

**Comments of Powerex Corp. on
Consolidated EIM Initiatives from 2017 Roadmap
Issue Paper**

Submitted by	Company	Date Submitted
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Powerex appreciates the opportunity to submit comments on CAISO’s Consolidated EIM Initiatives from 2017 Roadmap Issue Paper (“Issue Paper”). The Issue Paper addresses three distinct potential transmission-related enhancements to the CAISO Energy Imbalance Market (“EIM”). Powerex recognizes that these are only some of several current EIM initiatives being explored by CAISO and stakeholders. In order to make the most efficient use of limited CAISO staff and stakeholder resources, Powerex believes that any EIM enhancements pursued in this proceeding should be limited to those intended to address issues that are having sustained and material adverse impacts on the EIM and/or that are likely to generate significant benefits.

As discussed more fully below:

1. Powerex supports CAISO developing a framework for transmission customers to “donate” to the EIM transmission capacity reserved pursuant to the terms of a transmission provider’s Open Access Transmission Tariff (“OATT”) in exchange for congestion revenues. However, Powerex questions whether such an initiative would provide material benefits at this time. As has been documented by CAISO and CAISO’s Department of Market Monitoring (“DMM”), transmission between EIM Entity balancing authority areas (“BAA”) is rarely congested. If the economic benefits of facilitating the donation of additional transmission capacity is likely to be limited at present, Powerex suggests that CAISO consider deferring this initiative so limited resources can be applied to higher-priority enhancements.
2. Powerex believes that the application of EIM-related imbalance charges to OATT customers that seek to use their reserved transmission rights after T-57 has materially reduced the incentives for some customers to continue to invest in OATT transmission service on some paths on certain EIM Entities’ systems. Powerex believes that EIM Entities should have the flexibility to take action to protect customers from these EIM charges, particularly to the extent that they believe that the issue may be having a material adverse impact on their transmission revenues; if so, there are at least two options available for EIM Entities to consider. However, Powerex does not believe that the “up to

congestion” concept outlined in the Issue Paper will be effective in addressing this issue.

3. The concept of a “net wheeling” charge appears to recognize that, under certain circumstances, certain EIM Entities may *enable* significant benefits to be realized by facilitating EIM Transfers, but do not currently *receive* any of those benefits (when the applicable transmission path does not congest). Powerex is supportive of exploring alternatives to achieve a more equitable allocation of EIM benefits in these circumstances, but cautions that this must be achieved in a manner that minimizes the introduction of “hurdle rates” that reduce the efficiency (and undermine the benefits) of the EIM.

I. Third Party Donation of Transmission

In the Issue Paper, CAISO explains that the overall benefits of the EIM market tend to increase with the availability of additional transmission capacity to support EIM Transfers. CAISO also notes that customers that hold reservations on third-party transmission systems between two EIM BAAs have expressed an interest in making this reserved capacity available for use in the EIM, which would increase potential EIM Transfers and, in turn, increase the benefits realized by EIM participants. CAISO states that it is considering modifying the mechanism currently used to allocate congestion rents associated with EIM interties to include an allocation to entities that donate transmission reservation to facilitate EIM Transfers.

Powerex generally supports the proposal to enable third-party donation of transmission to facilitate EIM Transfers. Currently, only EIM Entities are able to make transmission service on third-party systems available for use in the EIM. For example, Puget Sound Energy (“Puget”) makes available 300 MW of rights on the Bonneville Power Administration’s (“BPA”) system, in each direction, between the Puget/BPA interconnection and the BPA/PACW boundary, thereby enabling EIM Transfers between Puget and PACW. Powerex agrees that there is no reason to only permit EIM Entities and their affiliates to donate reserved transmission capacity on third-party systems to facilitate EIM Transfers.

As CAISO recognizes in the Issue Paper, enabling third-party donation of transmission rights to facilitate EIM Transfers will require modifications to the manner in which the CAISO allocates congestion revenues that are collected when EIM interties are congested. While congestion revenues currently are allocated to EIM Entity Scheduling Coordinators through the Real Time Congestion Imbalance Offset, there is no mechanism currently in place for CAISO to provide a portion of the congestion revenues associated with EIM Transfers to any party other than an EIM Entity. The Issue Paper outlines one potential mechanism for allocating congestion revenues to parties that make transmission reservations on third-party systems available to the EIM, thus

providing the financial incentive necessary to encourage such donation. Powerex supports this concept.

However, before further proceeding with efforts to extend this framework to third parties that donate transmission to facilitate EIM Transfers, it is important to consider whether doing so is likely to (1) result in substantial quantities of transmission rights being made available by third parties; and (2) whether this additional transmission capability will confer material benefits on EIM participants. Importantly, experience with the EIM to-date indicates that there has been little congestion between EIM Entity BAAs, implying that there may be limited interest by third parties in donating third-party transmission rights, as well as limited value to EIM participants of expanding EIM Transfer capability at this time. Moreover, the amount of EIM Transfer capability is already set to increase as new entities join the EIM, including Portland General, Idaho Power, and Powerex. The participation of these and other entities have the potential to significantly increase transfers between CAISO and the northern portions of the EIM, as well as among those northern participants. Moreover, the southern portion of the EIM already enjoys extensive EIM Transfer capability on an ongoing basis, as a result of EIM Entities in the region making all ATC available to support EIM Transfers. Powerex therefore believes that it may be appropriate for CAISO to defer further consideration of establishing a framework for third party donation of transmission until there is reason to believe that additional transmission capacity would be provided and that such a framework has the potential to confer material benefits on the EIM.

