EDAM Congestion Revenue Allocation

Scott Harvey
Member, California ISO/Western EIM Market Surveillance Committee

Market Surveillance Committee Meeting
March 28, 2025

Topics

- The Issue: Loopflow Impacts and Pricing
- Market Design Considerations
- EDAM Evolution

Loopflow Pricing

This discussion focuses on the pricing of loopflow in EDAM, WEIM and other markets, and the allocation of associated congestion charges.

- We need to have as context for this discussion that loopflow congestion charges are a small portion of overall congestion charges in WEIM and will be in EDAM as well.
- Loopflow congestion pricing and allocation rules can nevertheless have a significant effect on market efficiency.
- Loopflow congestion costs can arise as a result of:
  - Inter-balancing area intertie schedules;
  - Intra balancing area dispatch of generation to meet balancing area load;
  - WEIM or EDAM dispatch to meet market load.

Loopflow Pricing

There is an intrinsic potential for inter-balancing area transactions to result in loopflows over parallel systems.

- This potential is a consequence of the fact that power flows over all parallel paths from source to sink.
- These loopflows are generally small for generation dispatched to meet load within the same balancing area, but this is not the case if the balancing areas are large (e.g. PJM after its 2004 expansion, or MISO since 2005).
- The WEIM and EDAM market dispatch can also create flows on constraints in balancing areas other than those in which generation is dispatched up and down.

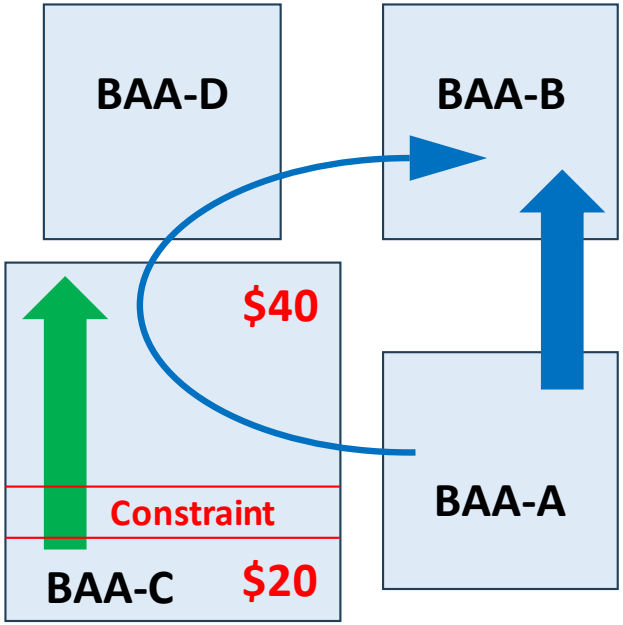
Loopflow Pricing

Loopflows do not have a material impact on adjacent systems if there is no transmission congestion.

- When there is transmission congestion, loopflows can raise the cost of meeting load in an adjacent balancing area by reducing the transfer capability available for use to meet native load.
- My understanding is that the WEIM does not assess the impact of base schedules on neighboring balancing areas when evaluating base schedule feasibility.
- The WEIM settlements price the impact of market flows on constraints in other balancing areas if the dispatch differs from the base schedule,

