

MAINE STATE LEGISLATURE

The following document is provided by the
LAW AND LEGISLATIVE DIGITAL LIBRARY
at the Maine State Law and Legislative Reference Library
<http://legislature.maine.gov/lawlib>



Reproduced from scanned originals with text recognition applied
(searchable text may contain some errors and/or omissions)

"The Regional Greenhouse Gas Initiative: Maine's Participation"
Comments of
Stephen Ward, RGGI Policy Advisor
on behalf of the Department of Environmental Protection
before the
Joint Standing Committee on Natural Resources
and the
Joint Standing Committee on Utilities and Energy

March 13, 2007

Senator Martin, Representative Koffman and Members of the Natural Resources Committee and Senator Bartlett, Representative Bliss and Members of the Utilities Committee. I am Steve Ward currently serve as a policy advisor to Commissioner Littel on greenhouse gas issues as they pertain to electric markets, with particular regard to the Regional Greenhouse Gas Initiative (RGGI). I formerly served for nearly twenty years as Maine's Public Advocate, representing the interests of electric, gas, telephone and water customers at the Public Utilities Commission, the courts and before federal agencies. The purpose of this afternoon's presentation is to provide a general overview for the Committee as to RGGI: its design, purposes and prospects, both for Maine and in a national context. I will be happy to respond to questions as time permits, quite possibly with the assistance of other DEP personnel who are here today.

What is RGGI?

RGGI is an agreement among ten states in the Northeast US to establish a cap-and-trade program to freeze carbon dioxide emissions from power plants at current levels for ten years and then reduce them by 10% by 2019 Compared with a "business as usual" case in which no such effort is made, RGGI will achieve a 35% reduction in 2019 -- due to an approximate increase in CO₂ emissions at 2% per year in response to routine increases in electric demand in the Northeast. Each participating state -- from Maryland to the South and as far west as New York -- has agreed to an annual cap on total CO₂ emissions from power generating stations with 25

megawatts or more output. Within each RGGI state, the designated power plants in turn will receive an annual cap on their maximum CO₂ emissions each year. In Maine there are six such power generators who collectively will account for Maine's total CO₂ cap of nearly 6 million tons of CO₂. The six covered units are: FP&L's Cousins Island oil-fired unit, the Veazie, Westbrook and Rumford gas-fired power plants, and Verso's two co-generating facilities at Bucksport and Jay. No other generating units or mills are covered in Maine under the RGGI program design.

Compared with Maine's 5.9 million ton cap, other states such as New Jersey, New York and Massachusetts have substantially larger totals; New York's annual emissions cap, for example, is 64.3 million tons of CO₂ emissions. As demonstrated in previous cap-and-trade programs in the US and elsewhere, the power of a trading system for emission allowances is that it can harness market forces and technology improvements in a way that is not possible under a "command and control" system. For example, a power plant that finds ways to dramatically reduce its emissions below its designated cap will have the opportunity of selling the surplus RGGI allowances and recouping some of its costs. The purchasers of those surplus allowances will include power plants who may have no immediate ability to make reductions in their CO₂ emissions.

How do allowances and offsets work?

RGGI's program design envisions a regional market in emission allowances that are bought and sold in a single clearinghouse like other commodity exchanges. A similar cap-and-trade system for CO₂ allowances has been underway since 2005 in the European Community where allowances have traded in a range from initial prices as high as \$22 per ton and as low as \$11 per ton currently. That market covers not only power plants but also refineries, paper mills, cement plants and steelmaking facilities. Since RGGI is limited solely to very large electric

generating units that sell more than 10% of their power output to the regional grid for wholesale purchase, it is not possible to look to the EU for an accurate prediction of what Maine's compliance costs are likely to be in terms of dollars per ton of CO₂.

