Memorandum

To: ISO Board of Governors

From: Keith Casey, Vice President, Market & Infrastructure Development

Date: June 14, 2018

Re: **Decision on congestion revenue rights auction efficiency track 1B proposal**

This memorandum requires Board action.

EXECUTIVE SUMMARY

Management seeks Board approval of changes to the ISO's congestion revenue right market rules that will reduce the net payment to a congestion revenue right holder if its payments exceed associated congestion charges collected in the day-ahead market. The ISO currently pays congestion revenue right holders in full even if the congestion revenues collected from the day-ahead market are insufficient to cover the total payments due to congestion revenue right holders. This occurs when more restrictive constraints are enforced in the day-ahead market than were enforced in the congestion revenue rights auction. When this occurs, day-ahead market congestion revenue is insufficient to cover payments to congestion revenue right holders. The ISO currently charges this revenue deficiency to load (more specifically, load and exports).

Management proposes that, instead of charging load for this revenue inadequacy, the ISO will charge congestion revenue right holders in proportion to congestion revenue rights flow over each constraint in the day-ahead market associated with the revenue inadequacy. This change will result in a more equitable allocation of the revenue inadequacy instead of charging it to load.

Management also proposes to decrease the percentage of system capacity released in the annual congestion revenue rights allocation and auction process to 65 percent from 75 percent. This will provide greater assurance that congestion revenue rights obtained in the annual process will be feasible in the monthly process. This will reduce the amount of payment reductions resulting from revenue inadequacy charges.

These changes are part of the ISO's congestion revenue rights auction efficiency initiative designed to decrease the ISO's congestion revenue rights auction revenue shortfall. Since 2014, auction revenues have averaged $99.5 million per year less than payments to congestion revenue rights. The Board approved track 1A of the initiative in

March 2018 and the ISO subsequently submitted these changes to the Federal Energy Regulatory Commission (FERC). Track 1A consisted of changes to the ISO's congestion revenue right market rules designed to decrease the auction revenue shortfall by limiting congestion revenue right sources and sinks and improving outage reporting.

While track 1A targeted decreasing the auction revenue shortfall primarily by increasing congestion revenue right prices, track 1B addresses the auction revenue shortfall by decreasing net congestion revenue right payments to bring them more in line with system conditions modeled in the auction. Management also proposes to offset the revenue inadequacy charged to congestion revenue right holders to the extent there are revenue surpluses collected on the same constraint over the course of a month. This will reduce the amount of revenue taken back from congestion revenue right holders and therefore mitigate incentives to bid lower prices for congestion revenue rights in the auction.

Management proposes the following motion:

> ***Moved, that the ISO Board of Governors approves the proposal to implement the congestion revenue rights auction efficiency track 1B changes described in the memorandum dated June 14, 2018; and***
>
> ***Moved, that the ISO Board of Governors authorizes Management to make all necessary and appropriate filings with the Federal Energy Regulatory Commission to implement this proposal, including any filings that implement the overarching initiative policy but contain discrete revisions to incorporate Commission guidance in any initial ruling on the proposed tariff amendment.***

BACKGROUND

Congestion revenue rights facilitate participation in the ISO's market by providing market participants the ability to hedge congestion costs in the ISO's locational marginal price-based day-ahead market – effectively locking in the cost of day-ahead market transmission service on a forward basis. This ability to hedge congestion cost risk is an important part of the ISO's market design. It results in more efficient bilateral long-term power contracting because suppliers do not have to include congestion cost risk premiums in power contracts. Congestion revenue rights and the congestion revenue rights auction are a standard part of all of the ISO and RTO market designs in the United States.

Congestion revenue rights entitle holders to a payment or charge based on the differences, due to congestion, of the locational marginal prices between two locations in the day-ahead market. For instance, if location A has a locational marginal price of $30/MWh and location B has a locational marginal price of $50/MWh, the holder of a

congestion revenue right from location A to location B will receive $20/MWh (the difference between location A and B day-ahead energy prices). An entity with supply at location A but with demand at location B would be exposed to $20/MWh in congestion charges if it does not acquire a congestion revenue right from location A (the source) to location B (the sink). The entity would receive $30/MWh in day-ahead market energy payments for supply at location A, but would be charged $50/MWh for energy delivered to location B in the day-ahead market. This entity can hedge the $20/MWh congestion cost by purchasing the congestion revenue right.