In the event that CAISO elects to further proceed with this initiative at this time, however, Powerex believes that stakeholders would benefit from clarification of a number of aspects of CAISO's proposals.

First, Powerex believes that stakeholders would benefit from further clarification of the manner in which congestion revenues would be allocated and settled in different circumstances. As Powerex understands it, the congestion revenues allocated to a donating party would be calculated as the product of (1) the quantity of EIM Transfers scheduled on the donated reservations; and (2) the positive difference in the congestion components of the LMP at the Point of Delivery (POD) and at the Point of Receive (POR). Donated rights would be eligible for compensation in both the 15-minute market and in the 5-minute market (for any changes in quantity from the 15-minute market solution).

Powerex requests that CAISO confirm this understanding, and/or provide illustrative examples of the financial settlement that would occur under various circumstances. In particular, Powerex believes it would be valuable to more fully understand the compensation for "counterflow" capability available in the 5-minute market based on

schedules from the 15-minute market solution. For example, consider a donation of 100 MW of transmission rights from A to B, which supports 80 MW of EIM Transfer in the 15-minute market. Since the EIM Transfers are not at the scheduling limit, this implies there was no congestion in the 15-minute market. In the 5-minute market, the donating party would be eligible to receive congestion revenue on the 20 MW of remaining unscheduled capability in the A-to-B direction, to the extent there was congestion from A to B in the 5-minute market. It would also be eligible to receive congestion revenues in the opposite direction—from B to A—for the 80 MW that was scheduled in the 15-minute market, to the extent there was congestion from B to A in the 5-minute market. The 15-minute market schedule of 80 MW from A to B can be reduced in the 5-minute market if there is congestion from B to A, effectively creating additional “counterflow” capability from B to A.

Powerex also recommends that CAISO clarify that the proposal would permit donation of rights held by transmission customers—and does not contemplate CAISO procuring service from a transmission service provider. Whereas a donation by a transmission *customer* simply represents the customer’s decision regarding how it utilizes the transmission service it has reserved and paid for, a donation of transmission by a transmission service *provider* would constitute a new type of transmission service under a rate not currently contained in the respective third party transmission providers’ tariff.

More broadly, Powerex believes that CAISO should clarify that financial settlement associated with the donation of transmission rights will be directly between CAISO and the transmission customer that makes its reservations available to the EIM. Powerex believes there is no need or benefit for the third-party transmission service provider to be involved in the financial settlement of EIM congestion revenues.

Finally, Powerex believes that the Issue Paper should clarify whether any donation framework would be limited to paths that connect two entities participating in the EIM Area. This could be on existing paths with ETSRs between EIM participants or new paths, subject to CAISO approval.

II. Evaluating the Impact of T-57 Base Scheduling Deadline on Transmission Revenues of EIM Entities

In the Issue Paper, CAISO explains that it is considering modifications to the EIM framework to mitigate the exposure of bilateral transactions to congestion charges following the deadline for the submission of base schedules (i.e., T-57). CAISO explains that, “[w]hen the balancing authority area through which these transactions are scheduled becomes an EIM Entity, schedule changes made after hourly base schedules are submitted are exposed to real-time imbalance settlement.” In particular, CAISO notes that any “difference between the LMP of the source and the LMP of the

sink can result in a charge or payment, but customers have no advance knowledge of the dollar magnitude for such changes.” In order to address this issue, CAISO explains that it is considering extending the CAISO’s existing functionality supporting wheel through transactions (i.e., an import paired with an export). CAISO explains that this functionality would allow market participants to specify the maximum LMP difference between the source and sink that they would be willing to accept, with the bid clearing when the price specified is higher than the LMP at the relevant points.

Powerex appreciates CAISO’s consideration of the impact that the current scheduling deadlines of the EIM are having on transmission customers and their willingness to invest in OATT transmission rights for non-EIM use. In Powerex’s experience, the application of EIM imbalance charges to all schedule adjustments made after T-57 has materially discouraged certain non-EIM transactions from occurring, which in turn has reduced the incentives for customers to invest in transmission service on EIM Entities’ transmission systems in the first place. Whether or not this materially affects transmission revenues varies, however; it may be an important issue for some EIM Entities, but not for others.

Generally, all current EIM Entities are also transmission service providers that sell transmission service into, out of, or through their service territory under contracts of durations ranging from one hour to multiple years. The sale of transmission service helps fund the overall transmission revenue requirement of the transmission provider, and hence reduces the remaining transmission revenue requirement that must be recovered from native load customers. Thus, the application of EIM charges to non-EIM transactions can result in a lower level of transmission investments by third parties, and has the effect of increasing the transmission cost of service for native load.

