



California ISO
Shaping a Renewed Future

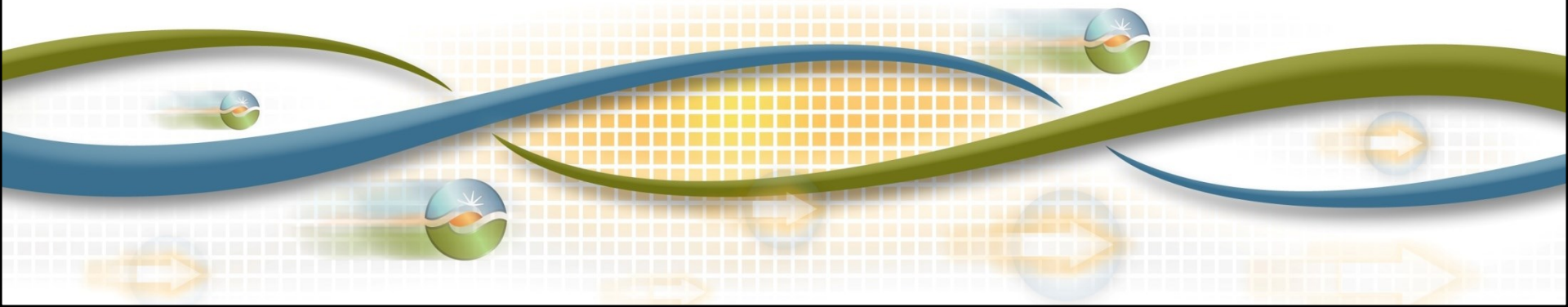
Greenhouse Gas Regulation in Energy Imbalance Market

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Overview

- California Greenhouse Gas Regulation
- GHG Compliance in EIM:
Problem and Solution
- Market Optimization Model Changes
- GHG Compliance Settlement in EIM
- Future Challenges
- References

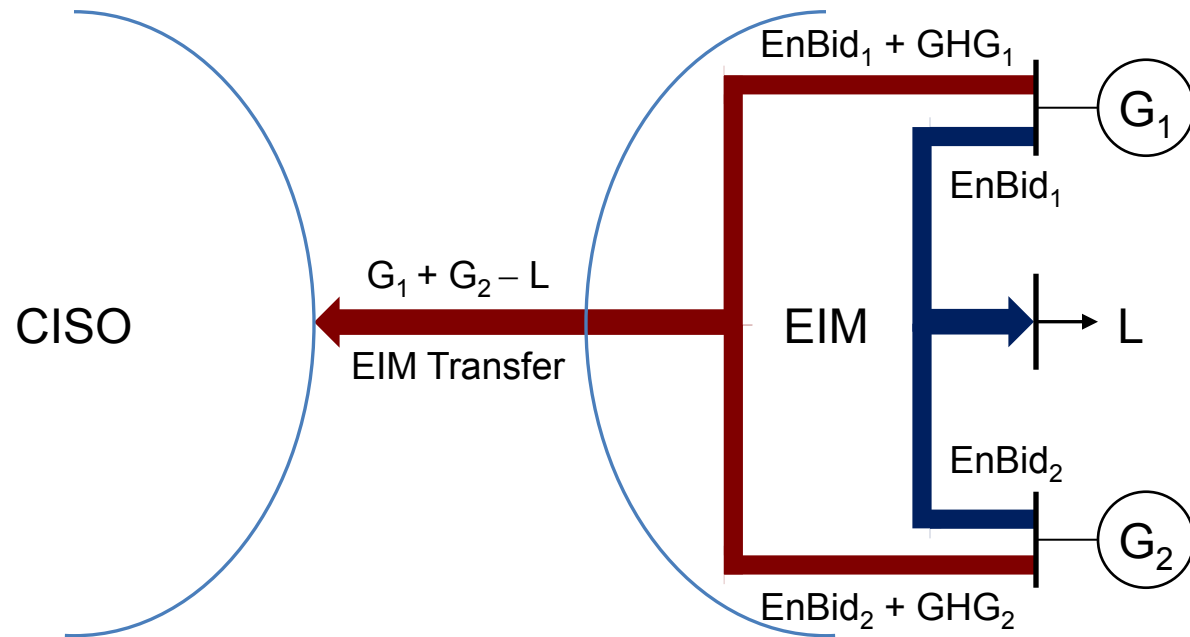
California Greenhouse Gas Regulation

- California Air Resources Board (CARB) implements three regulations:
 - ◆ Cap and Trade Regulation
 - Declining annual emission allowances
 - ◆ Mandatory Reporting Regulation
 - Annual reporting and verification of emissions
 - ◆ Cost of Implementation Administrative Fee Regulation
 - Collecting administrative fees for the cost of implementation

GHG Compliance Problematic for EIM

- Generating resources in ISO BAA and import resources on ISO interties include GHG compliance costs in their energy bids
 - ◆ Still applicable with EIM
- Not applicable to generating resources in EIM BAAs or import resources on EIM interties
 - ◆ Imbalance energy from EIM resources serves EIM load (no GHG regulation) or exported to CA (subject to GHG regulation)

GHG Compliance Solution for EIM



Market Optimization Model Changes for GHG Compliance in EIM

- Allow a GHG bid adder from EIM Participating Resources
- Introduce a new decision variable for each EIM Participating Resource: EIM export allocation
- Add the GHG bid cost of the EIM export allocation to the objective function
- Cap the EIM export allocation by the dispatch
- Fully allocate net EIM Transfer export to EIM Participating Resources

GHG Compliance Settlement in EIM

- Marginal GHG compliance cost is the shadow price of the EIM Transfer export allocation
 - ◆ Zero for EIM Transfer import
- It becomes the 4th LMP component for EIM BAAs
- GHG compliance revenue from net imbalance energy settlement in EIM BAAs
 - ◆ Paid to EIM Participating Resources for their EIM Transfer export allocation
- Market Operator is revenue neutral

Future Challenges

- Can this GHG compliance methodology be expanded for different EIM Entities with varying GHG regulation rules and costs?
- Can GHG regulation rules and costs be standardized across States and Provinces
 - ◆ For example, GHG compliance instruments are the same in California and Quebec and can be used in both equally

References

- [EIM Draft Final Proposal](#)
 - ◆ Section 3.9
 - Simplified mathematical formulation
 - Four numerical examples