However, the RGGI system does build in two "safety valves" for avoiding financial harm if allowance prices gyrate or increase rapidly. First, if allowance prices reach \$7 per ton, a power plant can satisfy 5% of its emissions cap by investing in one or more of an approved set of "offset" projects. Secondly, if allowance prices jump to \$10 per ton, a second "safety valve" permits allowance trading between the RGGI market and CO₂ cap-and-trade markets elsewhere, potentially such as the EU market or the proposed Western States market in California, Oregon, Washington, Arizona and New Mexico. At \$10 per ton, 20% of the emissions cap can be satisfied with investment in approved "offset" projects.

There are four approved offset categories, all of which offer opportunity for investment in Maine. These are: energy efficiency programs that are targeted at fossil fuel reductions, landfill gas recapture and agricultural methane recapture, development of forest stands in areas that previously were not forested and capturing emissions of a potent greenhouse gas (SF₆) that is routinely released at electric substations. Each of these categories offers some promise for economic development and for assisting Maine's six generators to satisfy the requirements of the RGGI program.

All of Maine's emission allowances will be sold in routine auctions. Maine will therefore derive a source of important revenue because generators must pay for allowances and will not receive them for free. Maine will join other RGGI state in requiring that 100% of the allowances must be put to use for purposes that provide public benefits. These include but are not limited to: energy efficiency programs and contract arrangements that reduce the consumption of electricity,

particularly in peak periods; and direct bill credits on the monthly bills of all electric customers to neutralize the impact of RGGI compliance on electric prices in the region. When allowances trade at \$3 per ton of CO₂, the total revenue that Maine will derive during a three-year compliance period will come to \$17.7 million; at \$5 per ton, the total amount of "Public Benefits" funding rises to \$29.5 million.

How will this affect electric rates?

What are the likely effects that RGGI will have on electric rates in the region and in Maine? The answer hinges on predictions about the future price of carbon allowances in a brand-new RGGI marketplace. At \$10 per ton, the effect on residential customers of Central Maine Power or Bangor Hydro is expected to be no more than \$.005 per kilowatt-hour (one-half cent/kwh) or approximately a 3% annual increase by 2015. This estimate is based on a study undertaken for the Public Advocate Office by Synapse Energy Economics of Cambridge, Massachusetts. This translates into a one-time \$30 annual increase by 2015 for a typical residential customer in the worst case. However, it is likely that effects on electric bills will be considerably more modest, for two reasons: first, the funding of new energy efficiency programs with RGGI "Public Benefits" money will ensure that many customers will be able to reduce their monthly usage and avoid most (if not all) of any RGGI -related increase. Second, most observers anticipate that RGGI allowances will trade well below the \$10 level that generated the example used earlier. A \$5 allowance price will have an eventual effect on residential customers of \$15 per year, according to the Synapse study, assuming no participation in any energy efficiency programs or new efficiency investments. There is a strong possibility that customers participating in RGGI-funded efficiency programs will see a net negative decrease in their monthly electric bills.

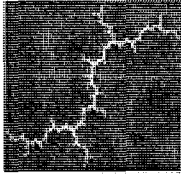
What if Congress enacts Climate Change legislation?

Most observers anticipate that there could be a national cap-and-trade program adopted by Congress in the next four to six years. If this actually happens, are there advantages from Maine having already joined the RGGI program? Yes, particularly with respect to the possibility that the federal program will adopt program elements from the RGGI program that are particularly advantageous to Maine. These include: a 100% "Public Benefits" allocation of allowances, excluding from all RGGI cap requirements bio-mass generators of electricity who do not sell output to the electric grid; and as well, the likelihood that sustainable forest management practices will be recognized as an eligible category for approved offsets in the future.

Any final concerns?

What would happen if Maine chose not to join the RGGI system along with the nine other Northeastern states? First, we will lose an opportunity to influence the design of regional or federal cap-and-trade programs for carbon and therefore forfeit opportunities to secure identifiable benefits for Maine, such as in the area of managing forestlands for carbon reductions. Secondly, we will lose an important new source of revenue for energy efficiency programs, similar to the PUC's Efficiency Maine program, and miss an opportunity to double the state's budget for electrical efficiency programming. Finally, most observers believe that in New England's wholesale market system for electricity, power costs will increase -- with or without Maine's participation in RGGI -- by the amount of RGGI compliance costs as long as Massachusetts and Connecticut are going ahead with the program. Given the likelihood that these increases will occur anyway, Maine is better off participating in the program, receiving "Public Benefits" funding from the sale of allowances and mitigating any price effects through energy efficiency programs and direct bill credits.