Market participants obtain congestion revenue rights in annual and monthly allocation and auction processes. In both the annual and monthly process, the ISO first allocates congestion revenue rights to load-serving entities based on their requests and then auctions the remaining congestion rights to all eligible participants (e.g., generator owners, marketers, financial traders).

Generally, over the long-term, congestion revenue rights auction prices should reflect the value of the hedge provided against day-ahead market congestion charges and consequently should generate auction revenues that are more or less commensurate with the payments congestion revenue rights receive from the day-ahead market. This has not been the case for ISO congestion revenue rights. ISO congestion revenue rights auction revenues have been much less than payments to congestion revenue rights holders. Since 2014, auction revenues have averaged $99.5 million per year less than payments to congestion revenue rights holders. The ISO allocates auction revenues to load and exports.

In March 2018, the Board approved track 1A of the ISO's congestion revenue rights auction efficiency initiative and the ISO subsequently submitted these changes to the FERC. Track 1A consisted of two changes to the ISO's congestion revenue right market rules that were designed to decrease the auction revenue shortfall. The first change was to limit congestion revenue right sources and sinks to only the combinations needed to hedge congestion costs associated with delivering supply. This is intended to increase auction prices by concentrating congestion revenue right bidding to transmission paths involving supply delivery. Track 1A also included an earlier transmission outage reporting requirement so that the ISO can more accurately model outages in the congestion revenue rights auction and allocation process.

In conjunction with these changes, the ISO has implemented various congestion revenue rights process changes also intended to improve the efficiency of the congestion revenue rights auction. These include changes to outage reporting and constraint modeling in the auction and the day-ahead markets that the ISO can implement without tariff changes. These changes are referred to as track 0 of the initiative.

In its March 2018 Board memorandum regarding track 1A, Management described that it was continuing to consider additional congestion revenue right market rule changes that it would propose to the Board at a later date. Management also described that it was seeking earlier action on the initial track 1A changes so that they could be developed and implemented in the ISO systems in time for the 2019 annual congestion revenue right allocation and auction process.

PROPOSAL

The ISO currently makes day-ahead market payments to congestion revenue right holders for the full MW quantity of their congestion revenue rights awarded in the auction. This occurs even if constraints subsequently enforced or tightened in the day-ahead market, such as due to transmission outages, prevent the day-ahead market from scheduling a corresponding amount of power. The lower amount of power scheduled in the day-ahead market over a constraint reduces the associated congestion revenue the day-ahead market collects. When this happens, this full congestion revenue right funding results in congestion revenue being insufficient to cover payments to congestion revenue rights holders. The ISO currently charges load (more specifically, load and exports) to make up for this revenue inadequacy and allocates it any surplus. The CAISO also allocates any surplus in the monthly balancing account to demand.

Full funding of congestion revenue rights also exacerbates congestion revenue rights revenue inadequacy and auction revenue shortfalls. For example, market participants can obtain low-priced congestion revenue rights in the auction that can have high payouts if a constraint not modeled in the auction turns out to be enforced in the day-ahead markets, or vice versa. This results in high payouts that often lead to revenue inadequacy and also contribute to auction revenue deficiencies due to payouts that are inconsistent with the conditions modeled, and resulting prices, in the auction.

To address these issues, Management proposes to modify the market rules to allocate congestion revenue rights revenue inadequacy to congestion revenue right holders. Under this approach, congestion revenue right holders will receive day-ahead market congestion payments for only the transmission capacity that is actually available in the day-ahead market. The proposed changes in track 1B are designed to work in conjunction with the track 1A changes to reduce the auction revenue shortfall.

