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Energy solutions
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C2ES and Tsinghua University Informal MRV Workshop

Perspective from the Regional Greenhouse Gas Initiative

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The Regulatory Assistance Project

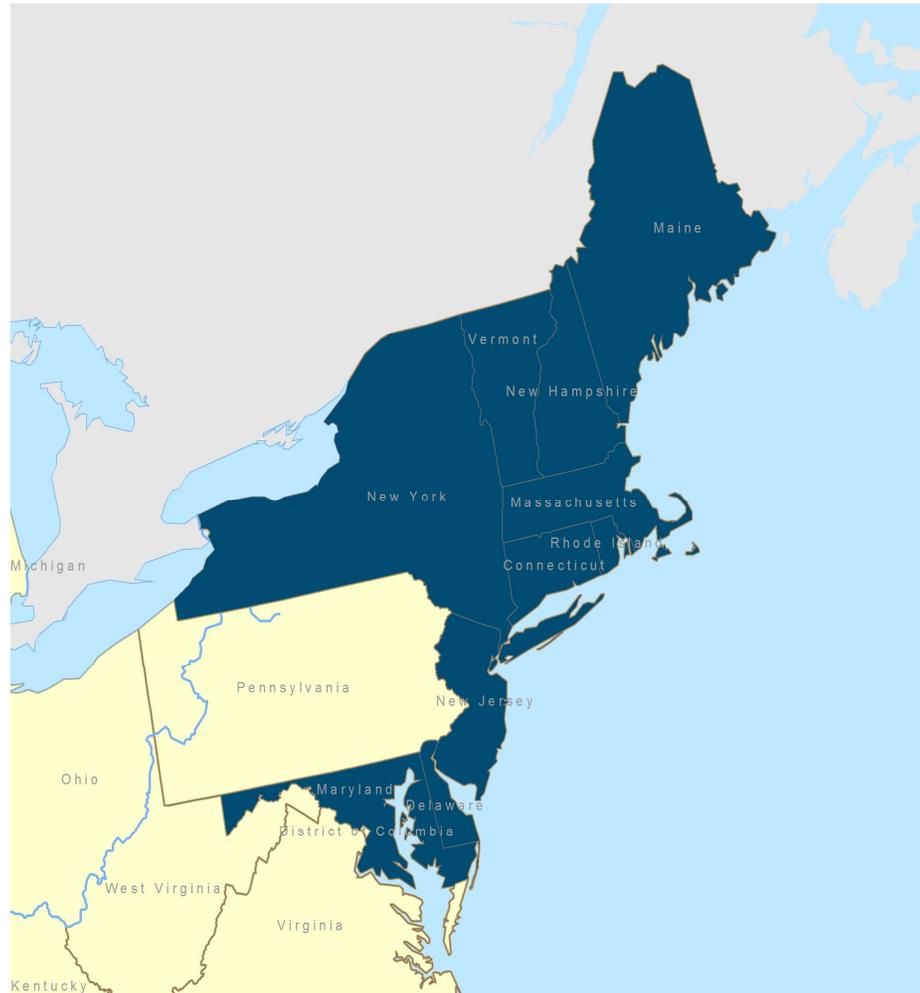
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Themes

- The Program's Origin
- RGGI: a Model for electric generation cap-and-trade
- MRV aspects of RGGI
- Why RGGI is a good model

The Regional Greenhouse Gas Initiative



The Original Idea: A Modest Program to Model for Federal Action

- “We did it with SO₂ so let’s do it with CO₂“
- US air regulation based on cooperative federalism—federal standards implemented by the states
- Designed by air regulators and energy regulators from 10 states

Is it Like SO₂ ?

