM injections and withdrawals, not as use of existing OATT rights. Thus the ability to efficiently utilize external resources through self-supply to balance a customer's load and/or VER has been removed, with all such deviations

² Based on publicly available information provided to date.

treated as captive transactions within the EIM. No calculation has been performed on the efficiency loss resulting from this outcome.

Powerex understands the CAISO's desire to downplay the challenges that have been experienced since go-live, and to claim the maximum benefits associated with the EIM implementation, in an effort to encourage greater participation in its EIM. Indeed, the extent to which the CAISO EIM successfully attracts the participation of additional BAAs, and the resources in those BAAs, will be a major determinant of the benefits achieved by all EIM participants.³ However, Powerex cautions that efforts to can have the opposite effect if market entities come to regard CAISO's analyses or descriptions of EIM performance with skepticism. Instead, greater participation—and hence greater potential EIM benefits—is more likely to be achieved through objectively recognizing the current status of the EIM by providing objective analysis of the true *incremental* costs and benefits of the EIM to date, while engaging collaboratively with stakeholders to significantly improve the current EIM design.

II. COMMENTS ON SPECIFIC EIM PHASE 1 ENHANCEMENTS

A. Carbon Flag

The Draft Final Proposal includes a mechanism for EIM participating resources to specify, on an hourly basis, both the quantity and the price adder at which they are willing to have their EIM dispatched output be “deemed” as being imported into California. This is a significant improvement over the existing design, in which EIM participating resources are unable to avoid CARB reporting and compliance obligations because they have no way to affirmatively decline to have their output imported into California. Although Powerex continues to have concerns with CAISO's general framework for determining the GHG emissions and the CARB liability associated with the dispatch of generation in the EIM, Powerex commends the CAISO for responding to stakeholder comments in developing this improved functionality.

B. Treatment of Failed Imports in the Resource Sufficiency Evaluation

The Draft Final Proposal proposes an enhancement to the calculation of the EIM Entity BAA flexible ramping capacity requirement. The proposal specifically relates to the potential for imports and exports to not perform as specified in the base schedules. Specifically, CAISO recognizes that interchange transactions in an EIM Entity BAA's final base schedules at T-40 may not be equal to the interchange transactions that are e-Tagged by the WECC scheduling

³ This is especially true of participating BAAs with significant intra-hour transfer capability with other EIM participating BAAs. For example, Powerex expects there may be significant genuine efficiency benefits due to intra-hour transfers between the NV Energy and PacifiCorp BAAs. This is in contrast to the much more limited potential for increased intra-hour transfers between the PacifiCorp and CAISO BAAs, as the transfer capability needed to support such transfers is limited, and such transfers were already possible prior to the EIM.

deadline of T-20. The Draft Final Proposal describes a probabilistic assessment of the difference between base scheduled imports and exports and the volume tagged at T-20.

CAISO initially proposed to require EIM Entity BAAs to carry additional flexible ramping capacity merely for the *average* difference between base schedule and e-Tagged imports and exports. Several stakeholders, including Powerex, expressed concern that planning for the average adverse event would leave the EIM exposed to outcomes that were more severe than average. By definition, average conditions will frequently be exceeded. The Draft Final Proposal addresses this concern by proposing to require EIM Entity BAAs to increase flexible ramping capacity by an amount equal to the 95th percentile of the prior-period energy demands due to untagged imports and exports. Moreover, the Draft Final Proposal expresses the difference between base schedule and e-Tagged imports and exports as a percentage of the base schedule amount, and applies the resulting percentage to the actual base schedule quantities received in a given hour in order to calculate the additional flexible ramping capacity requirement. In this manner, the additional flexible ramping capacity requirement will be scaled to the quantity of imports and exports actually being scheduled, as opposed to merely reflecting the prior-period quantity (which may be considerably greater or less than the current-period quantities).