Take, for example, a transmission customer evaluating whether or not to invest in acquiring long-term firm transmission service across a particular BAA, at a cost of \$10 million per year. The customer anticipates that the transmission service would enable it to enter into additional forward or day-ahead transactions that it values at \$8 million per year, plus additional real-time transactions that it values at \$3 million per year. Overall, the \$10 million investment is expected to enable \$11 million in additional value, for a net benefit of \$1 million. This positive expected net benefit supports the transmission customer committing to transmission service that costs \$10 million per year. As a result, the transmission service provider receives \$10 million in transmission revenue, which reduces the cost that must be recovered from native load customers by \$10 million.

A critical element of the above calculation is that the cost of transmission service was fully known ahead of time (*i.e.*, \$10 million). And indeed, for transmission service on systems that do not participate in the EIM, this is typically the case.¹ This reflects that transmission customers that reserve firm transmission traditionally have not been directly exposed to the cost of congestion that may arise during the periods they schedule on their acquired rights. If there is congestion across the transmission provider's system in a given hour, the transmission customer using a constrained path is thus not subject to any additional financial charges. Instead, the transmission provider will re-dispatch its system to relieve congestion and respect the usage of the transmission customer without passing any incremental costs onto the specific customers.²

For transmission providers that have elected to participate in the EIM, however, the manner in which congestion is relieved is very different. First, real-time dispatch of resources is determined as part of the EIM's security-constrained economic dispatch optimization, which makes use of all participating resources to jointly meet all needs across the entire EIM footprint. The EIM calculates prices at locations throughout the EIM Entity BAA. Second, in implementing EIM participation, all EIM Entities to date have also modified their transmission tariffs to treat changes in interchange schedules that occur after T-57 as "energy imbalances" subject to Schedule 4 or Schedule 9. In other words, a transmission customer scheduling on a service reservation *before* the T-57 deadline experiences the same service, and the same financial charges, as before the EIM was implemented. However, a transmission customer that schedules on its service reservation *after* the T-57 deadline is exposed to financial charges if there is congestion on the path they have reserved.

These new charges have two broad features. First, while it is theoretically the case that the financial settlement could be either positive or negative, in practice the result will typically be to impose new and additional costs on the path that transmission customers typically seek to reserve. This is because the same fundamentals that make a particular path attractive in a particular direction (*i.e.*, higher value at the Point of Delivery than at the Point of Receipt) also tend to result in real-time congestion in the EIM in the same direction. For instance, north-to-south transmission service between the Pacific Northwest and California is generally fully subscribed. These paths also regularly experience north-to-south congestion in the CAISO day-ahead and real-time

¹ Transmission service usually requires compensation for losses calculated as a fixed percentage of the energy actually scheduled. Losses are typically compensated either financially (with reference to a published index) or in-kind. Consequently, a transmission customer can generally hedge the cost of losses through other forward transactions.

² The anticipated costs of redispatch are already incorporated into the ratemaking process that determines the rates for transmission service.

markets, particularly during the morning and evening peaks. On average, therefore, the introduction of EIM-related imbalance charges will generally increase the cost of transmission service across the systems of EIM Entities on the paths most relevant to transmission customers.

Second, in any particular hour or interval, these EIM-related imbalance charges are highly uncertain. This uncertainty prevents a transmission customer from evaluating whether the use of its transmission rights to support a real-time transaction will render the transaction unprofitable, since the full cost of the transaction is not known until after the fact. The higher risk can be expected to discourage activity that would be exposed to EIM-related imbalance charges.

In practice, the activity most impacted by these charges is the use of OATT transmission reservations to wheel-through an EIM Entity BAA to:

- 1) support real-time hourly bilateral transactions, and
- 2) hourly and 15-minute transactions in CAISO's real-time market.

This reflects that the timing of these transactions typically does not permit the transaction and associated schedule to be reflected in the interchange base schedules at T-57. Consequently, transmission schedules to support these transactions will be treated as "imbalances" under the transmission provider's tariff and subject to settlement using EIM prices. In Powerex's case, it has had the effect of sharply reducing its real-time hourly transactions that require transmission service on EIM Entity systems.

In Powerex's view, the introduction of EIM-related imbalance charges likely has had the effect—on certain paths and for specific EIM Entities—of "tipping the scales" and rendering otherwise economic investments in transmission service uneconomic. For some EIM Entities, this may have had a material impact on the transmission revenues received from third parties. The potential consequences of these additional costs on the revenues received by transmission customers can be considered by returning to the hypothetical example above. Assume that the transmission customer estimates that the application of EIM-related imbalance charges to real-time wheel-through service will reduce the value of real-time transactions from \$3 million to \$1 million. That relatively small change is sufficient, however, to alter the overall evaluation of whether to invest the required \$10 million in transmission service, which now is seen to have a *net loss* of \$1 million per year. Under this example, the transmission customer would elect not to procure the transmission service at all. And while this has some impact on the transmission customer—which no longer has the opportunity to earn \$1 million in additional net revenues—the much larger impact is on the transmission service

provider, and its native load customers, which will lose \$10 million in transmission revenue in this example.

