

CAISO GHG Working Group

PG&E Problem Statement 1 Sponsorship

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Why is PS1 important?

A well-designed GHG accounting system is essential for delivering clean and affordable energy

Clean and Affordable:

- Decarbonization is expensive
- Inefficient or overly costly GHG design results in unnecessary expenditures:
 - These funds could be better utilized for carbonization efforts elsewhere
 - Anticipates higher volumes under EDAM (~20-30%WECC-wide trade increase)¹ may exacerbate cost imbalances
 - Addressing this issue is crucial to avoid market inefficiencies

[1] Estimate from the Brattle Group's recent studies of EDAM



PS1 is Aligned with Cap & Trade Principals

The Secondary Dispatch Constraint avoids leakage at all cost.

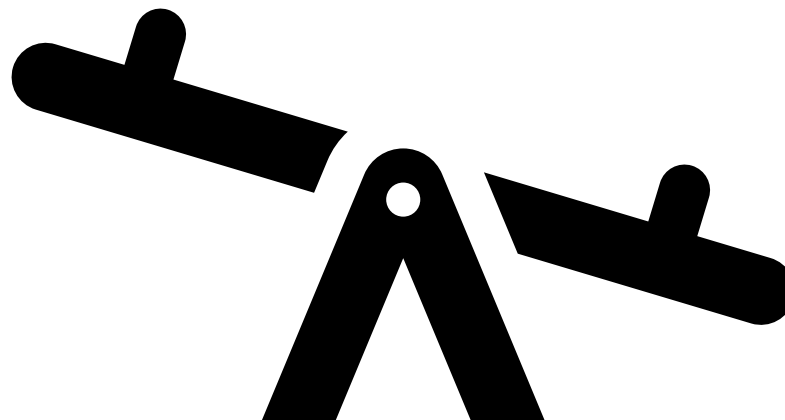
Cap & Trade Basics:

- Involves a declining cap on emissions
- Market determines the most economically efficient usage of allowances
 - Allows for banking allowances during times when its cost-effective to reduce emissions.
 - Permits the use of allowances when it is more economical to emit and purchase additional allowances
- Problem statement 1 assesses the market's effectiveness by:
 - Avoiding leakage and banking allowances during economically favorable periods.
 - Allowing leakage and purchasing allowances during economically favorable periods.

Constraining 2ndary Dispatch Too Much?

PS1: The optimization does not take the explicit cost of secondary dispatch into account, and therefore may not balance optimized attribution with constraints to limit secondary dispatch.

Cost of Leakage



Cost of Constraints

What is the cost of 1 MWh of leakage from Coal?

\$50-\$200/MWh

- $\sim 0.9606 \text{ Ton CO}_{2\text{eq}} / \text{MWh}^1$
 - $(0.09581 \text{ Ton CO}_{2\text{eq}} / \text{MWh}) / (10.026 \text{ MMBTU} / \text{MWh})$
- Social Cost of Carbon at most \$50-\$191/ Ton $\text{CO}_{2\text{eq}}^2$
- **\$52 - \$190 / MWh of coal**

What is the cost of \$0.01/MWh increase in GHG price?

~1-2 times the cost of one MWh of “leaked” coal

- CAISO load ranges from $\sim 25,000 - 55,000 \text{ MW}$
- \$250 - \$550 / MWh
- ~ 1 to 2 times the cost of high estimate of 1 MWh of “leaked” coal

[1] [Emissions Rates by Combustion Type.xlsx](#)

[2] [https://www.brookings.edu/articles/what-is-the-social-cost-of-carbon/#:~:text=The%20social%20cost%20of%20carbon%20\(SCC\)%20is%20an%20estimate%20of,a%20ton%20of%20carbon%20emissions.](https://www.brookings.edu/articles/what-is-the-social-cost-of-carbon/#:~:text=The%20social%20cost%20of%20carbon%20(SCC)%20is%20an%20estimate%20of,a%20ton%20of%20carbon%20emissions.)



What are we asking of CAISO?

How well, and at what cost, is the secondary dispatch doing at avoiding leakage?

Possible Cost-Benefit Analysis:

- Estimate the extent of leakage and its approximate value
 - Refine the calculation of leakage occurring and being prevented
 - Estimate the value of prevented leakage value based on allowance price
- Assess the cost of the constraint on California
 - Includes increased real-time load cost

Goal: Determine if there are instances where the cost and benefit of the Secondary dispatch constraint are imbalanced