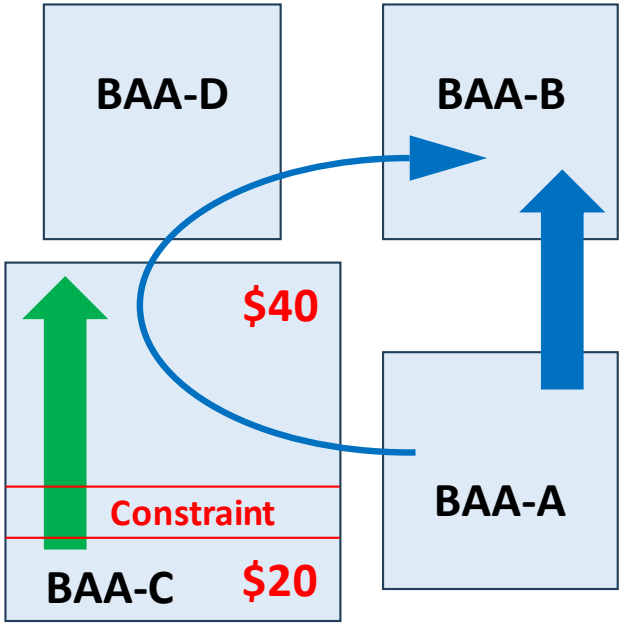
Loopflow Pricing

The graphic below illustrates the potential for transactions between balancing areas A and B to create loopflows over a constraint internal to balancing area C. These loopflows reduce the transfer capability available to meet load in the northern part of balancing area C with lower cost generation in the southern part of balancing area C



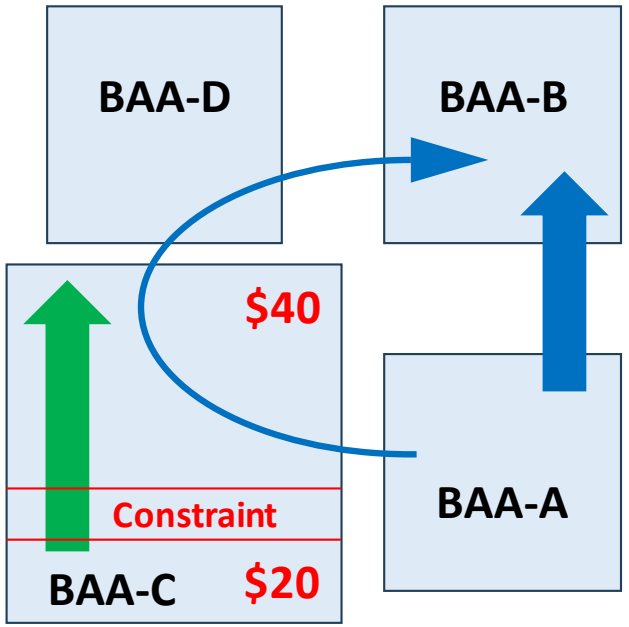
Loopflow Pricing

The loopflow impacts would be the same if the dispatch of generation in balancing area A to meet load in balancing area B were the result of the WEIM market dispatch.



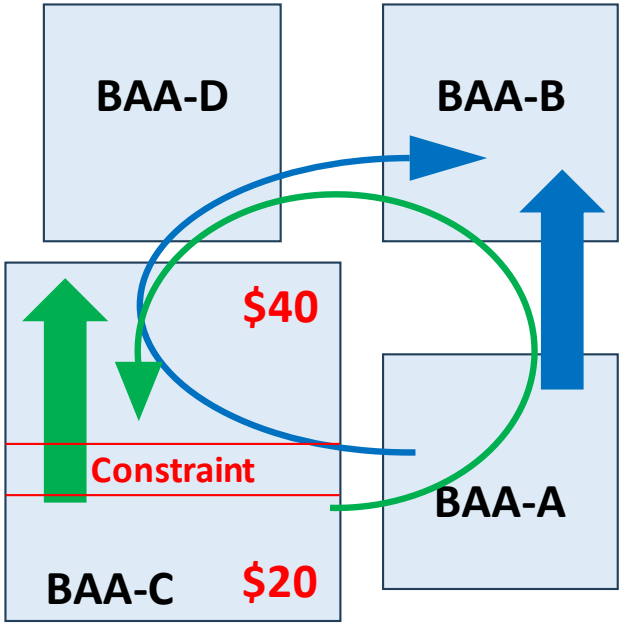
Loopflow Pricing

With LMP pricing of WEIM flows, the congestion charge for flows over the binding constraint in BAA C would be greater than or equal to the as bid cost savings to BAA C load from dispatching generation in the southern part of BBA C to meet load in the north. Hence, BBA C rate payers would not be adversely impacted by the loopflow if they receive the congestion charges for loopflows on the internal constraint. However, BAA C rate payers would be adversely impacted if the congestion charges on the loopflows were rebated to another balancing area.