Ultimately, the impact of applying EIM-related imbalance charges will vary from EIM Entity to EIM Entity. A transmission provider that historically has earned minimal revenue from the sale of wheel-through transmission service will have little or no exposure to factors that make wheel-through service less attractive. Similarly, for some transmission providers, there may continue to be sufficient value in obtaining wheel-through service to support forward and day-ahead transactions that the EIM impact on real-time hourly transactions does not lead to a material reduction in transmission revenues. For that reason, Powerex believes each EIM Entity should have the flexibility to determine whether the impact on its individual transmission system merits taking steps to mitigate the exposure of transmission customers to EIM-related charges for schedules submitted or adjusted after T-57.

For an EIM Entity that decides to pursue ways to reduce the impact of EIM-related imbalance charges on its transmission customers, two broad options appear to merit further examination. One option would be for an EIM Entity to modify its OATT to prevent the application of EIM imbalance charges to wheel-through schedules, even if they are submitted after T-57.³ Since a wheel-through schedule consists of a linked import and export schedule of equal quantity, it does not create an energy imbalance on the transmission provider's system. A wheel-through schedule may, however, increase congestion in the EIM Entity's BAA, requiring resources to be re-dispatched in order to accommodate the scheduled transaction. This is true for wheel-through schedules submitted prior to T-57, however, and was equally true for all wheel-through schedules prior to implementation of the EIM. It would appear entirely appropriate for an EIM Entity to not treat wheel-through schedules as imbalances under its tariff, if it chose to do so.

Alternatively, rather than changing how imbalances are defined or settled under the EIM Entity's OATT, an EIM Entity could develop a new mechanism that provides an offsetting credit to transmission customers that submit wheel-through schedules after T-57. More specifically, an EIM Entity could work with CAISO to calculate a financial credit equal to the difference in the congestion component of LMP at the Point of Receipt and the Point of Delivery for the quantity of deviations from base schedules associated with wheel-through schedules after T-57. This credit would effectively match

³ It is important to recognize that the current application of EIM-related imbalance charges to schedule changes after T-57 reflects the decision of EIM Entities to amend their own transmission tariffs and the rates charged for imbalance service. In other words, the application of these charges is not an inherent feature of the EIM design, but rather the product of how each EIM Entity implemented the EIM within its transmission service territory.

and offset the charges applied to such wheel-through schedules under the transmission provider's OATT.⁴

One way to implement this hedge would be to modify the current allocation of the RTCIO. Currently, CAISO collects congestion revenues and returns them to an EIM Entities through the RTCIO. Each EIM Entity subsequently sub-allocates this revenue to all of its transmission customers, *pro rata* based on measured demand. Rather than providing all of the RTCIO to the EIM Entity, however, CAISO would provide the credit discussed above, and reduce the RTCIO allocation to the EIM Entity by the same amount.

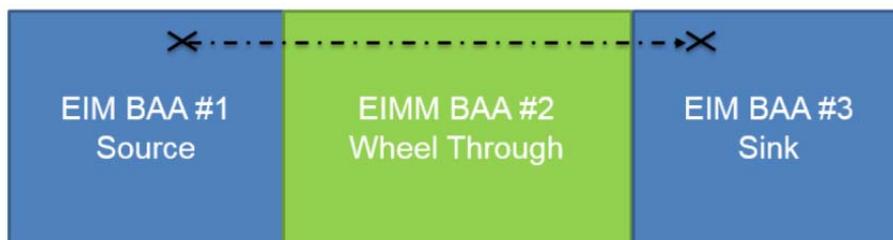
In considering either approach—or additional approaches not yet identified—an EIM Entity may wish to consider whether such treatment would extend to all wheel-through activity, or whether it would be limited depending on the priority of transmission service (*i.e.*, Firm vs. Non-Firm service) or the duration of the reservation (*i.e.*, hourly, daily, monthly, or long-term).

Finally, it is important to recognize that the “up to congestion” proposal discussed in the Issue Paper will not address the fundamental issue faced by transmission customers that are currently exposed to EIM imbalance charges for wheel-through activity after T-57. The “up to congestion” proposal would permit a transmission customer to indicate a price at which they will or will not submit a wheel-through schedule, but this only results in curtailing a transmission schedule and potentially causing non-performance on a commercial transaction. Powerex believes that removing disincentives to real-time hourly and sub-hourly activity requires certainty about what the EIM-related charges will be, not a mechanism that automates interruptions to delivery schedules when charges exceed a threshold price. For this reason, Powerex does not support the CAISO's “up to congestion” proposal.

III. Net Wheeling Charge

The Issue Paper explains that there are situations where “energy will source in one EIM BAA, wheel through another EIM BAA, and sink in a third EIM BAA.” The Issue Paper provides the following illustration of this situation:

⁴ The credit may differ from the imbalance charges since the latter will also reflect differences in the marginal losses component of LMPs, whereas the former is based only on the differences in the congestion component of LMPs. Since congestion is significantly more volatile and can reach higher levels, however, a hedge based only on the congestion component of LMPs is likely to mitigate nearly all of the impact of applying EIM-related imbalance charges on wheel-through activity after T-57.