Thank you for your attention. I am happy to respond to questions from the Committee.



Memorandum

To: Steve Ward, Maine OPA
From: Bob Fagan and Lucy Johnston, Synapse Energy Economics
Re: Regional Greenhouse Gas Initiative (RGGI)
Date: February 7, 2007

This memo addresses the following aspects of the regional greenhouse gas initiative:

- RGGI “package” abbreviated summary;
- RGGI price impacts based on 1) wholesale market dynamics, and 2) retail market - the RGGI staff working group and consultant modeling;
- Status of emissions allocation plan by state;
- European Union ETS (Emissions Trading System) CO2 Trading; and
- Comparison between EU CO2 market and RGGI market.

Abbreviated Summary of RGGI “Package”

Participating States	Six NE states plus New York, New Jersey, Delaware. Maryland will join later in 2007.
Milestone dates and metrics	January 1, 2009 start. Emissions capped at approximately current levels through 2015 (150 million short tons/yr excluding MD, whose cap is to be determined). 10% reduction in CO2 from this level mandated by 2018. 2.5% reduction per year beginning in 2015 for four years.
Compliance period	Three years – no limits on banking. Increase to 4 years if allowance price reaches \$10/ton. Penalty = to 3x allowance if out of compliance.
Regulated units	All fossil fueled generation plants 25MW or greater.
Allowance allocation	25% must be auctioned for consumer benefit. Most states leaning to larger consumer allocation or auction.
Offsets	Five categories of offsets: landfill gas, SF6 capture, afforestation, natgas/oil/propane end-use efficiency, avoided methane – agriculture. Up to 3.3% of plant emissions can be offset, up to 5% if regional allowance price equals or exceeds \$7/ton. Offsets are emission reduction alternatives outside of the electric industry sphere – e.g., not tied to energy efficiency or renewable energy generation.

Leakage	Plan under development. Consideration for how/if imports can have an associated emission value.
Cost impacts	Broadly: cost impacts range from 0.3% to 0.6% in 2015 on overall bills (\$3-\$16 per HH per year in 2015) excluding effect of increased efficiency savings.
Exemptions	Industrial units that sell less than 10% of output to grid.
Set asides	For renewables. Allows for states to retire some allowances if tied to voluntary renewables installations.

Sources: RGGI model rule, Environment Northeast summary documentation and model rule description.

State Emission Caps (millions of short tons of CO2 per year, starting Jan 1, 2009)

ME	NH	VT	MA	RI	CT	NY	NJ	DE	MD
5.9	8.6	1.2	26.7	2.7	10.7	64.3	22.9	7.6	TBD
Total Region: ~150 short tons; New England states: 53.8 million short tons. Current (2006) New England emissions: ~60 million short tons (ISO NE).									

Price Impact Summary – Wholesale Market and Energy Efficiency Effect

Synapse's ballpark estimate for wholesale market price change is based upon the following assumptions:

1. Natural gas is "on the margin" in the New England electricity system nearly 100 percent of the time.
2. The emissions rate for natural gas is 120 lbs of CO2/MBtu.
3. The system marginal heat rate is 8500 Btu/kWh.
4. A range of emission allowance prices from \$2-\$10 per ton of CO2.

