Extended day-ahead market greenhouse gas (GHG) discussion

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The resource specific GHG approach in EDAM

Design supports current and evolving regulations across the West. Key design elements include:

I. Modeling the geographic boundary of a GHG regulation area to reflect state-level policies;
II. Supporting bid adders for multiple GHG regulation areas;
III. Limiting secondary dispatch through a new counterfactual approach and;
IV. Applying a GHG net export constraint to further limit secondary dispatch potential

I. Multi-state BAA geographic modeling

Updated geographic boundary reflects state boundaries to align with state regulations

- Allows the ISO to reflect GHG compliance costs within a state but not in the dispatch of resources not subject to these programs
- Accommodates unique circumstances with multi-state BAAs that require a different geographic modeling approach and coordination with state air regulators
  - The ISO will continue to coordinate with EDAM entities and state air regulators

II. GHG Bid adders and attribution

Voluntary bid adders provide an approach flexible enough to accommodate a range of regulations

- Bid adders represent a resource's willingness to serve demand in a GHG area
- For resources within a GHG regulation area, the ISO includes reference level updates based on the prevailing allowance price
- Attribution is based on energy + GHG bids
- Compliance is ultimately based on real time dispatch and resulting emissions

III. Counterfactual: Optimized GHG Reference Pass

Attribution of transfers to serve a GHG regulation area is limited by the GHG reference pass:

- The optimized supply schedule provides a realistic counterfactual for EDAM entities to serve their native load
  - Attribution can occur either above or below a resource's counterfactual
- Real time counterfactual becomes the difference between the day-ahead energy award and the day-ahead GHG award
  - WEIM entities not in EDAM will use self-submitted base schedules as the counterfactual
  - Aligns with the approach taken in the WEIM

Counterfactual for use in Real Time Market

Resource	Day Ahead Market	FMM	Settlement
UEL = 100MW GHG Bid = 50MW GHG Cost = $30 *UEL: Upper Economic Limit	Energy Award = 90MW GHG Award = 50MW	FMM Counterfactual = 90MW – 50MW = 40MW FMM Eligible Attribution = 100MW – 40MW = 60MW	DA = 50MW *$30 = $1,500 FMM = (60MW – 50MW) * $30 = $300

FMM Counterfactual = DA Energy Award – DA GHG Award

Day Ahead Settlement = IFM Award MW * IFM Marginal Cost of GHG
FMM GHG Settlement = (FMM Award MW – IFM Award MW) * FMM MC of GHG
RT GHG Settlement = (RTD attribution MW – FMM Award MW) * MC of GHG

EDAM market passes

1. **RSE pass:** Single unit commitment for each BAA, in parallel

2. **GHG reference pass**:
   - Optimizes for the entire market footprint at the BAA level and across BAAs
   - Limits net GHG transfers in import direction to a GHG region but does not prevent an export

3. **MPM for the IFM**:
   - Unlocks GHG transfers between BAAs and GHG regulation areas
   - Applies GHG constraints

