



EPRI Spring Seminar 2011

Are Market Based Instruments Obsolete?

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Market-based instruments gave flexibility in compliance



- The era of regulatory reform started in the 70s
 - Railroads and trucking
 - Telecommunications
 - Natural gas
 - Regulatory impact analysis
- Lead phasedown
 - Refiners differed in ability to produce lead-free gas
 - Trading program allowed flexibility in detail to stay on fixed schedule, compared to rigid deadlines and arbitrary extensions
- Bubble rule
 - Precedent setting – redefine goal as total emissions rather than installing specific equipment
 - Introduces intra-facility flexibility

Why was Title IV so successful?



- Dealt with the problem directly – fix acid rain by reducing SO₂ emissions wherever and however
- Replaced a system universally recognized to be perverse
- Claims on allowances limited to emitters
- Transparent prices and measured reductions
- Lower cost than anticipated – not by magic
 - Unexpected sources of emission reduction – fuel switching
 - Intra-plant reductions – engineers found ways to squeeze out reductions that were unique to the units

The retreat from market-based instruments



- Title IV → Boiler MACT, CATR and Hg MACT
- Cap and trade → Waxman-Markey
- AB32 → 90% “complementary measures”
- CAFE and LCFS as transportation sector policy
- RPS, CES, EES as electric sector policies
- Replacements characterized by
 - Varying degrees of technology specificity
 - Narrowed scope of coverage of decisions, actors and sectors
 - Lack of transparency

Attributes of market based instruments – they all set a price



Price Based

- The original idea
- Incentives to individual firms to avoid paying by reducing emissions
- Equalize marginal cost across all sources
- Minimizes cost risk

Cap Based

- Development in the 70s
- Incentives to individual firms to avoid paying by reducing emissions
- Equalize marginal cost across all sources
- Assures emission limit

Price an externality or trade a certificate?



To be maximally cost-effective, the externality itself must be priced, not some surrogate

- Example: carbon tax or cap and trade including all sources
- CO₂ emissions directly create the global climate externality
- Every action that leads to release of CO₂ faces the same incentive
- Multiple externalities can be priced separately (CO₂, SO₂, NO_x, Hg) leading to the optimum balance of controls

Trading certificates can reduce costs of an arbitrary program but not achieve the benefits of pricing the externality

- Example: Renewable Portfolio Standard with tradable RECs
- Renewable energy is an imperfect surrogate for various externalities
- Increased (renewable) ethanol use can increase greenhouse gas emissions
- Extra incentives to renewables can drive out more cost-effective solutions (CCS or scrubbers)