Yes—So No Need to Reinvent the Wheel

- We know how to do cap-and-trade
 - Model Rule
- Emissions Inventory
- Part 75 monitoring (CEMS and Fuel Flow)
- CO₂ Allowance Tracking System (COATS)
- Market Monitoring

Is it Like SO₂ ? Actually, Not Entirely

- Where are the Compliance Options?
 - the scrubbers?
 - the low sulfur coal (Powder River)?
 - integrated utilities to pay for this?
- The cheapest way to scrub a ton of CO₂ today is to avoid emitting it in the first place – energy efficiency.

The Program Highlights

- The RGGI Memorandum of Understanding (MOU) sets out the essential elements of a proposed model rule, adopted by each participating state.
- Coverage: Fossil fuel-fired electric power plants 25 megawatts and larger (approximately 250 units)
- 3 Year Compliance Period
- Effective Date: January 1, 2009 (planning started in 2003)

Highlights cont.

- Allocation largely through quarterly allowance auctions
- Reserve Price \$1.89
- Approximately \$ 1,005,504,948 in revenues to date
- Cap based on historical emissions (2000-2002)
 - Total Reduction in Emissions Cap: 10 percent below 2009 levels by 2018
 - Timing of Reductions:
 - 2009-2014, cap stabilizes emissions
 - 2015-2018, cap reduces by 2.5 percent each year

Highlights – MOU

- Comprehensive 2012 Review of “all components of the Program.”
 - Program Success
 - Program Impacts (price and system reliability)
 - Additional Reductions
 - Imports and Emissions Leakage
 - Offsets

MOU cont.

- Allowance allocation:
 - as determined appropriate by each Signatory State, provided
 - each Signatory State agrees that 25% of the allowances will be allocated for a consumer benefit or strategic energy purpose.
- This includes:
 - the use of the allowances to promote energy efficiency, to directly mitigate electricity ratepayer impacts, to promote renewable or non-carbon-emitting energy technologies, to stimulate or reward investment in the development of innovative carbon emissions abatement technologies with significant carbon reduction potential, and/or to fund administration of this Program;

RGGI Inventory—Step One (2004)

- Compile list of units (including heat input, CO₂, and MWh data) that would potentially be subject to RGGI both member states and observer states.
- Reliable data sources
 - EIA-760 (Annual Steam-Electric Plant Operation and Design Data (2000, 2001, 2002))
 - EPA Clean Air Market Div. (for Acid Rain Program units 2000, 2001, 2002)
 - E-Grid – Emissions & Generation Resource Integrated Database (2000)
 - State Inventories: fuel consumption data (when/where available)

RGGI Inventory — Step Two

- Fill in data gaps:
 - Revise unit list to add missing units & remove units that shouldn't be included
 - Use additional unit-level state data (where available)
 - Incorporate stakeholder feedback
 - Obtain generation data from ISOs?

Continuous Emissions Monitoring Systems (CEMS)

- Under existing law, generation units covered by RGGI are required to report their CO₂, NO_x and SO₂ ***continuous emissions monitoring system*** (CEMS) data to the United States Environmental Protection Agency (EPA) and the states each quarter.

CEMS cont.

- EPA maintains the data system, and performs quality control and quality assurance tests on the CEMS data to ensure its accuracy; states also perform QA/QC
- The CEMS procedures are modeled after the EPA's NOx budget program, a market-based cap and trade program created to reduce the regional transport of NOx emissions from power plants and other large combustion sources that contribute to ozone nonattainment in the eastern United States.

CEMS cont.

- States can take direct enforcement action for:
 - Failure of the source to perform
 - QA/QC tests each quarter and
 - More robust tests (measured against a stack test) each year; and for
 - Emissions exceedances or absence of back-up proxy data for periods when the CEMS is not operating or available.

CO₂ Allowance Tracking System (RGGI COATS)

- An electronic platform that records and tracks data for each state's CO₂ Budget Trading Program.
- RGGI COATS enables the public to view, customize, and download reports of CO₂ allowance market activity and RGGI program data.