Note that the first assumption is supported by ISO-NE data and by the correlation between monthly natural gas and electricity prices (which is an expected result of the fact that gas generation is on the electric system margin). The second assumption is based on combustion chemistry for natural gas. The third assumption is a reasonable heat rate for combined cycle units. The last assumption uses an upper bound based on the RGGI threshold for increasing the compliance period. Synapse is uncertain of the source of the \$2 lower bound but uses it for illustration here. By simple multiplication (and appropriate dimensional analysis), the wholesale price impact ranges from approximately \$1/MWh to about \$5/MWh, calculated as follows:

$$\text{\$/ton of CO}_2 \text{ * 120 lbs/MBtu * 8.5 MBtu/MWh / 2000 lbs/ton} = \text{\$/MWh}$$

$$\text{\$/ton of CO}_2 \text{ * 120 lbs/MBtu * 8.5 MBtu/MWh / 2000 lbs/ton} = \text{\$/MWh}$$

For Maine, the price impact on an annual load of 12 million MWh translates to a range of approximately \$12 million to \$60 million/year if the generation component of retail prices is assumed to follow wholesale prices.

On the benefits side, clearly there are avoided climate-change-based destruction damages. There is also much to be seen in getting an early start, to avoid more dramatic implications of ramping up more quickly to an emissions reduction regime at a later time. This is especially true given the current climate in the US Congress and nationwide; not assuming a federal program at some point in the near future would at least be imprudent, if not severely short-sighted, and there is much to be gained by having a structure in place to ramp up to federal requirements for emissions reduction.

More prosaically, there is the allocation of allowance value to “consumer benefits,” which include investments in clean energy measures to help with RGGI compliance and to benefit consumers in the participating RGGI states. Maine’s participation in RGGI will result in a CO₂ allowance of 5.9 million tons annually. At a price of \$10 per ton of CO₂, these allowances would be worth \$59 million annually; at \$2/ton, they are worth about \$12 million annually. If 100 percent of the allowances are allocated to “consumer benefits” (the RGGI MOU indicates that at least 25 percent of the allowances should be allocated to consumer benefits but states are considering allocating all of the allowances to consumer benefits) and the money is spent wisely (e.g., on energy efficiency programs with benefit to cost ratios better than 1.0) then the net impact of the RGGI policy on electricity consumers in the state could easily be a net benefit.

That is, if the “direct” wholesale electricity price impact is \$12-\$60 million per year, but the allowance revenues are spent entirely on demand-side management programs with a benefit-cost ratio of at least slightly greater than 1.0, then the benefits would fully offset the price impact (and all of this excludes the climate change benefit, which is the reason this is being undertaken). Efficiency Maine reported a 2.7 to 1 benefit/cost ratio in its annual report for 2006, thus there is a lot of room to capture cost effective energy efficiency and fully mitigate all price impacts to customers; indeed the impacts are likely negative., given the low cost of the energy efficiency resource.

Lastly, it appears that Efficiency Maine could certainly absorb increased program funding and still achieve high benefit/cost ratios, based on rules of thumb concerning the level of spending for energy efficiency and the level of savings Efficiency Maine has achieved. In 2006, Efficiency Maine saw annual savings of 75,000 MWh, or 0.63% of Maine load. This is considerably below an industry savings benchmark of 1% of retail sales (which itself is hardly a ceiling), as an indicator of energy efficiency activity. Efficiency Maine spent \$9.2 million in 2006, or about 0.5% of annual retail sales revenue based on retail prices of 15c/kWh, below an industry benchmark of expenditures at a level at least equal to 1% of annual retail revenue (which is also hardly a ceiling – Vermont spends closer to 3%). This implies that Efficiency Maine has room to grow as an efficiency provider before lower benefit/cost ratios begin to be seen; and clearly even if the ratio was considerably lower than 2.7:1 efficiency is still a low-cost resource to procure.

In addition, investments in demand-side programs can help to reduce the market clearing prices for electricity and gas, providing additional benefits to consumers in the state and in the broader region.

Price Impact Summary – Retail Market - Information from RGGI documents

Retail price impacts as reported by the RGGI modeling are given below.

The “Standard Reference Case” is what the RGGI staff working group deemed a reasonable future scenario (middle of the road estimate of the future) without RGGI in place. It includes projections of load growth and natural gas prices. The reference case assumes that new coal will not be allowed in the time period of the analysis (p. 60 of assumptions document) due to political constraints.