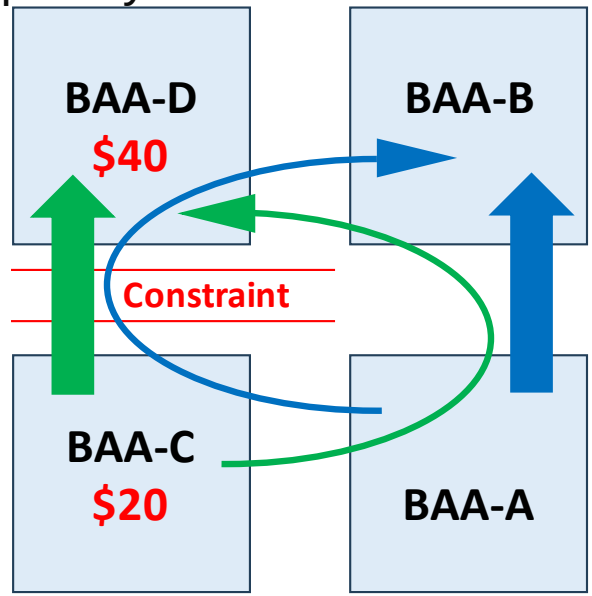
Loopflow Pricing

On the other hand, balancing area C load could also benefit from loopflows from the southern part of balancing C around through balancing area A and B to meet load in the northern part of balancing area C. These loopflows would reduce the impact of generation in southern C on the constraint and allow more generation in southern C to be dispatched to meet load in the north.



Loopflow Pricng

It is also possible for loopflows to use up transfer capability between balancing areas, reducing the transfer capability available to meet balancing area load with low cost imports. In this example, loop flows from A through C into D and B would reduce transfer capability available between balancing areas C and D. However, loopflows from C into A into B and into D would increase the transfer capability available to BAAs C and D.



Market Design Considerations

Treatment of OATT service that:

- Settles based on the transmission entitlement like a CRR, without regard to feasibility;
- Does not subject transactions to TLRs or to settlement reductions for outages.
- Pays OATT transactions for counterflow

Is much better than OATT service. This has been recognized in other markets and should be recognized in any transitional or long-term arrangements in EDAM.

Market Design Considerations

Several considerations should be kept in mind in evaluating alternative congestion rent allocation designs:

- Tying allocation of congestion rents to use of firm transmission, or to the dispatch of generation to meet balancing area load, will generally create inefficient use-it-or-lose-it self-scheduling incentives in EDAM.
  - My understanding is that there is no requirement that transactions self-scheduled in EDAM be self-scheduled in real-time. This is good.
  - Nevertheless, the EDAM unit commitment resulting from self-schedules incented by congestion rent allocation rules may be inefficient. If low cost resources are not committed in EDAM because they are displaced by self-scheduling of higher cost resources, the high resources self-scheduled in EDAM may have to be dispatched in real-time.
  - On the other hand, paying congestion rents for the full amount of OATT transmission entitlements may result in much better than OATT service and result in congestion rent shortfalls in settling native load.

Market Design Considerations

Several considerations should be kept in mind in evaluating alternative congestion rent allocation designs (continued):

- Paying for counter-flow provided by OATT transmission as part of the market dispatch results in better than OATT service and may result in congestion rent shortfalls in settling native load if the counterflow enables increased prevailing flows that are not charged for congestion..
- Firm transmission schedules in the Resource Sufficiency Evaluation might provide an alternative basis for defining firm transmission rights holder and native load rebate entitlements, while not impacting EDAM schedules and the EDAM unit commitment (which would be determined in a different EDAM pass).