The net exporting BAA (EIM BAA 1) derives a benefit from additional sales opportunities, while the net importing BAA (EIM BAA 3) derives a benefit from purchasing energy at a lower cost than is available within its own BAA. The intermediary BAA (EIM BAA 2), however, derives no benefit from these transactions, and also receives no compensation for use of its transmission system.⁵

The EIM was designed with the principle of transmission reciprocity, whereby each EIM Entity provides transmission service to support EIM activity at no incremental charge. The elimination of variable hurdle rates has been central to achieving efficient dispatch across the entire EIM participating footprint. Nevertheless, as illustrated by the example in the Issue Paper, transmission reciprocity raises at least two broad categories of concerns that may arise:

- 1) the potential for transmission revenues to decline if activity shifts into the EIM, where transmission is available at no charge; and
- 2) the potential for an inequitable distribution of EIM benefits.

A. An EIM Transmission Charge is Not Needed to Address Risks to EIM Entity Transmission Revenues

The first issue raised by transmission reciprocity is the potential for an EIM Entity to lose transmission revenue. In the prior example, in order for a resource in BAA 1 to sell to a customer in BAA 3 in the forward or day-ahead markets, it would need to purchase transmission service across BAA 2. But if the resource in BAA 1 can instead shift its sale into the EIM, and the customer in BAA 3 can do so as well, then an equivalent transaction can occur but with no need to purchase transmission across BAA 2. A similar concern exists for resources located inside BAA 1, which no longer need to purchase transmission service to export energy outside of the BAA.

In Powerex's view, there would indeed be significant cause for concern if the free transmission reciprocity framework of the EIM resulted in a demonstrated and material

⁵ If there is congestion between BAA 1 and BAA 3, there would be congestion revenues collected by the market operator and returned to the EIM Entities in which the congested constraints are located.

reduction in any EIM Entity's transmission revenue. Such a scenario would appear to put the EIM's efficiency benefits of eliminating hurdle rates into direct conflict with the needs of transmission service providers to equitably recover their costs through rates.

To date, however, Powerex has not seen any indication that EIM Entities have lost material transmission revenue as a result of its existing transmission customers shifting commercial activity into the EIM, where transmission service is provided at no charge.⁶ In other words, there does not yet seem to be a need to make EIM Entities "whole" for the transmission service being provided to other EIM participants. This is likely driven by the specific circumstances of each EIM Entity, however, and will not necessarily be the case for all future entrants.

The risk to transmission revenues of "shifting activity" into the EIM is likely to be greatest for EIM Entities, and prospective EIM Entities, that have traditionally recovered a significant portion of their transmission revenues from providing export and/or wheel-through service to transmission customers that are also EIM participants. For instance, BPA recovers a large fraction of its annual transmission revenue from the sale of export and wheel-through transmission service to third parties, and a substantial amount of this activity involves resources and sinks that are, or plan to be, EIM participants. For entities such as BPA, there would likely be great cause for concern if BPA were to make its transmission service available at no charge in the EIM, as this could significantly reduce BPA's transmission revenues, and hence increase the costs that must be recovered from its native load customers. In contrast, transmission providers that earn relatively modest revenues from the sale of export or wheel-through service are unlikely to be significantly affected by a shift in activities to the EIM.

Even if there were clear evidence of transmission revenue loss, however, Powerex does not believe that an EIM "wheeling charge" would be necessary or particularly effective. The risk to transmission revenue only arises if transmission customers can rely on transmission service that has not been reserved (and paid for) and is available at no charge in the EIM. While the "ATC Methodology" does, indeed, make all unused transmission capacity available for use in the EIM, this is not the only possible approach. An EIM Entity can also choose to designate how much—if any—transmission capability will be made available to support EIM Transfers. This is the framework used by PacifiCorp for EIM Transfers with CAISO, and is also the framework used by Puget Sound Energy for EIM Transfers with PacifiCorp. Powerex believes that any current or prospective EIM Entity that faces a material risk to transmission revenue

⁶ Powerex does believe, however, that some EIM Entities have experienced a loss of transmission revenue as a result of the impact of EIM implementation on their transmission customers' non-EIM activity. This occurs because certain non-EIM activity has ceased altogether, not because the activity has shifted into the EIM to avoid paying transmission charges. See Section II.

as a result of making service available in the EIM at no charge, can most effectively manage this risk by using the donation framework for EIM Transfers. This avoids creating an incentive for transmission customers to shift large amounts of their commercial transactions into the EIM in order to receive transmission service at no charge. For these reasons, Powerex believes that potential concerns over transmission revenue do not provide sufficient justification for creating any new charge for transactions in the EIM at this time.

B. A New EIM Charge May be Appropriate to Equitably Allocate EIM Benefits from EIM Transfers Across Intermediary BAAs

The second issue raised by transmission reciprocity is whether it results in an equitable distribution of EIM benefits. In the scenario discussed in the Issue Paper, it is obvious that the benefits received by BAA 1 and BAA 3 are possible only because of the EIM Transfers across BAA 2. Despite the importance of BAA 2 in enabling these benefits, however, BAA 2 does not actually receive any benefits in this scenario (due to the absence of congestion). The Issue Paper identifies this outcome as potentially inequitable, and seeks comments on whether a mechanism is needed to achieve a more equitable distribution of EIM benefits.

Powerex agrees that the scenario discussed in the Issue Paper presents an inequitable outcome. Powerex supports further consideration of steps that can be taken to address the equity issues associated with EIM Entities that disproportionately enable, but do not participate in, EIM Transfers through intermediary BAAs. Powerex believes this issue goes beyond the ordinary variation in EIM benefits that different EIM Entities are able to receive. Rather, it presents a situation where EIM Entities that *provide* benefits to the EIM, do not actually *receive* a portion of those benefits.