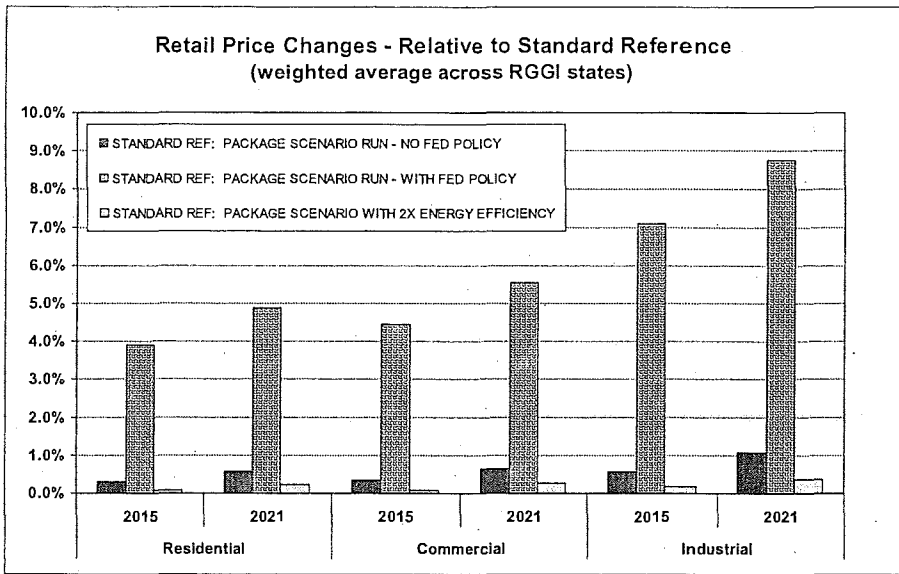
The High Emissions Case analyzes higher gas prices and allows coal builds (i.e., new coal-fired generation) on an economic basis (see the “Capacity Additions” on slide 17 of the IPM modeling results). In this scenario the model can select coal builds on an economic basis rather than having them severely restricted as in the reference scenario. The High Emissions case is not a high load scenario – it is focused on the fuel mix of resources (i.e., increased coal fuel use due to high natural gas prices and because of less restrictive coal-fired additions assumption).

The “2X Energy Efficiency” is a scenario where energy efficiency spending is doubled – and impacts of that spending are projected based on current program costs.

The federal policy case assumes a carbon cap and trade program implemented nationwide, which would lead to higher allowance values.

Standard Reference Case

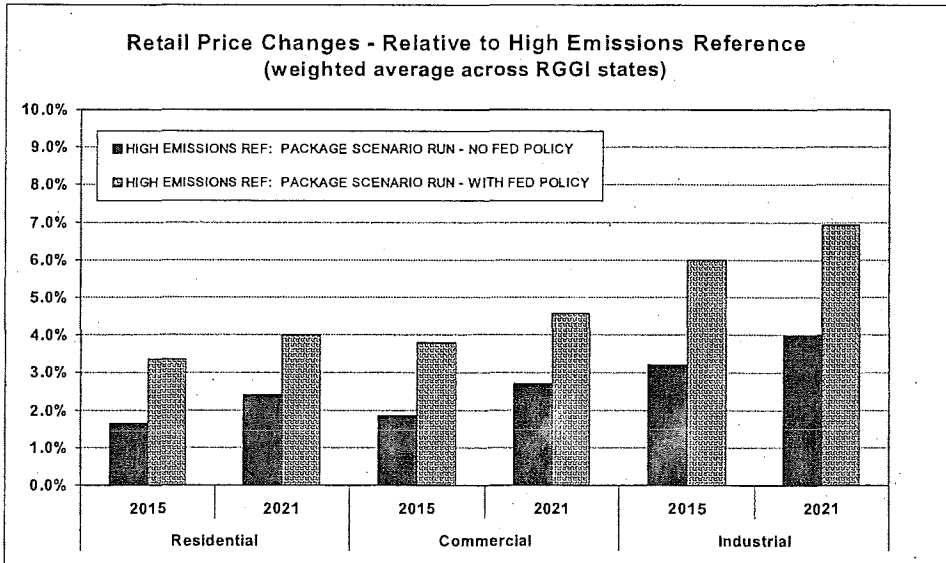
- Customer prices increase by <0.5% to no more than 1.0% between 2015 and 2021 across the sectors under the RGGI “package” scenario, in the standard reference case.
- With doubled energy efficiency, the customer price increase is <0.5% by 2021.



