

EIM GHG Market Design

MAY 2020

California Cap-and-Trade Program

- ❑ **The California cap-and-trade program was implemented in 2013**
 - A multi-sector, market-based mechanism that covers electricity generated in or imported into California
 - Sets a cap on GHG emissions that decreases annually to achieve 40% below 1990 levels by 2030.
 - Covered entities must purchase or obtain “allowances” to cover their reported GHG emissions

- ❑ **Electricity generated in or imported into California is subject to the California cap-and-trade program**
 - An emission factor is assigned to a generation source based on its fuel source (metric ton of CO₂e emitted per MWh).
 - The emissions factor for an unspecified source is 0.428 metric ton CO₂e per MWh, roughly equivalent to natural gas thermal generation.

Asset Controlling Supplier

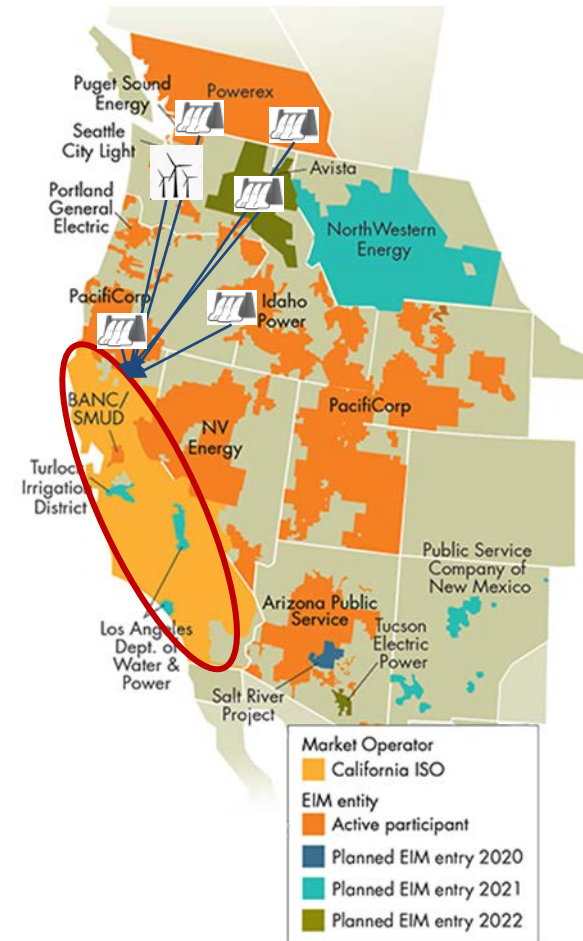
- ❑ **Entities outside of California can register as an Asset Controlling Supplier (ACS) and voluntarily report GHG emissions annually to the California Air Resource Board (CARB)**
 - An ACS owns or operates interconnected electricity generating facilities or serves as an exclusive marketer for these facilities even though it does not own them
 - ACS emission factors are based on the resource mix reports, which has a two-year delay
- ❑ **There are three entities currently registered as ACS:**

Asset Controlling Supplier	CARB-Assigned Emission Factor
Bonneville Power Administration (BPA) ARB ID #4000	0.0120 MT CO ₂ e per MWh
Powerex ARB ID #3101	0.0254 MT CO ₂ e per MWh
Tacoma Power ARB ID #104567	0.0155 MT CO ₂ e per MWh

