Market-Based Emission Trading Programs

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Tom Bourgeois, Pace Energy and Climate Center

Why Utilize Trading?

- Some sources may have high compliance costs
- Other sources may have lower compliance costs
- Trading may result in more aggressive reductions at a lower total cost to society

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Conditions Facilitating Trading Programs

- Large numbers of potential buyers & sellers
- The ability to precisely specify commodity
- Diverse set of control / compliance options
- Broadly dispersed allowance holdings (no ability to wield market power)
- Low transaction costs to create, buy/sell
- Liquid markets – actively traded among diverse parties

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Three Major Trading Programs

- Emission Allowances (EAs)
- Emission Reduction Credits (ERCs)
- Renewable Energy Certificates/Credits (RECs)

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ERCs, EAs, RECs: Comparison

	ERCs	EAs	RECs
What They Are	Decrease of pollutant by 1 ton in perpetuity	Permit to emit 1 ton of pollutant/yr	Unit representing 1 MWh of renew. energy
How Created	Facility/Emission unit shutdown or reduction	Allocated by states to affected sources based on prior emissions/size	Unbundling env. attributes from of renew. energy from electricity
Pollutants	Particulate matter, O_3, CO	NO_x, SO_2	Avoided emiss. of NO_x, SO_2, CO, GHGs
Lifetime	Never expire	Never expire	Never expire
Transferability	Depends upon non-attainment area/MOUs	Sold to affected facilities or private buyers	Determined by NYSERDA

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ERCs: What They Are

- A decrease in the emission of a specific pollutant by 1 ton per year (TPY), in perpetuity
- Applicants must demonstrate that each ERC is:
  - (1) Surplus
  - (2) Quantifiable
  - (3) Permanent
  - (4) Real
  - (5) Enforceable

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ERCs: How They Are Created

- ERCs are generated through:
  - Facility shutdowns,
  - Emissions unit shutdowns, or
  - Source reductions (operational adjustments, fuel changes, curtailments, etc.)

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ERCs: How They Are Created

- An ERC results from the quantified, permanent, surplus and real difference of baseline (past) emissions less future period emissions:

ERC = (Prior Period – Future Emissions)

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ERCs: Pollutants Governed

- Fine Particulate Matter (<2.5μ)
- Ozone
  - VOCs → Volatile Organic Compounds
  - NO_2 → Nitrogen Dioxide
- CO → Carbon Monoxide

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ERCs: Ownership & Transferability

- Sale is limited to:
  - State in which they are created and certified, or
  - States that have a reciprocal trading agreement in place (MOU)
- To satisfy New Source Review (NSR), offsets must come from either:
  - Same nonattainment area, or
  - Another nonattainment area with equal or higher nonattainment status, and emissions from the other nonattainment area contribute to violation of NAAQS in the new area

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ERCs: Market Overview

- At one point, ERCs were sold in NY for as much as $29,000
  - Since then, they have plummeted to $1,000/ton, and are probably much less than that today
  - Very little trading activity in recent years, little demand → An illiquid lightly traded market
- A few entities hold a significant share of the ERC's

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Demand for ERCs is Driven by Affected Business Activities

- In the absence of increased demand, these measures may marginally improve the market:
  - Expand ERC trading area to stimulate market
  - Interstate Memoranda of Understanding (MOUs) (e.g. PA/NY)
  - Harmonization of ERC certification process across state lines
- Reduce paperwork requirements
- Simplify certification process to increase certainty

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Emission Allowances (EAs): What They Are

- A allowance to emit 1 ton of NO_X or SO_2 (sulfur dioxide), during a control period, for the time specified

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EAs: General Facts

- Pollutants Governed:
  - NO_x (Annual, Seasonal)
  - SO_2
- Ownership & Transferability:
  - May be sold to affected facilities in other states participating in the program or to third parties
- Affected Units:
  - Electric and Non-electric generating units (>15MW), large industrial boilers >250MMBtu/hr, Portland Cement Kilns

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NO_x Budget Trading Program

(Concluded in December 2008, replaced by CAIR)

- 2008 Program Statistics:
  - 2,568 affected units, only 2 out of compliance
  - Ozone season emissions → 481,420 tons
    - 9% below the 2008 cap, 62% lower than 2000 emissions, 75% lower than 1990 emissions (CAA)
  - NYS emissions → 20,934 tons
    - 49% below the 2008 cap

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New York Emission Allowance Programs: CAIR

- Applicable NYSDEC regulations for the cap and trade programs under CAIR are:
  - 6 NYCRR Part 243, implementing the CAIR NO_x ozone season program;
  - 6 NYCRR Part 244, which governs the implementation of the NO_x annual trading program; and
  - 6 NYCRR Part 245, which establishes the CAIR sulfur dioxide (SO_2) trading program.

