**California Energy and Climate Policies**

In 2006, California passed legislation (Global Warming Solutions Act) formally addressing greenhouse gas emissions.

The legislation committed the state to [reducing greenhouse gas emissions to](file:///C:\Users\mfinney5\Desktop\classes%20this%20semester\Econ%204340\California's%202017%20Climate%20Change%20Scoping%20Plan%20Executive%20Summary.pdf)

1. 1990 levels by 2020
2. 40% below the 1990 level by 2030
3. 80% below the 1990 level by 2050

Legislation produced a number of measures to reach target including

1. A [pollution tax](https://ww2.arb.ca.gov/our-work/programs/ab-32-coi-fee-regulation/coi-fee-calculation) levied on large emitters of greenhouse gases in the state.
2. An emissions trading program for greenhouse gases.
3. Command and Control regulations for large emitters.

Emissions trading began in 2012 and was expected to provide 29% of the reductions needed to comply with mandate

Other measures make up the remaining reduction.

Trading program covers large stationary sources that emit at least 25,000 metric tons of greenhouse gases per year.

Initially included 600 facilities across the state, mainly electricity suppliers, oil refineries and cement producers.

Later expanded to other types of facilities.

Number of pollution permits allocated to each facility related to previous level of emissions.

Over time permits decrease for each facility.

Ten percent of the permits were distributed by auction.

Suppose firm given 100 yearly permits each worth 1 ton

Choices open to firm:

1. Emit 100 tons CO2 over year using all rights
2. Emit less than 100 tons and sell remaining rights
3. Buy rights if anticipated emissions over 100 tons

Firm could purchase from other firms or from the CARB auction.

Pollution trading program supposed to decrease the social cost of reducing greenhouse gas emissions.

Pollution rights trading:

Should work to equate MAC among sources

Decrease total social cost of decreasing pollution

Firm B

Firm A

$ $

MAC

MAC

25

14

Emission tons/per period

Emission tons/per period

Emissions/week

5

5

12

12

If firms could ignore pollution costs, each emit 12 tons SO2/ week

Suppose each firm given tradable permits to five tons per week

Both firms would have to cut back by 7 tons per week

Firm A’s MAC for eliminating 7th ton is $14; $25 for firm B

A right for a given time period purchased from another firm was equivalent to a right purchased through auction from CARB.

The minimum set price of permits that were auctioned started at $10 in 2012, rose to $12 in 2016.

By 2016, the market price of rights fell below the minimum price for auctioned rights set by CARB. Some rights auctioned by CARB went unsold in 2016. Market saturated with auctioned rights.

Firm A above willing to pay at least $14 for first right, firm B willing to pay $25.

In 2016, any firm with marginal abatement cost over $12 should have incentive to purchase rights.

Does the fact that there were unsold permits at the minimum price of $12 imply that all firms were MAC less than $12?

No.

Command and Control Measures

Example:

Utility companies selling to retail customers are evaluated by the greenhouse gases emitted by their energy sources: the power generating companies.

CARB passed rule requiring utility companies to procure at least 1/3 of its energy from renewable sources by 2020. Renewable sources include hydro, solar, wind. (Nuclear excluded).

Marginal cost of abiding by regulation is difficult the estimate.

One estimate from CARB is that each ton of greenhouse emissions eliminated by the program costs approximately $133.

MAC

Renewable source regulation

$20

Emission tons/ period

Allocated rights

$133

100

50

Regulation impedes efforts to reduce social cost of abating pollution through trading

Other measures passed through the legislation to limit greenhouse gases:

A. Regulations limiting greenhouse gases emitting from tailpipes of cars sold in California. Standards were more stringent than the EPA standards under Clean Air Act. EPA eventually adopted California standard nationwide.

B. Limitations on the greenhouse gases involved in production and consumption of gasoline sold in the state. (For example, ethanol produced in Midwest is at disadvantage due to estimated greenhouse gases emitted to produce it).

C. New residential construction mandated to be “net zero energy” by 2020. Housing is not supposed to consume energy from the grid on a yearly basis. Energy produced on-site mainly though solar or wind.