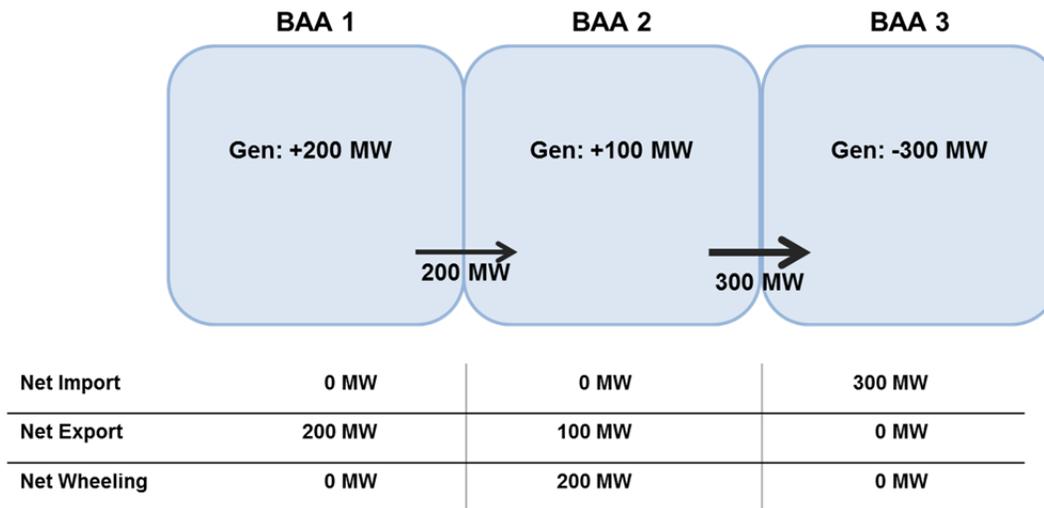
In contemplating possible ways to address this issue, Powerex believes it would be beneficial to keep certain high-level principles in mind:

- First, any new charge should strive to avoid introducing a new material hurdle rate, since doing so will inhibit efficient dispatch and reduce the benefits of the EIM. Any new hurdle rate should therefore be as small as possible.
- Second, any new charge should clearly *not* be a “transmission charge.” It is an established design principle of the EIM that transmission service is provided by EIM Entities at no charge. Further, any entities that have already paid for OATT transmission service across an EIM Entity’s system may challenge an EIM transmission charge as impermissible double-charging. These entities also may face a financial incentive to reduce their EIM activity or cease participation in the

EIM altogether, if they were to face a second charge (for service that they have already paid for).

- Third, the purpose and design of any new charge should be to more equitably distribute the benefits realized in the EIM and, therefore, should be based on a measure of those benefits.

A useful starting point for pursuing a more equitable allocation of the benefits of EIM Transfers is to examine what those transfers have been, what EIM BAAs have participated in them, and how they have changed as the EIM has expanded. Powerex analyzed CAISO data on 5-minute EIM Transfers for each BAA since the start of 2016 to compare the volume of net exports or net imports against the volume of overlapping imports and exports, representing the EIM Transfers across the BAA or “net wheeling” quantity.⁷ The figure below illustrates how EIM Transfer volumes were used to develop the net import/export metrics and the net wheeling metric:

