

Day-Ahead Market PTP modeling issue

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DC Energy has become aware of a concern surrounding modeling of Day-Ahead Market Point-To-Point Obligations

PTP Obligation Issue

- **The issue can result in a PTP price from the optimization that is different than the price spread calculated from the published Day-Ahead Market (DAM) Settlement Point Prices (SPPs)**
 - As articulated by ERCOT, the issue can occur when a contingency de-energizes a Settlement Point where either a source or sink of a PTP Obligation bid exists, AND this contingency results in a binding constraint where the remaining energized Settlement Point (source or sink) has a non-trivial shift factor to the constraint
- **Upon reviewing the issue, we identified additional market inefficiencies that can occur due to a PTP position at a de-energized Settlement Point (SP)**
 - Since the de-energized SP's shift factor to the disconnecting constraint is not used in the optimization to clear awards or establish energy price, the amount of flow that can clear on the constraint due to injections and withdraws at the disconnected path is unbounded and has no impact on the price of that constraint
 - A counterflowing transaction with exposure to the disconnecting constraint that is supported by the prevailing direction flow of the PTP could be used to arbitrage the pricing inefficiency
- **Per PUCT rule § 25.503(f)(12), we are sharing our observations of this inefficiency**
 - Market participant...who identifies a provision in the ERCOT procedures that produces an outcome inconsistent with the efficient and reliable operation of the ERCOT-administered markets shall call the provision to the attention of the appropriate ERCOT subcommittee



There is a misalignment between the optimization used for awards and market settlement

Identification of the issue

- The shift factor of the disconnected SPP to the disconnecting constraint is undefined, however both nodes in the PTP are considered zero in the clearing optimization by virtue of not being used; whereas only the disconnected SPP is considered zero in the formulation of energy price
- The following equation represents the status quo equation for optimizing awards and is borrowed from the example found in ERCOT's whitepaper, where a PTP at Settlement Points S1 and S2 are impacted by three constraints and SP S1 is disconnected by constraint 2:

$$PTP_{S1-S2}^{\$optim} = SF_{S1,c1,hr} \times SP_{c1} + SF_{S1,c3,hr} \times SP_{c3} - SF_{S2,c1,hr} \times SP_{c1} - SF_{S2,c3,hr} \times SP_{c3}$$

- Using the example above, the settlement treatment for S1 and S2 is as follows:

$$SPP_{S1} = \lambda - SF_{S1,c1,hr} \times SP_{c1} - SF_{S1,c3,hr} \times SP_{c3}$$

$$SPP_{S2} = \lambda - SF_{S2,c1,hr} \times SP_{c1} - \underbrace{SF_{S2,c2,hr} \times SP_{c2}}_{\text{This value is not found in the optimization}} - SF_{S2,c3,hr} \times SP_{c3}$$



This value is not found in the optimization



We submit the following fixes to equations are the best forward to stop the issues from reoccurring

DC Energy's Proposal

- DC Energy's recommendation for resolving the issues is to align the optimization with the settlement of the disconnected path and explicitly state that the status quo treatment of undefined shift factor of the disconnected Settlement Point is treated as the value of zero in the optimization and settlement equation

$$PTP_{S1-S2}^{\$ optim} = SF_{S1,c1,hr} \times SP_{c1} + SF_{S1,c2,hr} \times SP_{c2} + SF_{S1,c3,hr} \times SP_{c3} - SF_{S2,c1,hr} \times SP_{c1} - SF_{S2,c2,hr} \times SP_{c2} - SF_{S2,c3,hr} \times SP_{c3}$$

Where, $SF_{S1,c2,hr} = 0$

$$SPP_{S1} = \lambda - SF_{S1,c1,hr} \times SP_{c1} - SF_{S1,c2,hr} \times SP_{c2} - SF_{S1,c3,hr} \times SP_{c3}$$

Where, $SF_{S1,c2,hr} = 0$