Management proposes to allocate congestion revenue rights revenue inadequacy to congestion revenue right holders based on each of their congestion revenue rights' modeled flow over market constraints resulting in revenue insufficiency. The ISO will charge each congestion revenue right holder for each of their congestion revenue right's share of each constraint's revenue inadequacy based on each congestion revenue right's proportional share of all congestion revenue rights' modeled flow over the constraint. For example, assume the congestion revenue rights auction modeled congestion revenue rights as having 800 MW of flow over a constraint representing a 1,000 MW line. Assume the ISO subsequently reduces the line's transmission capacity

for one day in a month to 500 MW, and that the line is congested for all hours of the day with congestion charges averaging $10/MWh. Under the current market rules, the congestion revenue rights over the line will be paid the full MW value despite the line's derate in the day-ahead market, with payments on that day totaling $192,000 (800 MW * $10/MWh * 24 hours). However, the day-ahead market for that day will only collect $120,000 in congestion charges associated with the line because only 500 MW can flow over it, resulting in a $72,000 revenue deficiency. The ISO charges load for this revenue deficiency under the current market rules. Under Management's proposal, the ISO will instead charge the $72,000 revenue deficiency to the congestion revenue rights that have flows over the line. For example, if one congestion revenue right in this example has 400 MW of flow over the line and two others each have 200 MW of flow over the line, the ISO will charge the first congestion revenue right $36,000 ($72,000 * 400 MW/800 MW) and will charge each of the other two congestion revenue rights $18,000 each ($72,000 * 200 MW/800 MW).

Management's proposal ensures net revenue adequacy by assigning shortfalls to all congestion revenue right holders, rather than assigning all shortfalls to load as it does today. Management proposes that all congestion revenue rights, whether they are obtained through the allocation or auction processes be treated similarly. Management's proposal is equitable among all categories of market participants because each congestion revenue right holder pays shortfalls associated with their own congestion revenue rights. This means that the load and exports that currently suffer all of the revenue inadequacy shortfalls will only be charged for those shortfalls associated with the congestion revenue rights they hold.

One potential drawback to allocating congestion revenue rights revenue inadequacy to congestion revenue rights rather than to load is that market participants may reduce the amount they are willing to pay for congestion revenue rights in the auction. This could potentially increase, rather than decrease, auction revenue shortfall if auction prices decrease by a large amount.

Management proposes two measures to mitigate that potential. First, Management proposes to offset the charge to congestion revenue rights for revenue inadequacy that is described above with any day-ahead market revenue surpluses associated with the constraint over the month. The day-ahead market will collect a revenue surplus associated with a constraint when the day-ahead market scheduled flow over the constraint is greater than congestion revenue rights entitlements on the constraint.

Second, Management proposes to decrease the percentage of system capacity released in the annual congestion revenue rights allocation and auction process to 65 percent from 75 percent. This will increase auction participants' confidence that a congestion revenue right they are bidding to purchase in the auction will not have its payment reduced because the corresponding transmission capacity may become unavailable.

POSITION OF THE PARTIES

Pacific Gas & Electric, Northern California Power Agency, and Powerex support Management's proposal to allocate congestion revenue shortfalls to congestion revenue rights rather than load, noting it makes important improvements to equitably allocate the cost of congestion revenue right revenue inadequacy.

The Market Surveillance Committee generally supports Management's proposal and emphasizes the importance of the ISO's continued role as a provider of congestion revenue rights through both allocation and auction processes. However, the Market Surveillance Committee also notes that if auction participants view Management's proposed allocation of congestion revenue shortfalls as making congestion revenue rights too risky, then it would potentially decrease auction revenues more than it decreases payouts. Consequently, the Market Surveillance Committee proposed several potential modifications to guard against this. One of these recommendations was to decrease the percentage of system capacity made available in the annual auction to provide increased assurance congestion revenue rights, which Management adopted. Other stakeholders are divided on this measure, those opposing it being concerned it will reduce available congestion revenue rights.

