Observations of current EIM dispatch optimization

- Least cost dispatch can have effect of sending low GHG gas emitting resources to ISO, while not accounting for “secondary” dispatch of other resources backfilling to serve external demand
  - ARB has implemented bridge solution to temporarily account for these additional emissions.

- Least cost dispatch can result in avoided curtailment of ISO renewables by displacing external emitting resources to serve external demand in EIM
Atmospheric effect of EIM transfers serving CAISO load is not always apparent when attributed to a base schedule

• If the attributed resource would have generated in the absence of serving ISO demand, then another external resource’s incremental dispatch with higher emissions may be serving ISO demand

• But, if the attributed resource would not have generated in the absence of serving ISO demand, then the resource’s incremental emissions correctly reflect the atmospheric effect
Previously proposed two pass market optimization to address secondary dispatch emissions is problematic

• Can introduce pricing inconsistency

• Can create perverse bidding incentives

• Identified issues undermine principle that when load outside CAISO is served by generation outside CAISO, prices should not reflect the cost of GHG compliance
GHG design has changed since go-live, but market optimization algorithm has not changed to date

<table>
<thead>
<tr>
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<th>GHG Bid Quantity</th>
<th>GHG Bid Price</th>
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</thead>
<tbody>
<tr>
<td>At outset of EIM</td>
<td>Pmax of resource</td>
<td>&lt; $1,000 less Energy bid</td>
</tr>
<tr>
<td>Year One Enhancement</td>
<td>0 MW to Pmax</td>
<td>&lt; Resource daily GHG cost plus 10%</td>
</tr>
<tr>
<td>Current Proposal</td>
<td>0 MW to (Upper economic limit less base schedule)*</td>
<td>&lt; Resource daily GHG cost plus 10% But, subject to minimum bid price at secondary emission GHG cost.</td>
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- CAISO can address bid quantity independently
- CARB input needed to address secondary dispatch through bid price
Limiting bid quantity reduces the secondary emissions that can occur, but not completely

- Reduces magnitude of secondary dispatch by reducing potential attribution quantity

- For example, assume a
  - 100 MW hydro resource  100 MW GHG bid quantity
  - 80 MW base schedule  85 MW dispatch

- Currently, attribution can be 85 MW
  - 80 MW of potential secondary dispatch emissions

- Design change, attribution can be up to 20 MW
  - Thus limiting potential secondary dispatch quantity to 15 MW
Secondary dispatch emission rate can be between 0 MtCO2/MWh and the calculated rate

- CAISO is willing to continue to support CARB to develop the secondary emission rate
- Resources will be able to reflect full emissions obligation in the GHG bid price to ensure CAISO market prices and settlement cover cost of compliance
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