Source: RGGI Stakeholder presentation, 11/2005.

High Emissions Case

- Customer prices increase by 1.6% to 4.0% between 2015 and 2021 across the sectors under the RGGI “package” scenario, in the High Emissions reference case.



Source: RGGI Stakeholder presentation, 11/2005.

Customer Bill Impacts

- Customer *bills* drop 5-12% with a doubling of efficiency spending

Implied Annual Household Bill Impacts

Before Energy Efficiency Savings	Household Bill Impact (\$/yr)		After Energy Efficiency Savings	Household Bill Impact (\$/yr)			
				Participating Households*		If all EE savings distributed equally across all households	
Direct Impact of RGGI due to retail price change	2015	2021	Impact of RGGI after assumed EE Programs resulting in reduction in household energy usage	2015	2021	2015	2021
Standard REF Case			Standard REF Case				
Package	2.90	5.45	Package	-92.54	-153.67	-30.51	-50.24
Package + Fed	36.84	45.99	Package + Fed	-61.95	-119.81	2.26	-12.04
Package + 2X EE	0.77	2.16	Package + 2X EE	-189.59	-314.99	-65.85	-108.84
Hi Emissions REF Case			Hi Emissions REF Case				
Package	16.02	22.44	Package	-86.15	-147.43	-19.74	-37.02
Package + Fed	31.93	38.04	Package + Fed	-71.60	-133.97	-4.31	-22.17

* Assumes 35% Participation rate across households reached over time

Table source: REMI Impacts for RGGI Policies based on the Std REF & Hi-Emission REF, Economic Development Research Group, presentation by Lisa Petraglia & Dwayne Breger (MA DOER), November 2005.

Status of Emission Allowance Plans by State – Percent to be Auctioned for Consumer Good

Maine	NH	VT	MA	RI	CT	NY	NJ	DE	MD
?	Unknown	100%	100%	Just joined	Leaning 100%	100%	Leaning 100%	Unknown	Unknown

Summary information on the European Union Emissions Trading System

Background and summary: The European Union (EU) has developed an Emissions Trading System (ETS) to enable EU member states to meet their greenhouse gas emission reduction commitments under the Kyoto Protocol.¹ The EU ETS is a multi-sector greenhouse gas emissions trading mechanism that covers multiple energy-intensive sectors including energy activities (power generation and oil refining), production and processing of iron and steel, cement and other building materials, and pulp and paper industries (covered activities are listed in Annex I of the EU ETS Directive).² The ETS was launched in January 2005, and covers about 11,500 industrial installations.³

¹ Background material on the EU ETS is available from the European Commission at <http://ec.europa.eu/environment/climat/emission.htm>, from the UK Department for Environment, Food and Rural Affairs at <http://www.defra.gov.uk/environment/climatechange/trading/eu/index.htm>, and from the UK Environment Agency at <http://www.environment-agency.gov.uk/business/444217/590750/590838/1294204/>.

² Directive 2003/87/EC of the European Parliament and of the Council, October 13, 2003: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32003L0087:EN:HTML>

³ Zapfel, P.; "The EU ETS – Now and into the Future," Presentation to RFF/Mistra conference, November 2005.