Powerex commends the CAISO for the significant improvements to the proposed design. The Draft Final Proposal recognizes that resource sufficiency requires that there be sufficient flexible capacity to cover the potential imbalance needs for a wide range of conditions, even if those conditions occur relatively infrequently. Additionally, Powerex believes that the clear articulation of the purpose, principles, and analytical methodology through which CAISO proposes to calculate the additional flexible ramping capacity requirement provides valuable transparency into a critical feature of the EIM (*i.e.*, its evaluation of resource sufficiency). CAISO's approach to calculating additional required flexible ramping capacity specifically to protect against untagged imports and exports should be applied to the other major sources of real-time energy imbalance needs, including load deviations and VER output deviations. Indeed, Powerex encourages CAISO to provide a similar level of transparency for all aspects of its determination of the flexible ramping capacity requirement of each EIM Entity BAA (and of the CAISO BAA).

Powerex offers the following comments on the specific methodology contained in the Draft Final Proposal:

- Use of the 95th percentile still implies that one hour of every day will experience imbalance energy demands due to untagged imports and exports that exceed the proposed additional capacity requirements. Powerex notes that Bonneville Power Administration

utilizes a 99.5 percent probability in calculating the quantity of reserves necessary to meet imbalance energy needs.⁴ This higher percentile would imply that the additional flexible ramping capacity is exceeded in approximately 4 hours per month.

- CAISO’s proposed analysis is focused only on the difference between imports and exports included in base schedules at T-40 and the quantity that is e-Tagged by T-20. However, it is Powerex’s experience that even interchange transactions that are e-Tagged as of T-20 may fail to deliver at that level for the entire duration of the hour. For instance, static schedules are permitted to be adjusted up to 20 minutes prior to each 15-minute interval. Moreover, even after the e-Tag deadline has passed, interchange transactions may be subject to curtailment within the interval. For these reasons, Powerex suggests that CAISO perform its analysis by comparing import and export base scheduled quantities and the quantities actually delivered, as this better reflects the extent to which changes in interchange transactions affect the demand of imbalance energy in the EIM.
- CAISO describes the analysis as being performed for each operating hour (*i.e.*, all Hours Ending 8 will be analyzed separately from Hours Ending 7, ... etc.) But CAISO adds that it may group hours together to increase sample size. Powerex agrees that it is likely appropriate to group several operating hours together for the analysis. Indeed, Powerex suggests that CAISO initially *not* treat each operating hour separately, but group all of the hours into a single analytical group. Only if CAISO’s analysis determines that certain hours or groups of hours are unrelated should the sample size be split into two or more groups. The ultimate objective of the analysis is to determine a probability distribution of energy needs due to non-performing imports and exports. Splitting the sample size effectively says that what is observed in one set of hours is of no informational value to what might occur in another set of hours. But this is a conclusion that can only be reached through empirical analysis; it should not be assumed to be a valid starting point for CAISO’s calculation.
- Similar to the above discussion, CAISO should consider including other attributes of import and export schedules in its analysis of the probability that they will not perform according to the base schedules. One possibility is to classify imports and exports according to interruptibility (*i.e.*, Firm, VER, or seller’s choice). The risk of non-performance is likely to vary significantly across those different energy types, meaning the additional flexible capacity requirements should also reflect the composition of each

⁴ See, e.g., Bonneville’s November 2012 “Generation Inputs Study” for rate period BP-14, Exh. No. BP-14-E-BPA-05 at 22:12-14, explaining that Bonneville “produces a forecast of the balancing reserve capacity that BPA needs to meet its balancing requirements 99.5 percent of the time.” Available at <https://www.bpa.gov/secure/Ratecase/Documents.aspx?ID=23>

type of interchange schedule in the base schedules (*e.g.*, Firm interchange results in no additional flexible capacity requirements, seller's choice requires 100% additional flexible capacity, and the additional flexible capacity required for VER imports is based on historic performance rates).

C. CAISO's decision to treat base schedules as financially binding at T-20

As discussed extensively in Section 1 and in Powerex's prior comments, there are important interactions between the EIM and the existing OATT framework for scheduling of energy deliveries. PacifiCorp's implementation of the EIM has resulted in the premature expiry of the economic value of Firm OATT rights at T-57, subjecting transmission customers that schedule or modify their use of those Firm OATT rights after T-57 to the same congestion charges that would apply if they had no transmission rights at all.