Based on 2017 data for reporting year 2019

EIM GHG Accounting

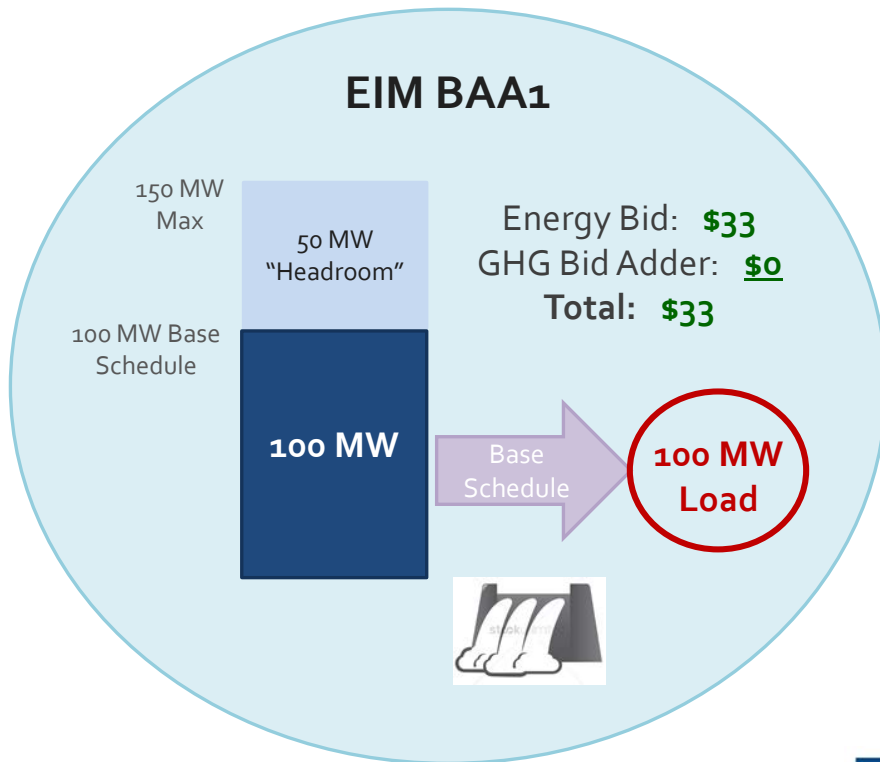
- ❑ **In organized markets, there is no explicit link between individual resources and loads.**
 - An organized market optimizes generation and load simultaneously for the entire market footprint.
 - The market optimization does not associate any specific generation to any serve specific load.
- ❑ **To track the carbon content of imports into the CAISO from the EIM, CAISO deems resources being imported into California based on the GHG bid adder.**
 - EIM Participants must indicate willingness to be “deemed” to be imported into California.
 - EIM “deems” those resources with the lowest GHG bid adder cost to be imported into California.
 - Results in zero/low carbon resources predominantly “deemed” to be imported into California.