COATS enables the public to view program and market data reports

1. CO₂ allowance transactions, (the date, price, and type of transaction)
2. RGGI COATS accounts, showing a list of every account registered in RGGI COATS
3. RGGI COATS account representatives, showing individual contact details for all accounts
4. RGGI sources, listing each regulated power plant and its location
5. Owners/operators of RGGI sources, showing the corporate affiliation of owners and operators for each regulated power plant
6. Special approvals, detailing allowance allocations made by states
7. Offset project applications and approvals
8. CO₂ emissions from RGGI sources, showing emissions for each regulated power plant and summary CO₂ emissions for the 10-state region

RGGI's Market Monitor

- The Goal of Market Monitoring:

To protect and foster competition, and to increase the confidence of the states, participants, and public in the allowance market

- RGGI contracts to *Potomac Economics* for independent monitoring of the competitive performance and efficiency of the RGGI Allowance Market. This includes:
 - Identify attempts to exercise market power, collude, or otherwise manipulate prices in the auction and/or the secondary market;
 - Assess whether or not the auctions are administered in accordance with the noticed auction rules and procedures; and
 - Make recommendations regarding proposed market rule changes to improve the efficiency of the market for RGGI Allowances

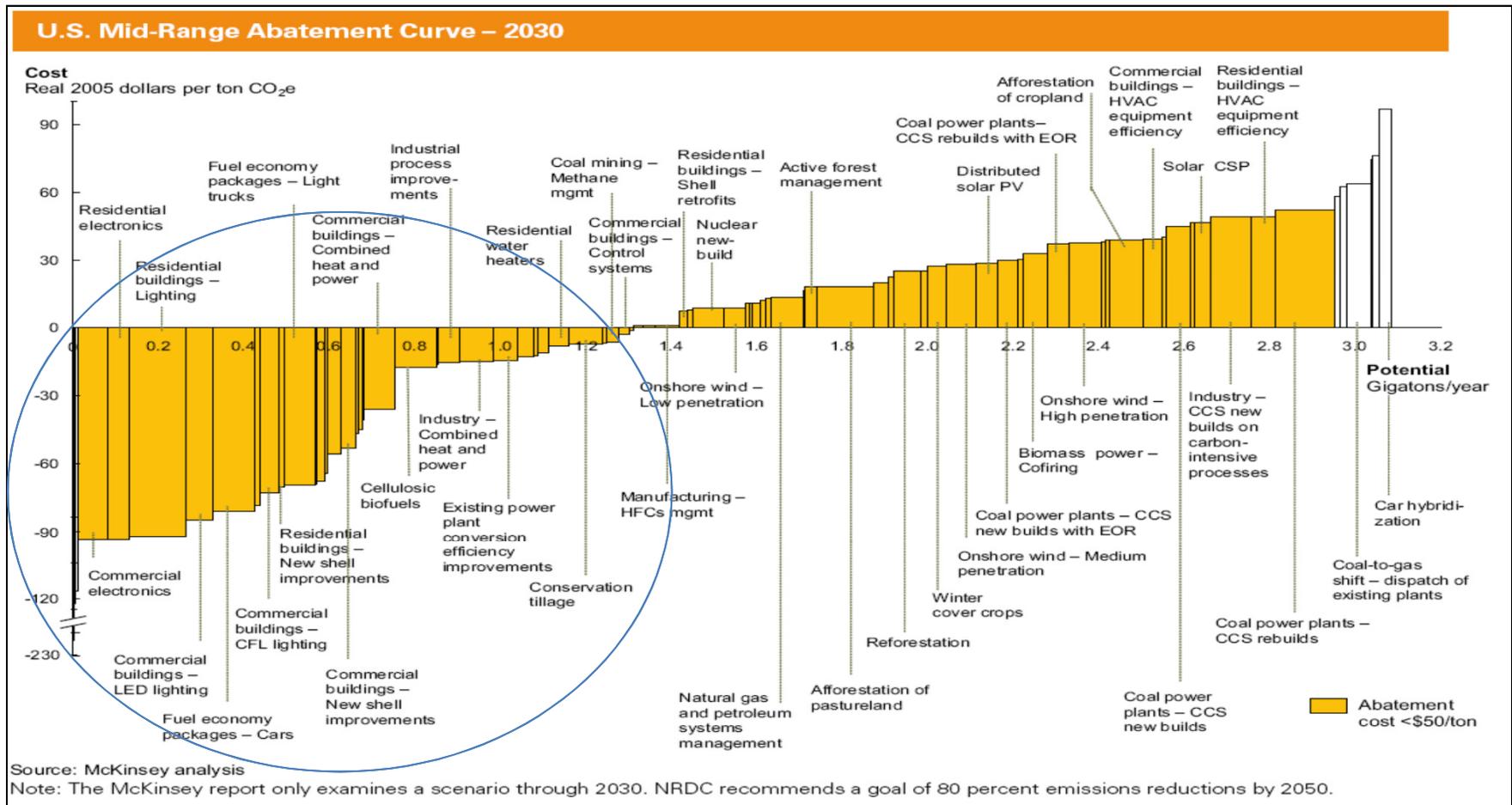
The Revenue Side of RGGI: States determined that price alone will not achieve program goals.