The Draft Final Proposal contemplates making base schedules financially binding at T-20. While T-20 is the notional deadline for submission of static hourly transmission schedules in the WECC, making all base schedules financially binding as of a seemingly similar T-20 deadline will continue to result in the EIM impairing OATT rights in participating BAAs, for at least two reasons:

- OATT rights can be used to deliver 15-minute energy up to 20 minutes prior to *each 15-minute interval*, and hence OATT rights can be submitted or changed even after the CAISO proposal of 20 minutes prior to the start of the *hour*.
- OATT rights can be used to deliver energy in quantities that vary continually throughout the operating hour via dynamic schedules.

In short, OATT rights do not "expire" at any point prior to EIM operations. Powerex recognizes that, to prepare for EIM operations, CAISO needs an estimate of how much transmission capacity it expects to have available to support the least cost dispatch of resources in the EIM. But the need for a timely estimate should not—and need not—impair the ability of OATT transmission customers to utilize their transmission reservations after that estimate has been made. Powerex urges CAISO to minimize the seams between EIM operations and the OATT transmission scheduling framework by requiring that participating EIM BAAs do not financially settle the use of Firm OATT rights as if they were EIM imbalances.

APPENDIX

Improper EIM Implementation Is Undermining OATT Rights and Transmission Investment

Significant unintended consequences have recently emerged from the PacifiCorp EIM implementation. The EIM is leading to the premature expiration of the value of all Firm OATT rights and forcing PacifiCorp transmission customers to become captive participants in the EIM. These outcomes will also occur in Nevada's implementation, which largely mirrors PacifiCorp's approach.

The development of organized intra-hour energy markets has the potential to lead to a more efficient use of generation and transmission assets. Properly designed, these markets can increase the available opportunities for cost-saving transactions over increasingly granular time periods. But these markets also carry a significant risk of unintended consequences, since they are being introduced on top of—and not instead of—existing frameworks that include both the CAISO organized market as well as de-centralized bilateral electricity markets utilizing transmission service under FERC's Open Access Transmission Tariff (OATT) framework. In order for energy imbalance markets to deliver on their potential benefits, close attention must be paid to the interplay between these new markets and the existing market and transmission frameworks.

The Erosion of PacifiCorp OATT Rights in the EIM

Powerex believes CAISO has dedicated significant effort to attempting to ensure that the operation of its Energy Imbalance Market (EIM) does not create unintended consequences in the CAISO's own organized markets. However, experience to date with PacifiCorp's implementation of the CAISO EIM shows that similar care has not been taken with regard to the interaction of the EIM and the existing bilateral markets and OATT transmission allocation framework external to CAISO. This was initially evident in the so-called "reciprocity" approach to transmission charges. As was observed at the time that the CAISO and PacifiCorp filed their EIM proposals with FERC, generators located in the PacifiCorp BAAs and dispatched in the EIM are not required to pay for transmission service related to EIM dispatch, even if the energy serves load in the CAISO BAA.

An additional and more far-reaching implication of the PacifiCorp/CAISO EIM is only recently emerging. Specifically, PacifiCorp now subjects customers with existing transmission reservations on its system to "imbalance" charges whenever their scheduled energy amount is modified after a newly-created deadline of 57 minutes prior to the start of the delivery hour ("T-57"). A scheduled energy delivery submitted or changed after this "T-57" deadline must now pay an additional charge for any congestion on PacifiCorp's system, with those charges determined by the EIM market-clearing prices. This is a radical departure from the long-standing ability of a transmission customer to schedule on a Firm reservation up to 20 minutes prior to the start of an hour or prior to each 15-minute delivery interval, or even to adjust the energy deliveries on an existing schedule continually through dynamic scheduling, *none of which previously subjected the transmission customer to additional costs*. PacifiCorp insists that "the EIM design does not *prevent* any use of reserved or scheduled transmission rights, it simply includes settlement consequences based upon actions or inactions."¹

Contrary to PacifiCorp's claims, its implementation of the CAISO EIM significantly diminishes the transmission scheduling rights for which its transmission customers have paid, in many cases under

¹ See "PacifiCorp's Comments on Technical Workshop" in CAISO EIM Year 1 Enhancements stakeholder workshop, February 6, 2015, at 3-4.

multi-year commitments. Under PacifiCorp's approach, new EIM "imbalance" charges will apply not only to the well-understood generation or load imbalances for which such charges were designed, but to PacifiCorp's expanded concept of imbalances. In short, PacifiCorp's existing transmission customers will now face substantial, additional charges simply for using their Firm transmission reservations:

- to serve intra-hour load variations from external energy resources;
- to export the output of variable energy resources on a dynamic or 15-minute basis; and
- to wheel energy across PacifiCorp's transmission system on a dynamic or 15-minute basis.