EIM Participant Bid

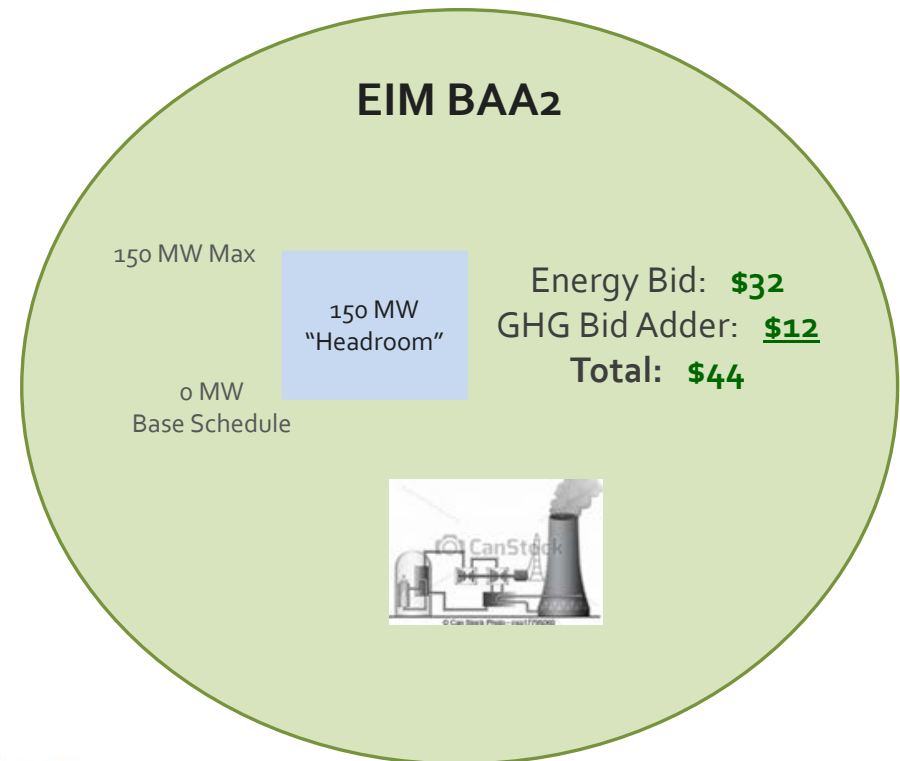
Hydro

EIM BAA1

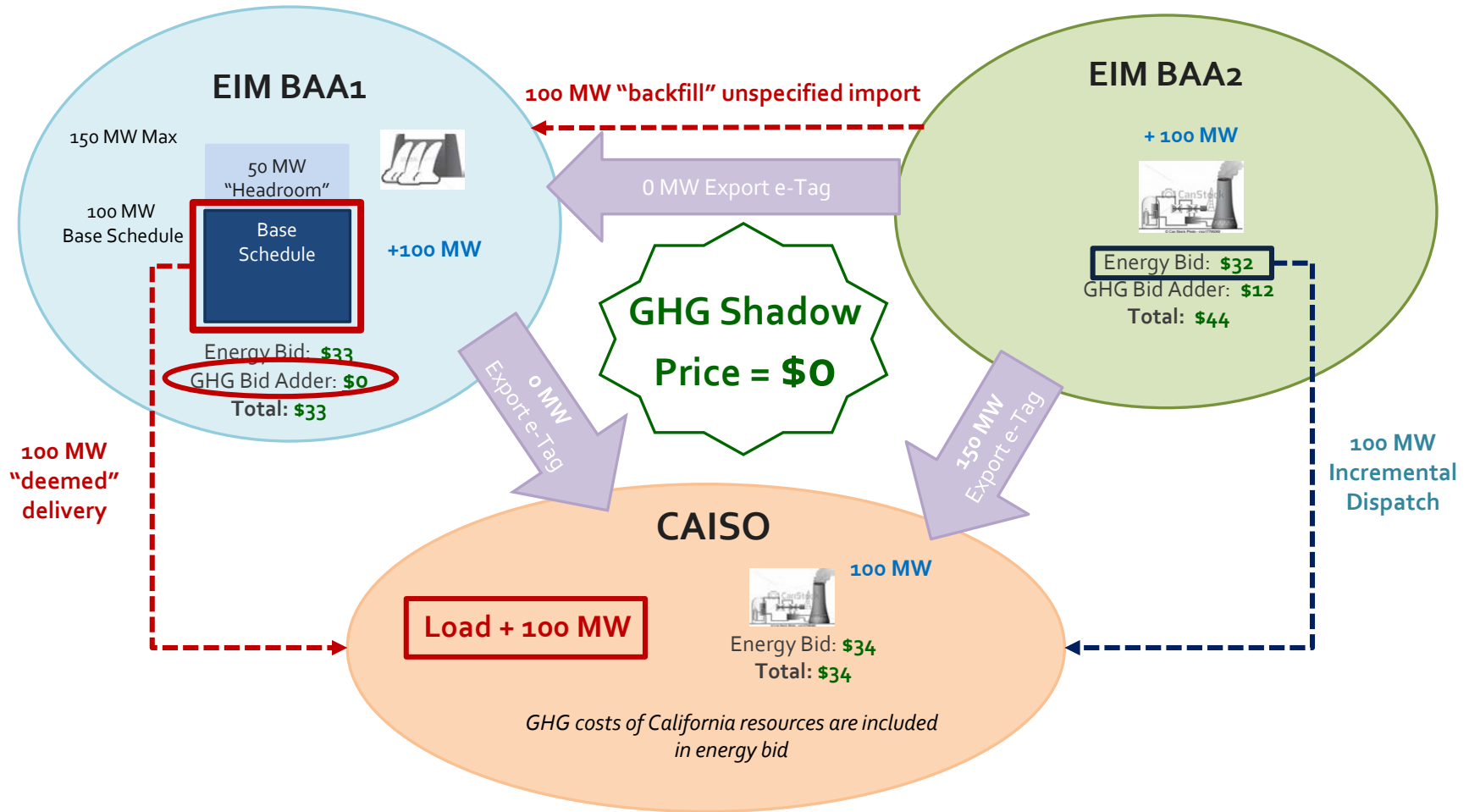


Thermal

EIM BAA2



EIM Deeming Algorithm



EIM Deeming Algorithm Outcomes

- 1. Dispatch is not consistent with GHG accounting**
 - Algorithm may result in higher emitting resources being dispatched instead of clean resources
 - California thermal resources may be displaced by higher cost/higher emitting external thermal resources
- 2. “Deemed” deliveries do not capture emissions deliveries of secondary leakage**
 - Incremental emissions incurred outside of California (“secondary leakage”) are not addressed by CARB’s program
- 3. The GHG shadow price does not reflect the GHG costs of resources incrementally dispatched to serve California load**
 - True costs of external resources being imported into California may not captured
 - The more clean resources that participate in the EIM, the higher the likelihood that a zero/low GHG cost resource is the marginal GHG resource.
- 4. Base schedule “deemed” to serve California is assumed to be backfilled by EIM imports**