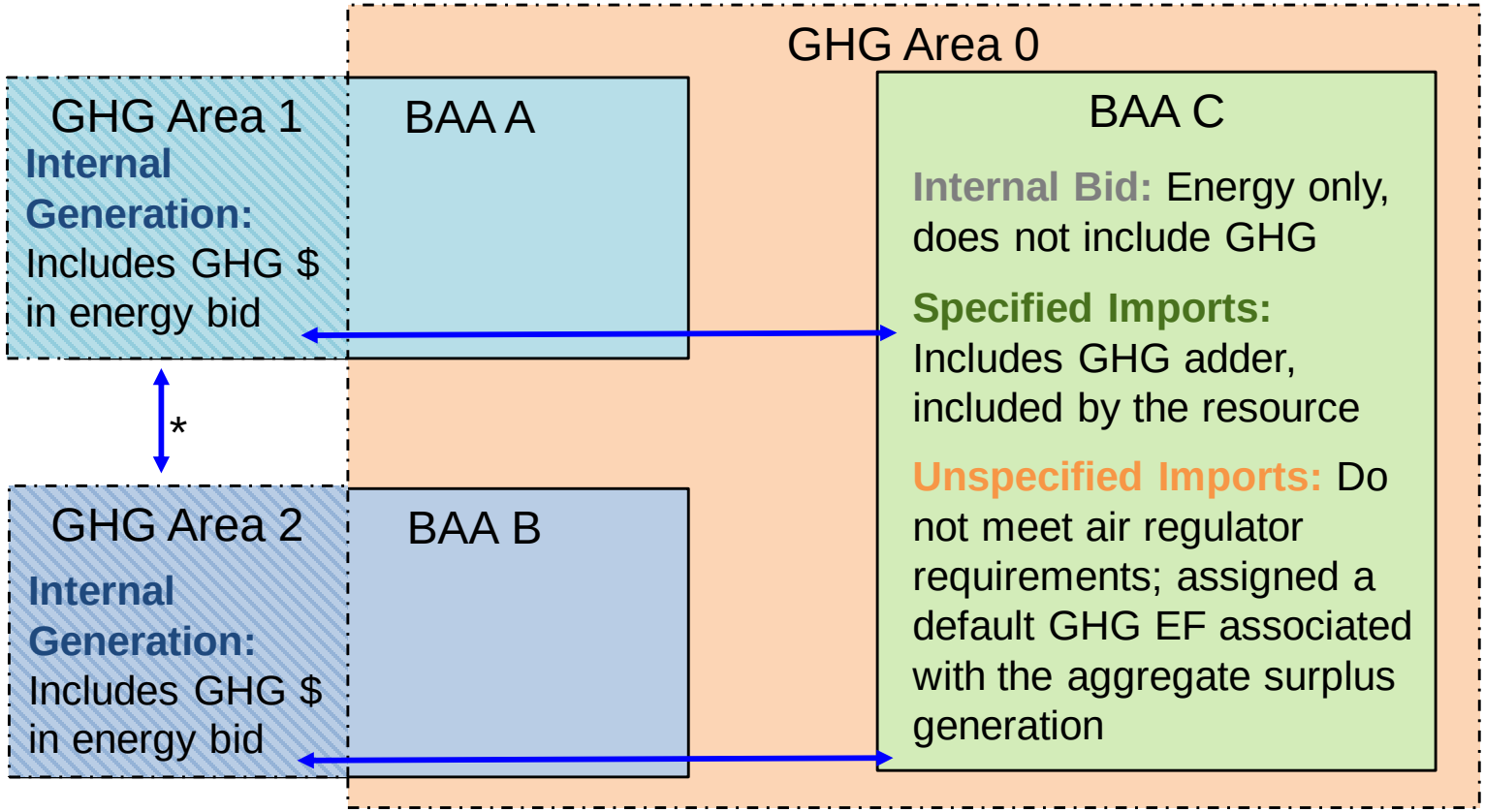
4. **IFM:**
   - Optimally schedules each BAA and GHG regulation area to reflect optimal dispatch in the EDAM footprint, considering constraints

5. **MPM pass for RUC**

6. **RUC**

Resource specific overview with multiple GHG areas

Uses resource-specific bid adders to optimize dispatch. Scheduling coordinators for resources in non-GHG regulation areas attributed to serve demand in a GHG regulation area would remain responsible for compliance and reporting.



* **Between GHG regions:** unlinked (GHG bid adder); linked (energy bid includes GHG $)

GHG constraints

The enhancements include constraints to reduce the potential for secondary dispatch

1. **GHG attribution constraint**: Attribution limited to the lower of:
   - The GHG bid capacity
   - The positive difference between the Upper Economic Limit (highest capacity on the energy bid) and the GHG reference pass
   - The optimal energy schedule

2. Hourly net export constraint: The aggregate GHG attribution in a BAA outside the GHG area will be limited to the higher of:

- The net export BAA transfer (zero if a net import), or
- The aggregate RA capacity procured from resources in the BAA

IV. Net Export Constraint

Based on stakeholder feedback, an hourly net export constraint limits attribution when a BAA is a net importer:

- The proposal maintains implementation flexibility on whether the constraint will be static or dynamic:
  - Static formulation will use the net export transfer from the previous iteration
  - Dynamic formulation will use the net export transfer co-optimized in the current iteration

- To ensure no reliability impacts, all net export constraints are deactivated during an hour in which a BAA that overlaps with a GHG area fails the RSE

Treatment of RA Capacity

Viewed as internal to the GHG regulation area; not attributed

- Resources with both a pseudo-tie PGA to associate the resource with the BAA and a GHG pseudo-tie to associate the resource with the GHG regulation area

Viewed as external to the GHG regulation area; fully attributed

- RA resources from EDAM BAAs shown as a bucket 1 energy transfer into the ISO BAA RSE
  - They will have a zero GHG reference so that the RA capacity can be fully attributed
  - Will not be constrained by net export transfer constraints

Treatment of RA Capacity

Viewed as internal to the GHG regulation area; not attributed

- Dynamically scheduled resources from non-EDAM BAAs shown as a system resource or tie-generators at an ISO scheduling point

Viewed as external to the GHG area; can be fully attributed

- Dynamically scheduled resources from non-EDAM BAAs shown as system resources or tie-generators at an EDAM BAA intertie can be viewed as external to the GHG area if the EDAM BAA is not inside the GHG regulation area

2022 GHG attribution awards above and below the base schedule for importing and exporting BAAs