In each of the above examples, PacifiCorp's implementation of the EIM exposes transmission customers using their Firm transmission reservations to new, additional charges they did not previously bear. To be clear, Powerex does not claim that PacifiCorp prohibits transmission customers from submitting or modifying schedules on their Firm transmission reservations after T-57, but rather that PacifiCorp has confiscated or prematurely expired the financial value of those rights by applying financial settlements to such use as if the rights did not exist at all. And given the performance of the EIM in its first months of implementation, these charges are also highly unpredictable.²

The only way PacifiCorp transmission customers can avoid the new EIM-related congestion charges applied to OATT transmission use is to try to avoid changes to scheduled energy deliveries after the early T-57 deadline. But this defeats the purpose of FERC Order No. 764, which required transmission providers to permit more flexible and granular scheduling closer to real-time (*i.e.*, 15-minute scheduling), and also defeats FERC policies encouraging the self-supply of imbalances and other ancillary services. This outcome is also contrary to PacifiCorp's prior representations that the EIM "will not result in the diminution of the existing transmission rights of Transmission Customers" and that "Transmission Customers who have reserved service will receive that service with the same quality and priority they receive today."³ The net result of PacifiCorp's EIM implementation is that the value of OATT transmission rights now expires at T-57, and transmission customers using or modifying their scheduled energy delivery quantities after that time effectively become captive customers that are forced to procure energy at their scheduled point of delivery and forced to dispose of energy at their scheduled point of receipt, exclusively with the EIM. Thus for customers with intra-hour changes in load or variable energy output located within PacifiCorp's BAAs, settlement in the EIM becomes simply unavoidable—scheduled or not, their intra-hour variations in demand or supply are completely captive to PacifiCorp's prevailing EIM prices, with no ability to avoid or hedge this exposure.

The consequences of an EIM that encroaches upon OATT reservations in this manner is not limited just to the transmission customers that have invested in those rights and now experience greatly diminished value. Eventually, all transmission reservations expire and point-to-point transmission customers can simply choose to not renew or invest in additional service. Ultimately, the consequence of EIM designs that undermine the value of OATT transmission rights will be felt by the native load customers of the BAAs that opt to join the EIM. Native load customers are the ultimate guarantors of the full recovery of embedded transmission costs; reduced sales of Firm point-to-point service will inevitably shift more of the cost burden onto them. This outcome would be particularly inequitable in BAAs where a significant portion of transmission assets are used to provide wheel-through or export service instead of serving native load.

² PacifiCorp correctly notes that, in theory, these charges may actually result in payments to transmission customers if their energy schedules reduce congestion. However, transmission customers making long-term investments in Firm transmission rights typically do so to secure service over paths that experience significant congestion, since service over uncongested paths, by definition, is generally available.

³ See PacifiCorp's March 25, 2014 FERC filing proposing tariff amendments to implement the CAISO EIM, Transmittal Letter at 42, and Attachment E (Testimony of Sara Edmonds) at 27:8-10.

NV Energy OATT Rights and the CAISO EIM

These very troubling impacts to existing and future investments in Firm OATT rights are not unique to PacifiCorp's EIM implementation. Not surprisingly, NV Energy's proposed EIM implementation appears to largely mirror PacifiCorp's implementation, and will result in a similar premature expiry of the value of Firm OATT transmission rights. In addition, during a recent CAISO stakeholder session on EIM, CAISO described a proposed "enhancement" that would permit the CAISO to treat Firm OATT transmission rights that are dynamically scheduled to or from CAISO's organized markets as "unused" transmission capacity ahead of the operating hour, and thereby available to facilitate intra-hour deliveries from *any* generator in the EIM. If implemented, this would nullify the priority-based dynamic scheduling rights paid for by Firm OATT customers, socializing their investments in any reservations that are not scheduled by the new, earlier EIM scheduling deadline.