- Extensive modeling of end-use energy efficiency found:
 - Carbon allowance prices drop 25%
 - Need for new fossil capacity drops 33%
 - Customer bills drop 5 percent (Industrial) to 12 percent (Residential)
 - And even greater EE investments (quite attainable) would yield greater savings

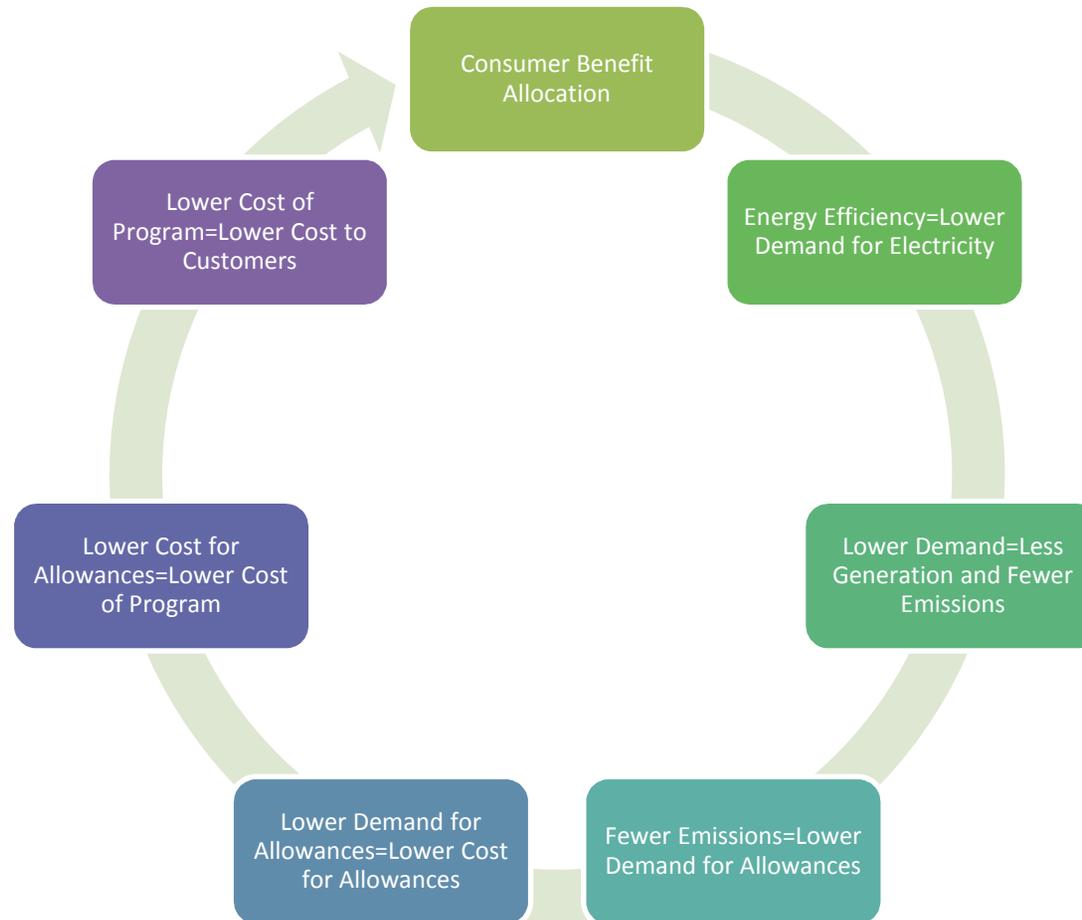
Mitigation – Investment

- A price on carbon creates a signal, but RGGI' cap is not binding
- Reserve price \$1.89
- Approximately \$ 1,005,504,948 in revenues to date
- Over half of this is spent on energy efficiency programs

Many Efficiency Resources at Low Cost



Effects of Efficiency Investment in a Carbon Cap-and-Trade Program



One State Program

- In May, the University of New Hampshire (NH) reported on the status of grants awarded by the NH's RGGI-funded *Greenhouse Gas Emissions Reduction Fund* whose proceeds are administered by the N.H. Public Utilities Commission.
 - The fund generated an annual energy use reduction of 182,800 million BTUs and a savings of more than \$5 million to state businesses, communities, and residents in year two of the program (July 2010-June 2011).
 - The lifetime savings from the \$18.1 million spent from the fund are projected to be \$84.5 million in energy costs based on current energy prices.
 - Carbon dioxide emissions were reduced by 18,900 metric tons. Projected out over the lifetime of the program, carbon dioxide emission reductions of 300,000 metric tons would be realized.
 - For every dollar invested by the NH program there will be a return of \$4.67 in energy savings over the lifetime of the projects.

Why is this Important?

- It is less about the price per ton, and more about allowance revenue investment:
 - Yes a cap creates a price signal: i.e., it imposes costs on emissions, (and, thereby, creates value in emissions reductions)