Market Design Considerations

Several considerations should be kept in mind in evaluating alternative congestion rent allocation designs (continued):

- Allocation of congestion rents to balancing areas based on loopfow congestion charges can result in an incentive to inefficiently schedule balancing area generation, because the effective generation price would be higher than the dispatch price.
    - With such a design there would appear to be an ability for the entity self-scheduling in EDAM to submit economic offers in real-time, resulting in the self-scheduled resource being dispatched down and selling back the loopflows the entity did not pay for.
    - These incentives and cost shifts might be immaterial in practice for particular balancing areas if loopflow congestion charges are generally small and larger charges are unpredictable and only known after the fact..

Market Design Considerations

Several considerations should be kept in mind in evaluating alternative congestion rent allocation designs: (continued)

- WEIM development was fundamentally different from that of MISO, SPP or NYISO because it did not begin with a big bang, but was the result of slow steady growth.
- EDAM development will likely be similar, which suggests application of interim congestion rent allocation rules until EDAM has grown to the point where development and agreement on a long run design is workable, taking into account operating experience.
- One interim rule could be the definition of flow entitlements on constraints in adjacent balancing areas.

Market Design Considerations

Joint congestion management designs in the east replace TLRs with congestion charges for loopflows as in WEIM and EDAM.

- PJM and MISO, for example, often make payments for flows over constraints in the other balancing area. The net payments from PJM to MISO were $40.9 million in 2024. [1]
- PJM and MISO have also agreed upon firm flow entitlements on the other's system, congestion charges are only paid for flows in excess of the flow entitlements. [2]

1. Monitoring Analytics, State of the Market Report for PJM, Volume 2, 2024 March 13, 2025 page 502 Table 9-38.
2. Ibid pp. 500-501. Note that the PJM IMM apparently recommends eliminating firm flow entitlements.

Market Design Considerations

Attention needs to be paid to the loopflow treatment of future sales of OATT firm transmission service.

- Should the sale of firm transmission service be subject to a simultaneous feasibility test?
- Should there be a constraint by constraint cap on loopflow congestion credits, with flows above the entitlement cap paying full congestion charges, including a prorated charge for OATT schedules?

Market Design Considerations

CRRs have several important characteristics that should be kept in mind in developing congestion rent settlements in EDAM. CRRs are:

- Subject to a simultaneous feasibility test;
- May not be fully funded in all circumstances;
- Are obligations, so require payments when they become counterflow;
- Are financial contracts that are intentionally disconnected from generation schedules or dispatch in order to avoid use-it-or-lose-it incentives.

EDAM Evolution

A long-run goal should be development and implementation of some type of financial congestion hedge that does not create use-it-or-lose-it incentives and supports economic dispatch across EDAM and the WEIM. This will require:

- Developing and agreeing upon an allocation and/or auction design for the financial rights, including the application of a simultaneous feasibility test to existing OATT service and native load entitlements to transmission;
- Agreement on the appropriate time of day granularity for the financial right awards;
- Developing a method to apply a simultaneous feasibility test to incremental OATT sales or replacing OATT sales as a funding mechanism;
- Developing rules to assign auction revenues, ARRs, and or residual congestion rents to BAAs;
- Development of a mechanism for assigning shortfalls due to transmission outages to the responsible balancing area or other transmission owner;

This will require a significant effort and will not be achieved overnight.

EDAM Evolution

An interim mechanism that assigns congestion rents on internal constraints to balancing areas and divides congestion rents on inter-balancing area constraints can provide a starting point for EDAM evolution.

- Such a design internalizes congestion rents due to infeasibilities and outages to the responsible balancing area without development and implementation of more complex rules.
- Such a design could be combined near-term with a fixed amount of balancing area flow entitlements on a set of constraints in adjacent balancing areas. This cap could be defined in aggregate $ terms or on a megawatt basis.
- Settlements based on flow entitlements will become more complex as the number of balancing areas in EDAM rises, so settlements based on flow entitlements should be viewed as an interim step before a transition to some form of a financial rights based design.
- Flow entitlements would also be complex to define and implement on a time of day basis.