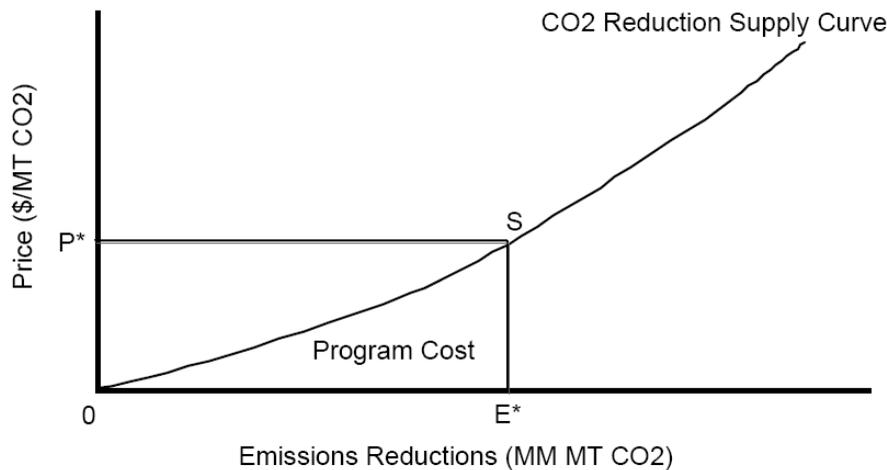
Market based vs command and control



Pricing emissions or cap and trade minimizes cost

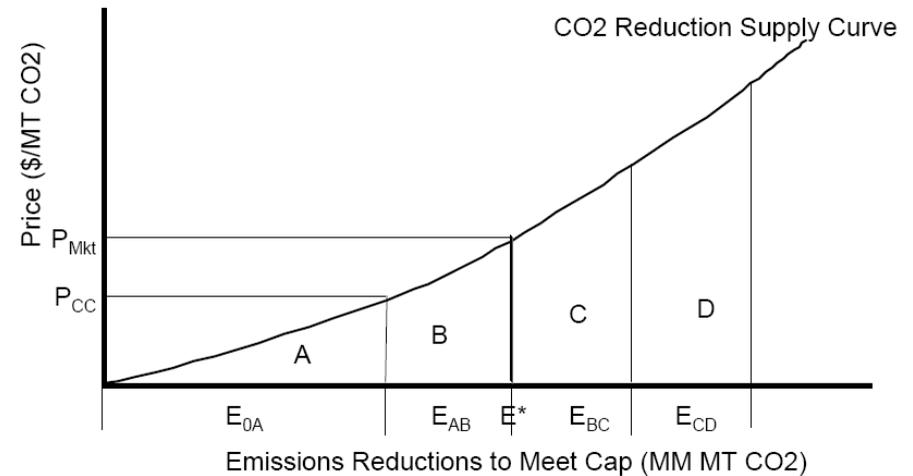
Command and control costs more or achieves less

CO2 Reduction Supply Curve



E^* = Emission reductions needed to meet cap
 P^* = Permit price for E^* reductions
 Program Cost = The area defined by $0SE^*$

Command and Control Programs Raise Costs and Lower Permit Prices



C & D represent command and control measures
 $E_{AB} = E_{BC} = E_{CD}$
 Cost under efficient policy = $A+B$; Permit price = P_{Mkt}
 Cost under C&C low cost = $A+C$; Permit price = P_{CC}
 Cost under C&C high cost = $A+D$; Permit price = P_{CC}

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Why doesn't command and control work as well?



- “Optimal” command and control requires more information on the MC abatement than the regulator can reasonably be assumed to have
 - Asymmetric information, in that regulated entities do have the information required for optimal choices
 - Market based systems motivate choices based on full information
- There may be related market failures that may be best addressed through command and control regulation
 - E.g., building energy efficiency standards for rented space
- Therefore, command and control should be
 - Narrowly construed
 - Tailored to cure specific market failure, and
 - Assessed in terms of transaction cost versus welfare gains

Examples of excess cost of command and control



- Mercury cap and trade vs mercury MACT
 - Rigid rate limit vs trading that gives large sources greater incentive to control

- AB32 complementary measures
 - Cap and trade + CAFE, LCFS, RES, Cogen, energy efficiency standards