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EAs: Market Overview

- EPA expected prices to be established by control costs for annual compliance
- EPA estimated that 2010 vintage allowances would be $1440/ton for the annual program
  - Now **$600/ton** (August)
  - Seasonal NO_x is **$150/ton** (2009 vintage)
- Uncertain future of CAIR -- EPA warnings buyers and sellers
  - EPA is warning about the potential impact that the status of CAIR and any replacement rule may have on the value of the allowances, particularly those allocated for years after the expected finalization of a replacement rule

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Market Based Trading: Opportunities to Promote Clean Energy Technology

- ERCs if certified and sold create a one-time payment that can improve the return on clean energy investments.
- EPA encouraged the states to create Energy Efficiency / Renewable Energy ("EE/RE") Set-Asides within the NO_X Budget Program
- Sites getting allowances through the set-aside can sell them and use revenues to finance projects

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EE/ RE Set Aside Allowances

- Available to non-affected sources via a special set-aside program
- States were encouraged to establish EE/RE set-asides as part of their program design for NBP and CAIR
- 7 States including NY, MA and NJ established an EE/RE Set-Aside under NBP. NY, CT, MA and NJ all have EE/RE Set-Aside Under CAIR

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Interaction of EE / RE Investments & Trading Programs

- An In-Progress NYSERDA / STAC Study Focused on 4 States (NY, CT, MA, NJ)
- The study examined the technical potential for replacing aged, inefficient #6 or #4 oil boilers with clean, high efficiency CHP
- Draft findings suggest 6 Industry targets to be promising, generating reductions of 44,000 tons NO_X, 125,000 tons SO_2 and 23,758,000 tons CO_2

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Emission Reduction Potential By Sector

Potential By Sector	Total CO_2 Reduction Potential (tons)	Total NO_x Reduction Potential (tons)	Total SO_2 Reduction Potential (tons)
Pulp & Paper	10,438,523	17,510	51,501
Multi-Family	5,845,008	12,457	32,978
Schools	2,506,148	4,318	12,608
Colleges/ Universities	2,300,122	4,692	13,803
Hospitals	1,683,895	3,393	9,291
Chemical Mfg	984,386	1,783	5,397
Emissions Reduction Potential	23,758,081	44,154	125,579

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Does Participation in Set-Aside and ERCs Programs Create Value for Clean Energy Technology?

- NYSERDA/STAC study underway addressing this question for investments in clean DG and CHP
- The effects are positive but small
- The best opportunities are for replacing aged oil boilers with clean DG/CHP

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Small Value at Current Depressed Prices (draft results from NYSERDA / STAC study)

Annual Revenue Impact $/Year	IC Engine w/SCR (3 MW)	CHP Gas Turbine (10 MW)	CHP Gas Turbine w/SCR (10 MW)
NO_x CAIR Allocation	$17,280	$51,435	$66,733
CO_2 RGGI	$27,462	$79,807	$79,807
Emission Reduction Credit	$7,128	$29,563	$42,340
Improvement in IRR; Percentage Points Increase	**IC Engine w/SCR (3 MW)**	**CHP Gas Turbine (10 MW)**	**CHP Gas Turbine w/SCR (10 MW)**
NO_x CAIR Allocation	0.47%	0.43%	0.53%
CO_2 RGGI	0.57%	0.62%	0.59%
Emission Reduction Credit	0.19%	0.25%	0.34%
Total of Programs	1.23%	1.30%	1.46%

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NO_x Budget Program Summary Results

- Lower costs / better outcomes relative to forecasts
- Efficiencies & costs exceeded expectations: lower overall compliance costs

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NO_x Budget Program Outcomes

- Ozone season emissions of 481,420 tons
  - 9% below the 2008 cap, 62% lower than 2000 emissions, 75% lower then 1990 emissions (CAA)
- NYS emissions 20,934 tons
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Conclusions

- National, Regional, State Emission Trading Programs have generally had a history of success
- Trading programs offer the promise of meeting emission reduction targets at a lower cost to society than command and control programs
- Market Based Trading Programs under the right set of conditions are an effective tool for meeting environmental objectives

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Contact Information

Tom Bourgeois, Deputy Director
Pace Energy and Climate Center
Pace Law School
tbourgeois@law.pace.edu