



Center for
Clean Air Policy

Lessons Learned from CRA Study of Allowance Allocation Methods

Ned Helme, President
Center for Clean Air Policy

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Project Background

- Collaborative modeling effort between CCAP, Charles River Associates (CRA) and modeling team.
- Work grew out of CCAP's GHG Emissions Trading Braintrust.
- Used CGE model to look at alternative designs of upstream, economy-wide cap-and-trade program for carbon dioxide.

Purpose of CRA Modeling

- To identify the winners and losers under an economy-wide CO₂ trading system with differing amounts of permits auctioned
- To estimate how much would be needed to compensate the losers
 - » how many free allowances do energy sectors (coal, NG, oil, and utilities) need to maintain asset value under an economy-wide system?
- To calculate the relative impact of different revenue recycling schemes

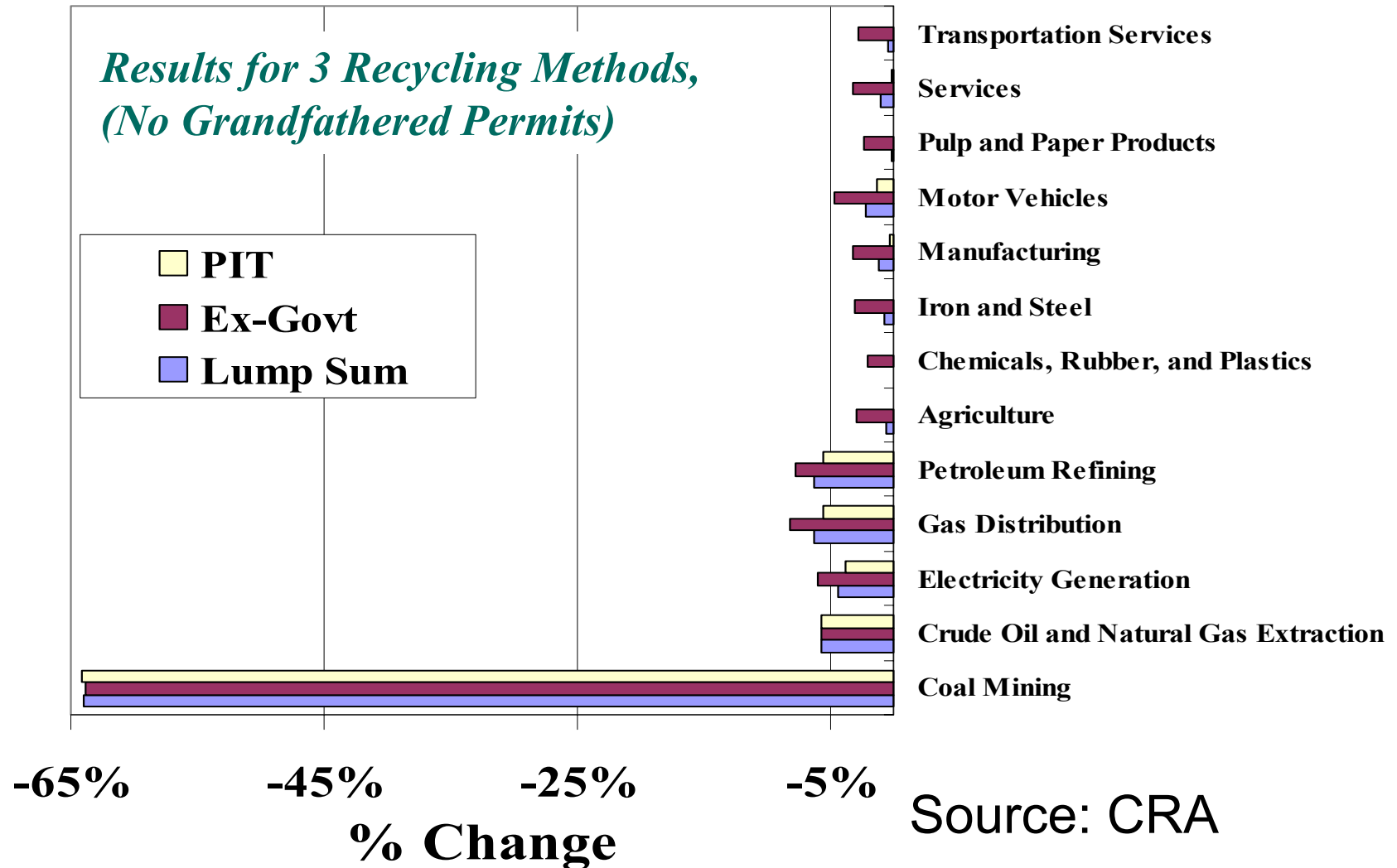
Grandfathering Compensates for Loss of Stock Value