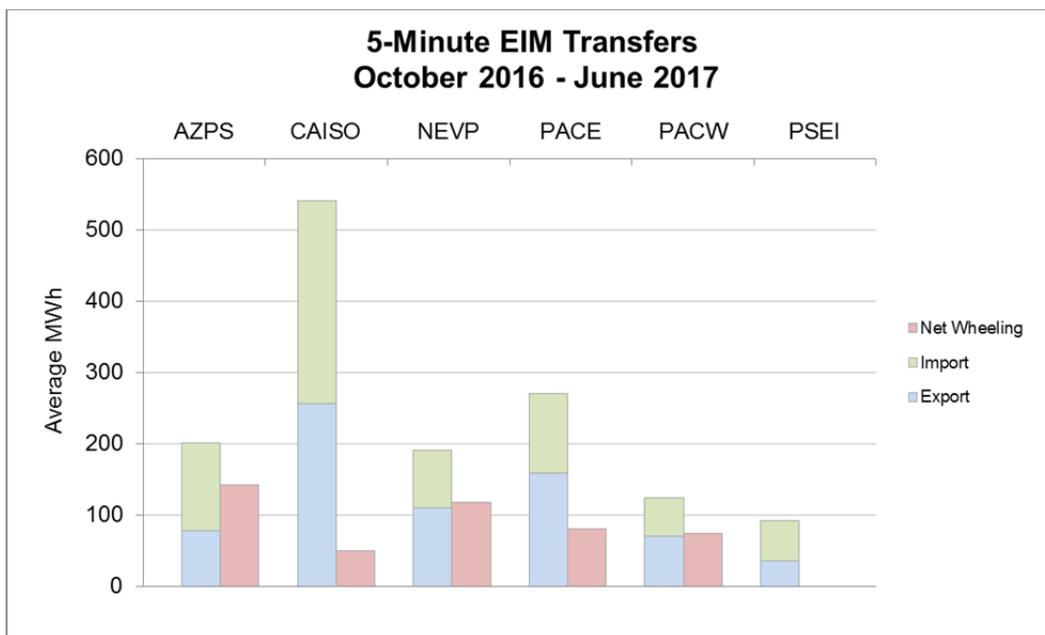
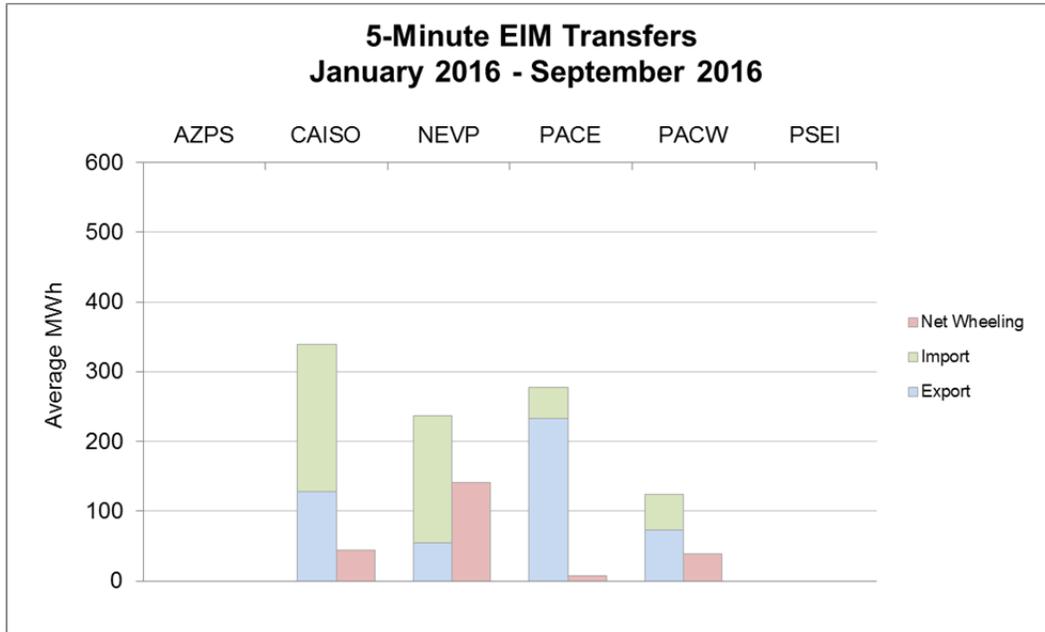


The net imports and net export volumes are a measure of the extent to which a BAA was the source or sink for EIM transactions. As discussed above, resources and/or loads in a BAA derive economic efficiency benefits from participating in net exports and net imports. The “net wheeling” volume is a measure of the EIM Transfers scheduled across an intermediary BAA, but without any change to the aggregate energy balance

⁷ Powerex urges CAISO to clarify that its use of the term “net wheeling” in this context refers to a situation in which an EIM BAA has EIM Transfers into its BAA at one intertie as well as EIM Transfers out of its BAA at a different intertie during the same interval, with the lesser of the two quantities termed the “net wheeling” quantity. This is merely a way to describe the volumes of EIM Transfers, and does not imply that the BAA provided transmission service for a matched or linked pair of import and export schedules, as the term is used in other transmission scheduling contexts.

within that BAA. This volume is a measure of the benefit that the BAA *enables* in the EIM, even though it does not receive those benefits at present.

The two charts below show the average net import and net export volumes for each EIM BAA, as well as the average net wheeling volume for each EIM BAA. The first chart covers the nine-month period January 1 – September 30, 2016, prior to the start of EIM operations by Puget Sound Energy and by Arizona Public Service (“APS”). The second chart covers the nine-month period October 1, 2016 – June 30, 2017.



Source: CAISO OASIS (both charts)

These charts show that the total “net wheeling” volume is a relatively large fraction of the total net import and net export volume.⁸ This implies that the ability for EIM Transfers to be scheduled across intermediary BAAs may be an important element of EIM benefits.

These charts also show which EIM BAAs have tended to be the intermediaries for EIM Transfers, and which EIM BAAs have tended to be the source or sink for EIM Transfers. Prior to APS and Puget joining the EIM, the primary net wheeling activity appears to have been between PACE and CAISO with NV Energy as the largest intermediary EIM BAA. Since October 2016, the CAISO and PACE have continued to be the BAAs in the EIM Area with the largest volume of net imports and net exports, but net wheeling now also occurs through APS, NV Energy and PACE. In both time periods, the CAISO is the EIM BAA with the largest volume of net imports and exports, and is also the EIM BAA with the lowest volume of net wheeling (except for EIM BAAs that are topographically at the “end” of the EIM footprint, such as Puget under the current configuration).

The foregoing can inform consideration of the three key design questions for a mechanism to more equitably distribute EIM benefits: (1) how much revenue should be collected for re-allocation? (2) From which entities and on what basis should these revenues be collected? (3) To which entities and on what basis should the revenues be distributed? Powerex provides its initial view on each of these design elements below.