 - But RGGI state clean energy programs address barriers to clean energy development through programmatic investment (traditionally state-led activity).

Conclusions MRV

- If data are opaque or unsound then the program integrity is questionable, and the currency will become worthless.
- RGGI's rules for emissions inventory, auctioning, allowance tracking, emissions monitoring and market monitoring are replicable data systems that ensure program transparency and protect its environmental integrity.
- Additional standardization of *Evaluation, Measurement and Verification* (EM&V) for efficiency investments being made with RGGI allowance revenues would further improve program MRV.

Resources

- RGGI Information
<http://www.rggi.org/about/documents>
- NH Greenhouse Gas Emissions Reduction Fund
<http://carbonsolutionsne.org/projects/ghgerf/>
- *Electricity Energy Efficiency Benefits of RGGI Proceeds: An Initial Analysis*, October 5, 2010, Max Chang, David White, Lucy Johnston, and Bruce Biewald <http://www.synapse-energy.com/Downloads/SynapseReport.2010-10.RAP.EE-Benefits-of-RGGI-Proceeds.10-027.pdf>
- *Energy Benefits Resulting from the Investment of 2010 RGGI Auction Revenues in Energy Efficiency*, February 28, 2012, Max Chang, David White, Patrick Knight, and Bruce Biewald <http://www.synapse-energy.com/Downloads/SynapseReport.2012-02.RAP.RGGI-Energy-Efficiency-Benefits.10-027A.pdf>



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About RAP

The Regulatory Assistance Project (RAP) is a global, non-profit team of experts that focuses on the long-term economic and environmental sustainability of the power and natural gas sectors. RAP has deep expertise in regulatory and market policies that:

- Promote economic efficiency
- Protect the environment
- Ensure system reliability
- Allocate system benefits fairly among all consumers

Learn more about RAP at www.raonline.org



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