- CAFE and LCFS
 - Standalone regulations or part of legislation

- Left out, but not because they don't have avoidable costs
 - CAIR vs CATR

Hg MACT vs Cap and Trade

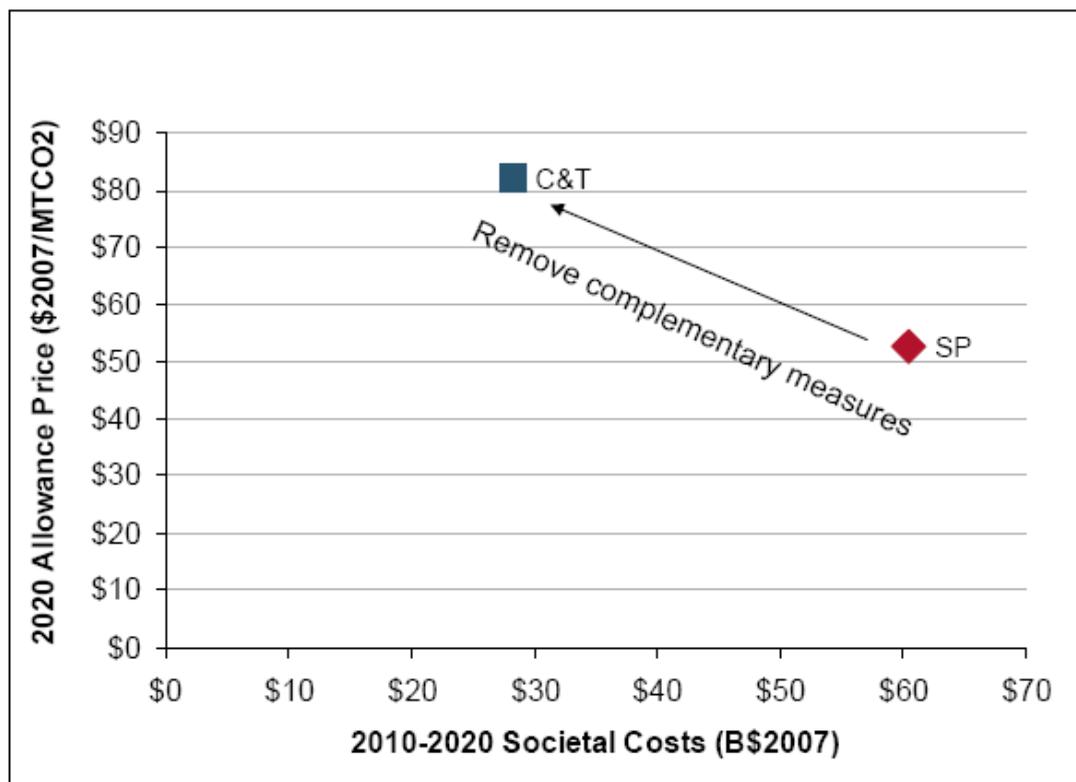


- Description
 - Emission rate constraint for each facility based on MACT
 - Market based alternative was ruled out by courts
- Hg MACT
 - Mandates scrubbing everywhere
 - Fails to motivate cost-effective reductions at the largest emitters
- Quantitative estimates
 - At least 5x cost

AB32 complementary measures are NOT “belt and suspenders”



Excluding complementary measures cuts program costs by 50%



- Overall policy costs cannot be inferred from the CO₂ allowance price because AB32 combines a market-based program to reduce carbon emissions (e.g., cap-and-trade) with command-and-control mandates (e.g., the complementary measures).

- Achieving the same cap, the complementary measures prescribe more expensive carbon emission reductions than the cap-and-trade program alone, resulting in lower allowance prices, but higher total compliance costs.

	SP (Case 1)	C&T
All Complementary Measures	Included	Excluded



- Starting in the Bush Administration, these two became environmental policy for transportation
 - CAFE to make new cars more fuel-efficient
 - LCFS to reduce share of gasoline and diesel
- Alternative has always been a gasoline or carbon tax
 - Addresses driving decisions and motivates clunker replacement
 - Provides an incentive for new technology on realistic schedule
 - Avoids distortion in detail
- CAFE at least 2x more costly than gasoline tax and even more compared to carbon tax for same reductions

Results with CAFE and LCFS



- “Technology Forcing” LCFS timetable will require reductions in total fuel demand if fuels with low enough emission factors and large enough supply do not appear
 - By 2025, a national LCFS would increase the cost of transportation fuels to consumers by 90% to 170%
 - By 2025, the higher cost of transportation fuel would cause personal and commercial VMT to fall by 9% to 14%
- Narrow scope leads to program creep – more regulations to deal with avoidance and incomplete responses
 - Land use restrictions and mass transit subsidies to change VMT
 - Intervention in vehicle choices to create infrastructure for fuels
 - Ratcheting of regulations

We will always underestimate costs of command and control



- The informational economy of price-based systems
- Deadweight losses of regulation arise from the manifold decisions it cannot control directly
- If the model had enough detail to estimate all costs, it would be possible to design the social engineer's dream
 - CAFE studies included VMT takeback effect and new source bias
 - Did not include costs and distortions from prohibition on trading across manufacturers, different standards for import and U.S. vehicles, different standards for car and trucks, and flex fuel credits
 - As regulations became simpler and more flexible, costs came closer our original underestimates – but they have not vanished
- No model can include all the diversity of the real economy – so modelers will always miss some of the distortions caused by command and control

How did we get here?



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- Outdated and judicially narrowed CAA framework
- Cost of market-based measures too explicit
- No longer keeping our eye on the ball of environmental protection
- Excessive lack of trust of markets
- Rent-seeking
- Electoral incentives

Where do we go from here?



- Most models designed for cap and trade are not configured to estimate the deadweight losses of command and control
 - Requisite detail lacking
 - Measures of economic welfare inadequate
- Efforts are underway in EMF 24
 - Assess model capabilities
 - Investigate scenarios with specific regulatory measures or sectoral policies as a surrogate
- Economy-wide approach is not sufficient when details of regulation matter
 - Back to the precedents from regulatory reform
 - Use applied microeconomic analysis of regulation to identify distortions in incentives and deadweight loss of regulation
 - Provide stronger rules for regulatory analysis in the Executive Branch, restore OMB and agency capabilities, and review for objectivity

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