1. How much revenue should be collected for re-allocation?

Since the objective is to ensure a more equitable allocation of EIM benefits, the revenue collected for re-allocation should be based on the benefits realized in the EIM. But more specifically, the revenue to be collected should reflect the *additional* benefits resulting from EIM Transfers across an intermediary BAA, as opposed to only between adjacent BAAs. A precise calculation of these incremental benefits could easily become highly complex and time-consuming, requiring the formulation and calculation of EIM outcomes under alternative counterfactual scenarios. Powerex does not advocate such an approach here. Instead, Powerex suggests that a workable approach might be based on the bid-in cost of the marginal resource dispatched in each EIM BAA. The difference between the market-clearing price in a BAA and the price of the marginal resource dispatched within the BAA provides one potential measure of the marginal benefit of EIM Transfers into or out of the BAA.

⁸ Since every MW of net export from one BAA must be matched by a MW of net import into another BAA, the wheel-through volume should be compared *either* to the total net import volume or to the total net export volume, but not to the sum of the two.

For example, the LMP in a BAA receiving net EIM Transfers may be \$30/MWh, based on the bid-in price of the marginal resource located in a different BAA. The bid-in price of the least expensive resource dispatched within its own BAA might be \$35/MWh, however. This would indicate that EIM Transfers into the BAA provide an incremental benefit of \$5/MWh.⁹ This amount can be referred to as the “infra-marginal” rent associated with EIM Transfers.

An attractive feature of this approach is that it can be calculated using only information from the actual market run; it does not rely on any counterfactual scenarios or require new optimization runs. Using this approach, CAISO could calculate the marginal value of EIM Transfers across all EIM BAAs over a rolling historical period (e.g., over the past quarter). A proportion of this total amount could then be designated as the target revenue to be collected and allocated to intermediary BAAs. For example, if “net wheeling” is approximately 20% of total EIM Transfers, perhaps 1/5th of all infra-marginal rents associated with EIM Transfers could be collected and provided to entities enabling “net wheeling”.

2. From which entities and on what basis should these revenues be collected?

There are several possible ways to collect the target revenue to be re-distributed. In this regard, Powerex believes that the primary consideration should be to avoid imposing a material hurdle rate on EIM transactions. The goal of this initiative is to achieve a more equitable distribution of EIM benefits, but pursuit of this goal should not sacrifice the very benefits it seeks to distribute.

As a practical matter, the risk of impairing efficient dispatch is minimized by imposing a per-MWh charge that is as small as possible.¹⁰ This, in turn, is achieved by spreading the revenue target over as broad a base of EIM activity as possible. Powerex therefore suggests that any revenue to be redistributed be collected as a charge on all EIM-settled transactions, including deviations in load and generation output, as well as instructed dispatches of resources. This is analogous to how the EIM administrative costs are currently recovered, except that the fee would also be charged on real-time market transactions within the CAISO BAA.

⁹ This assumes that the limitation on additional EIM Transfers is the DEC bid range of the \$35/MWh, rather than congestion on the EIM Transfers itself. As discussed in the Issue Paper, the concerns regarding allocation of EIM benefits arise when there is no congestion on EIM Transfers, since the presence of congestion results in revenues to the BAA where the binding constraint occurs.

¹⁰ In theory, distortions are minimized by allocating costs to the least price-sensitive activity. However, since the EIM is a voluntary energy-only market in which transactions are for economic displacement, all EIM transactions are likely to be price sensitive.

This approach is also consistent with cost-causation principles, as all BAAs engage in net imports and exports, and a substantial fraction of EIM Transfers involve intermediary BAAs.

3. *To which entities and on what basis should the revenues be distributed?*

The final design consideration is the basis on which the collected revenues will be distributed. It would seem relatively straightforward to allocate the revenues in proportion to the volume of net wheeling enabled by each EIM Entity, based on the type of metric presented in the prior charts. This implies that each MW of EIM Transfers across an intermediary BAA contributes equally to EIM benefits, which is unlikely to be the case. However, a framework for more accurately evaluating the contribution to EIM benefits is highly unlikely to be workable.

The distribution framework should recognize that EIM Transfers across intermediary BAAs can occur in at least two distinct ways. First, the intermediary BAA may itself be an EIM Entity, such as when net exports from PACE are scheduled across NV Energy's transmission system and into the CAISO BAA. Second, the intermediary BAA may be a transmission service provider that is not an EIM Entity. This occurs when net exports from the Puget BAA are scheduled across BPA's transmission system and into the PACW BAA, for example. In such cases, both Puget and PACW directly benefit from the EIM Transfers, but it is Puget, and not PACW, that enables the 300 MW of transmission service across BPA's BAA necessary for those benefits to be realized. Similarly, Powerex anticipates making available 150 MW of transmission reservations on BPA's system between the BC-US border and COB, in each direction. Both Powerex and the CAISO BAA will benefit when there are EIM Transfers scheduled on those rights, but it will be Powerex, and not the CAISO, that funds the intermediary transmission service across the BPA BAA that enables those benefits to be realized. Arrangements that enable EIM Transfers through a non-EIM BAA should be recognized as providing "net wheeling", similar to EIM Entities that enable those transfers across their own transmission systems.