- At \$70/ton, 9% grandfathering will hold shareholders harmless – no loss in stock value
 - » Coal Mining—3%
 - » Oil and Gas Sectors—5%
 - » Electricity Sector—2%
- At \$36/ton, 21% grandfathering will hold shareholders harmless
- This level of grandfathering does not compensate workers, communities or suppliers (railroads etc)
- Full grandfathering overcompensates emitters to the detriment of other affected parties and the larger economy

Impact of Revenue Recycling

- CRA modeled three ways to recycle revenue
 - » PIT -- Permit revenues are first used to offset government budget declines, remainder decrease personal income tax rates.
 - » Lump Sum -- Permit revenues are first used to offset budget declines, remainder to consumers per-capita.
 - » Ex-government -- ALL permit revenues returned to consumers on per-capita basis. Any government budget declines are made up through personal income tax increases.

Impact of Revenue Recycling (in \$70/ton Kyoto case)



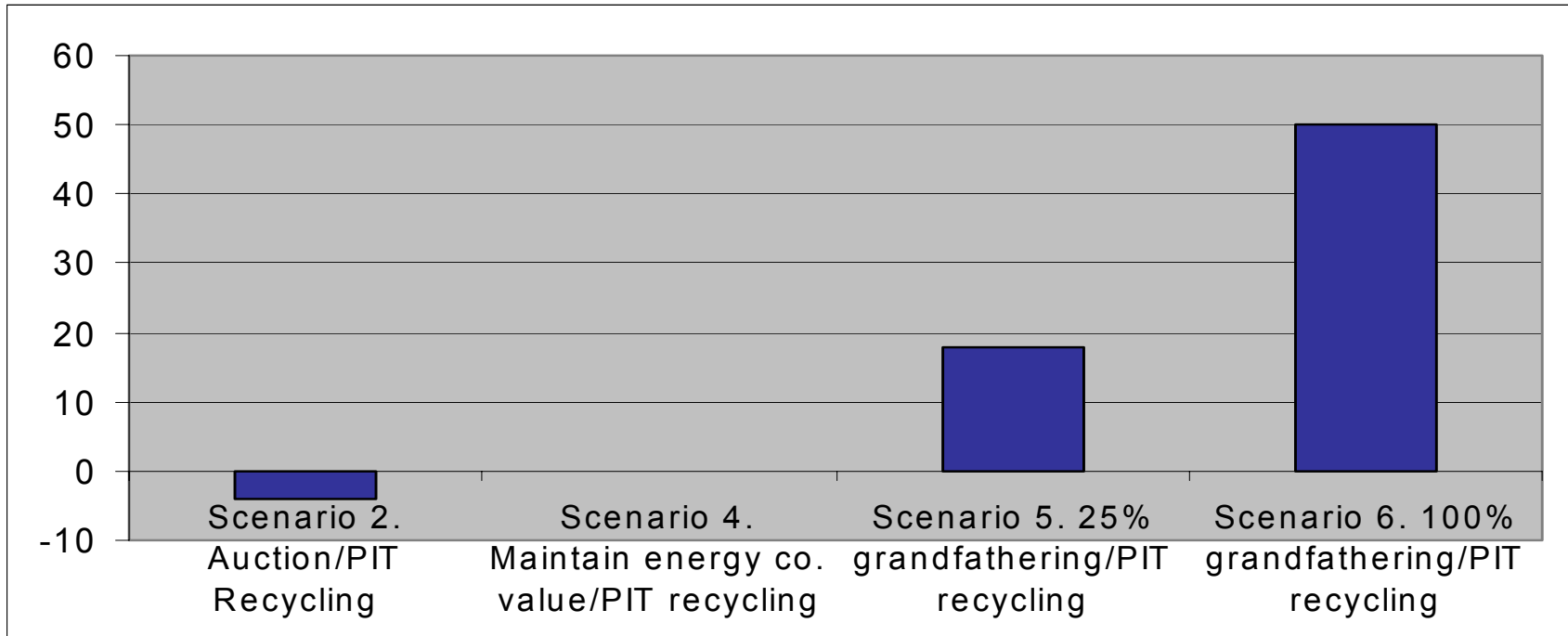
Equity

- A full auction allocation results in moderate equity losses (4-6%) in the oil, gas and power sectors, and larger (64%) losses in the coal sector.
- Depending on the amount given to affected industries, grandfathering based on past emissions can result in protection of current stock value, or significant gains or losses for particular sectors:
 - » Providing 93% of 1990 emissions (Kyoto target) to electric utilities would increase stock value by 50% over BAU

Equity

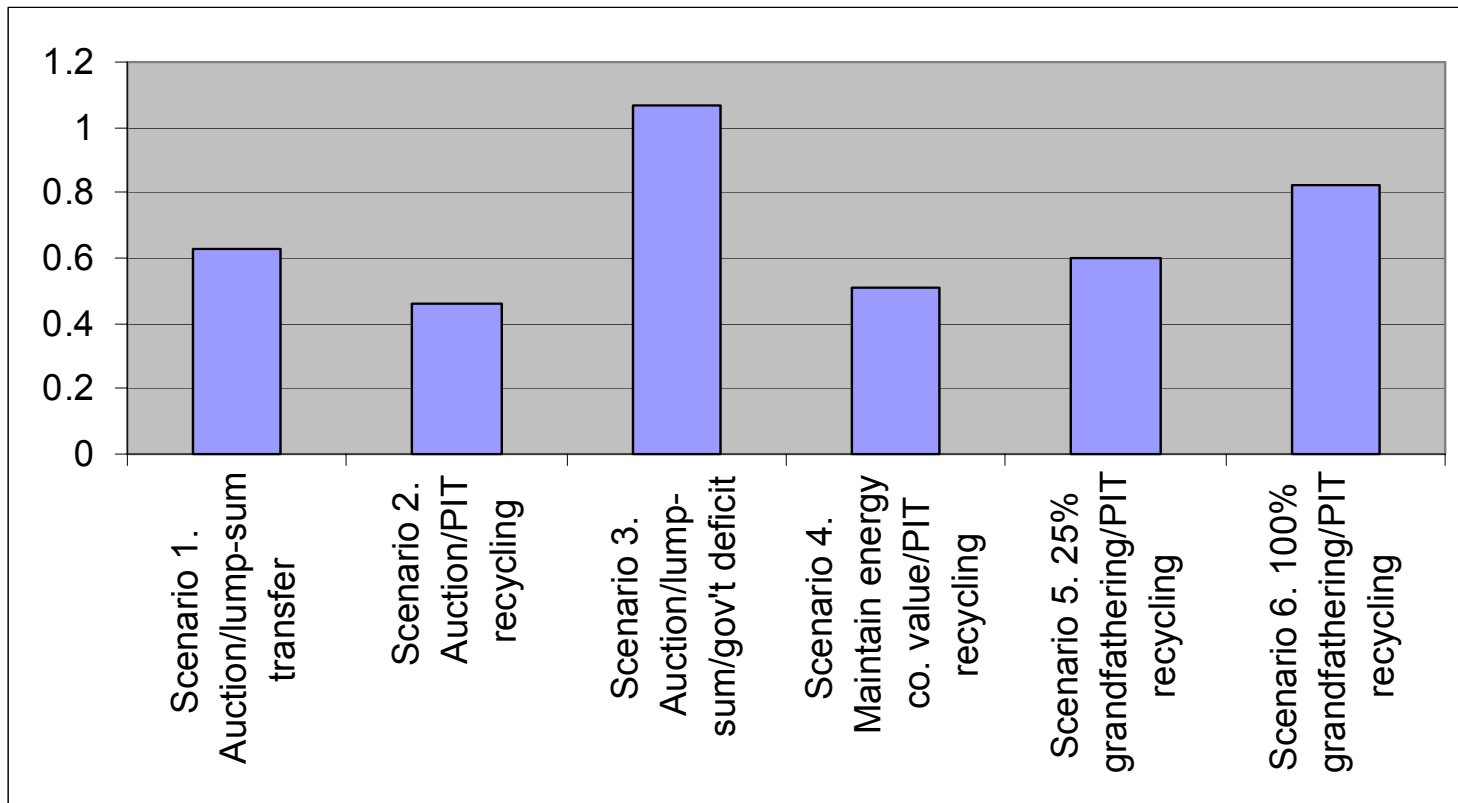
Change in Equity Value of the Electricity Generation Sector Based on Allocation Method

Note: No change in equity value in scenario 4.