The Department of Market Monitoring, Southern California Edison, Six Cities, and the California Public Utility Commission support Management's proposal as improvements to the current congestion revenue right market rules, but also maintain the ISO should make more fundamental changes to the congestion revenue rights auction. They maintain the ISO should implement a design in which only a "willing counterparty" would fund a congestion revenue right's payments in exchange for a fixed payment instead of the current design in which the ISO market funds congestion revenue right payments, effectively on behalf of load. They maintain the current design is not equitable because the auction revenue received for funding payments to congestion revenue rights has been substantially less than the payments.

Management agrees that the congestion revenue right market rules should minimize this auction revenue shortfall, but believes that the adverse impact to the overall wholesale energy market of discontinuing the congestion revenue right auction's sales of ISO-market backed congestion revenue rights would likely exceed the benefit of eliminating the auction revenue shortfall. Management believes the comprehensive changes in the three tracks of this initiative will significantly reduce the auction revenue shortfall while maintaining the auction's energy market benefits.

Auctioned congestion revenue rights enable all classes of market participants to participate in the ISO market under equivalent conditions by providing them all the same means to efficiently hedge day-ahead market congestion cost risk, particularly that associated with delivering power as part of forward contracts. This enables efficient forward contracting, which enables load to be served at the least cost and protects load

against market power, particularly during tight supply conditions. This is particularly important in today's environment in which generation is retiring and load is migrating to community choice aggregators. Community choice aggregators often must purchase at least a portion of their congestion revenue rights in the auction because the ISO bases congestion revenue right allocations on historical load and their load is increasing. The auction also allows suppliers to have access to the same hedging mechanism that load does so they can participate in the market under equivalent conditions.

The ISO's sales of congestion revenue rights in the auction ensures these benefits are realized. Also, the ISO can provide this hedging mechanism at the lowest cost because the day-ahead market generates the congestion revenue needed to make payments to congestion revenue right holders. In contrast third parties would demand a substantial additional risk premium to be counterparties to congestion revenue rights because they are not hedged by this stream of congestion revenues.

Finally, the proposal for an auction with sales of only congestion revenue rights backed by a "willing counterparty" poses a number of practical implementation challenges because of the large number of potential congestion revenue right source and sink combinations. It is unlikely that all of the source and sink combinations under the current design would be available, even as modified by this initiative's track 1A. This would decrease the overall benefits of congestion revenue rights described above.

Other stakeholders oppose management's track 1B proposal, offering different revenue inadequacy allocation methodologies, including allocating revenue inadequacy costs attributable to transmission outages to transmission owners, or suggesting that the ISO first wait until it sees the effect of the track 0 changes it has already made or the track 1A changes filed with FERC. Six Cities and Calpine offer different cost allocation methodologies that they suggest would reduce the impact to individual congestion revenue right holders. Management believes its proposal is preferable because it addresses incentives to exploit differences between constraints modeled in the congestion revenue rights market and the day-ahead market while being feasible to implement in time for congestion revenue right financial settlement in 2019.

Stakeholder comments relating to technical details of Management's proposal and Management's response, are outlined in a stakeholder comment matrix included as Attachment A. The Market Surveillance Committee provided a formal opinion on Management's proposals and is included as Attachment B.

CONCLUSION

Management requests the ISO Board of Governors approve the changes described above to adjust congestion revenue rights payments to the level supported by transmission capacity that is actually available in the day-ahead market. The proposed changes provide for the equitable allocation of congestion payment shortfalls among all congestion revenue rights holders, thereby reducing the congestion payment shortfall burden currently borne by load. The proposed changes also mitigate incentives to bid for congestion revenue rights that could have inflated payouts relative to their auction prices.

Management believes that the combined track 1A and track 1B proposals will resolve a majority of the observed auction inefficiencies. Management's proposals are extensive and the impact of these changes on auction performance will need to be assessed prior to pursuing further design changes. To allow time for this assessment, Management will continue to explore additional potentially comprehensive rule changes beginning mid-2019 and targeting implementation in time for the 2022 congestion revenue rights auction which takes place fall 2021.