 - EIM imports are considered “unspecified” from a carbon content perspective (0.428 metric ton CO₂e per MWh)
 - May impact an entity’s overall ACS emissions factor

Stakeholder Process to Address Secondary Leakage

- ❑ CARB was concerned about the increased emissions outside of California created by the EIM GHG design.
- ❑ In response, CAISO held a multi-year stakeholder process and considered several solutions, including a two-pass optimization:
 - First pass optimizes the footprint outside of California
 - Second pass adds California footprint to determine which resources were incrementally dispatched to serve California load.
- ❑ Through the stakeholder process, concerns were raised that market participants could game the two-pass solution:
 - Bid in such a way that a market participant doesn't get taken in the first pass but instead gets taken in the second pass to capture the higher price in California.

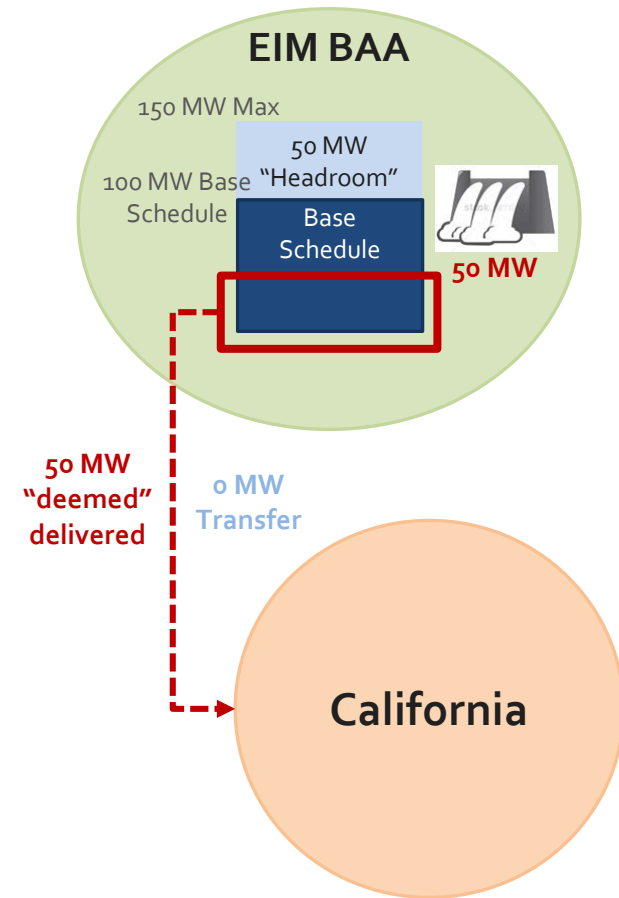
2018 EIM GHG Enhancements

❑ As such, CAISO put a different solution in place:

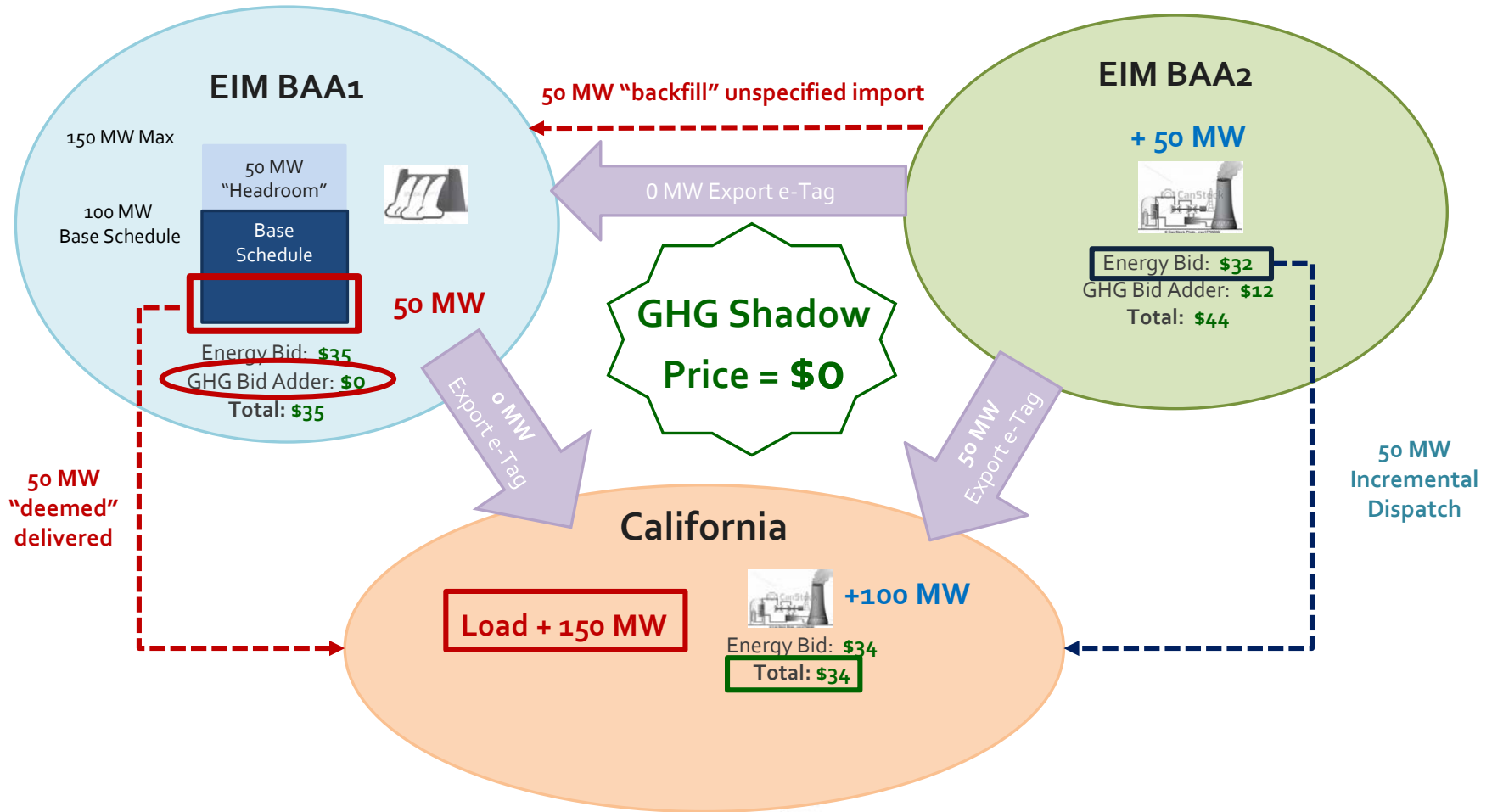
- Limits the quantity a resource can be “deemed” to be imported into California to the MW value bid above its base schedule.
- The market can still “deem” a resource’s base schedule to serve CA load if the resource’s upward dispatch range is not fully dispatched.

❑ As a result of the EIM GHG Enhancements, the amount of “secondary leakage” was reduced, but not eliminated.

❑ The EIM GHG Enhancements were implemented in November 2018.



EIM Deeming Algorithm with Enhancements



Next Steps

- ❑ CAISO plans to address GHG accounting in the Bundle #2 topics of the EDAM stakeholder process.
- ❑ The EDAM GHG solution should also explore unintended effects of remaining potential secondary dispatch effects and how to avoid them.
- ❑ It is anticipated that the GHG accounting methodology determine for EDAM will also be applied to the EIM.
- ❑ The EDAM GHG Accounting initiative is scheduled to begin fall 2020.