Economic Efficiency

Welfare Loss Under Different Allocation & Recycling Scenarios (Percentage loss relative to BAU)



Summary of Results of Economy-Wide Modeling

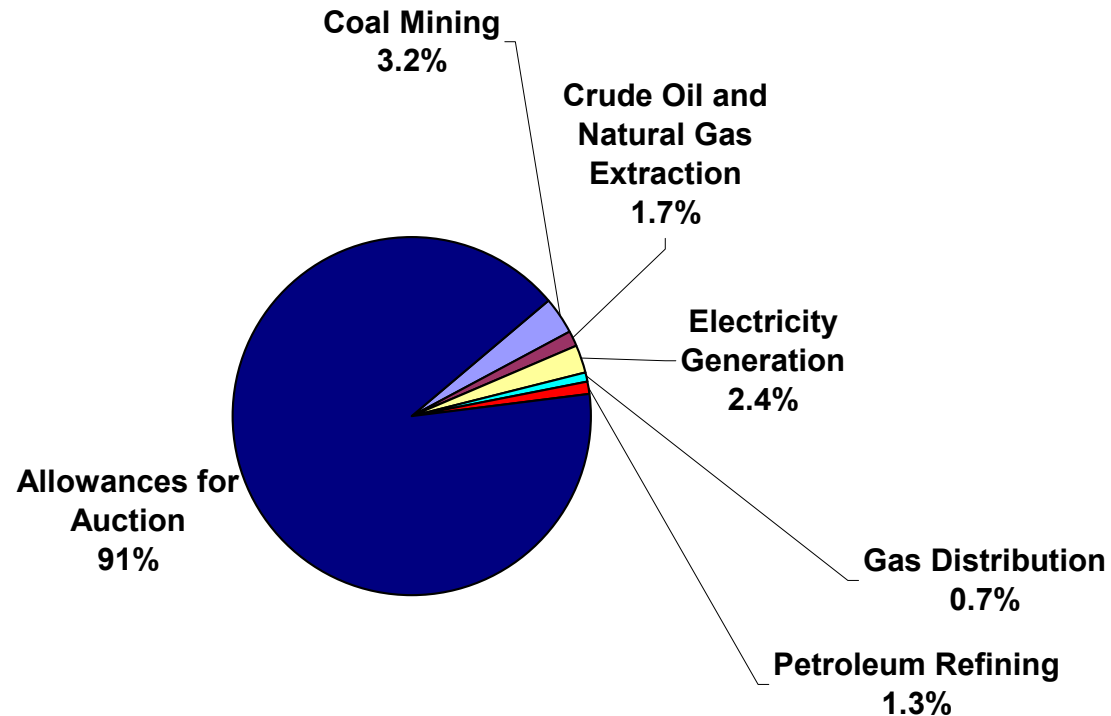
- An auction allocation with government compensation and PIT recycling is the most efficient approach—about half the cost to society of pure grandfathering allocation.
- Traditional grandfathering of allowances may overcompensate the electricity sector while other sectors and interests still lose.
- The combined auction/grandfather (to maintain stock value) approach cuts cost to economy by 40% below cost of pure grandfather

Implications for Trading System Design

- Is it desirable to hold shareholders harmless in key affected industry sectors?
- Earmarking non-grandfathered allowances to other purposes (e.g. technology, EE, worker compensation) has the same economic effect as grandfathering - how do we view these options?
- What is the optimal auction percentage? Is a 10% auction level a viable place to start as suggested by many witnesses at the Senate hearing?
- What is the best approach to revenue recycling?

Balancing Efficiency and Equity (in \$70/ton Kyoto case)

Grandfathering to Maintain Energy Company Equity Value: Fraction of Allowances for Energy Industries and for Auction



Note: Revenues from auction go both to make up government budget shortfalls and to reductions in marginal income tax rates

Impact of Permit Allocation