The EU committed under the Kyoto Protocol to reduce greenhouse gas emissions 8% from 1990 levels between 2008 and 2012. Each EU country receives a national allocation of CO₂ emissions, and countries determine National Allocation Plans for distributing allowances under the agreed cap. Each year companies must surrender emissions allowances and carbon credits equal to the amount of CO₂ they have emitted in that year. Any shortfall can be covered by purchases of emissions allowances or credits on the open market. The ETS includes fines for companies that don't hold sufficient allowances or credits (beginning at about \$47 per short ton, rising to about \$118 per short ton in 2008).

Experience: The ETS market for carbon allowances grew steadily in value throughout 2005, with prices tripling between January 2005 and January 2006.⁴ In April 2006, the allowance price plummeted as some EU countries announced their actual emissions levels for the first time and it became clear there was an allowance surplus due to overly generous initial allocations. As a result carbon markets lost over 50% of their value (i.e., prices dropped from the low 20s (\$US/short ton) to under \$10/short ton.⁵ However, recent analysis indicates that carbon markets appear strong.⁶ This may be due in part to long term prices now reflecting the beginning of "phase 2" of the trading system, covering the 2008-2012 period, with a tighter underlying allowance allocation by EU countries.

The EU market for carbon allowances in the first three quarters of 2006 grew to 764 million metric tonnes (842 short tons) carbon dioxide equivalent compared with about 324 million tonnes (about 360 short tons) carbon equivalent in 2005. The value of the market was \$18.9 billion through the first three quarters of 2006, compared with \$8.2 billion in 2005. In the first three quarters of 2006, 97% of the world volume of allowance transactions was in the EU ETS, and 91% of the volume of project-based transactions was in the EU ETS.

The figure on the following page shows carbon dioxide trading prices over the past 13 months, with currency and volume converted from the European "Euros per metric tonne" to the US equivalent "\$/short ton". It illustrates that

- 1) the dramatic drop in CO₂ prices in Europe in 2006 was due to the realization by the market that allowance allocation had been overly generous; and
- 2) that the tightening of such allowances will drive the price up.

It roughly confirms at least the reasonableness of a \$2-\$10 range that has been assumed by some in prognostications about RGGI allowance market prices, although each region's prices are predicated on their distinct, underlying attributes (including, for example, the allowance level and the marginal fuels). In the near term there is no direct relationship between the prices in RGGI and the prices in the EU. The forthcoming RGGI market is not yet tied to the EU market; consideration for such may begin with the EU's "third" period, which starts in 2013.

⁴ LeGoffe, Philippe; "The European Carbon Market – A Successful Launch," Parliamentary Information and Research Service, Library of Parliament, PRB 05-51E, January 25, 2006.

⁵ Wynn, Gerard; "CO₂ Market on Brink as Price Continues to Slide;" Reuters, April 28, 2006.

⁶ Capoor, K; and Ambrosi, P; STATE AND TRENDS OF THE CARBON MARKET 2006

Update: (January 1 – September 30, 2006), World Bank and International Emissions Trading Association. October 2006.

European Union CO2 Trading Prices - Near Term and Longer Term CO2 Price Trends, \$US/Short Ton



LT and NT contract price drop due to actual emissions announcement and realization of allowance surplus by market, April 2006.

LT contract price rise due to trading product change from 2007 to 2008 contract; and associated tighter allowance allocation from the European Commission.

Source: ECX trading data
http://www.europeanclimateexchange.com/index_noflash.php
 Conversion by Synapse based on Euro/US\$ rates and .907 metric tonnes per short ton.

— Longer Term - - - Near Term

Near term: near-month or near-quarter spot price
 Long term: 2007 or 2008 year contract price

To provide a sense of the comparative values used in European currency and volume reporting, the following figure is provided. Note, of course, that the pattern is mostly identical to the graph above (Euro to \$US dollar currency conversion affects the pattern slightly since it is not constant). Based on a Euro/\$US conversion rate of 1.3, and a metric tonne to short ton ratio of .907, the equivalent US price/short ton is about 70% of the European price Euro/metric tonne.

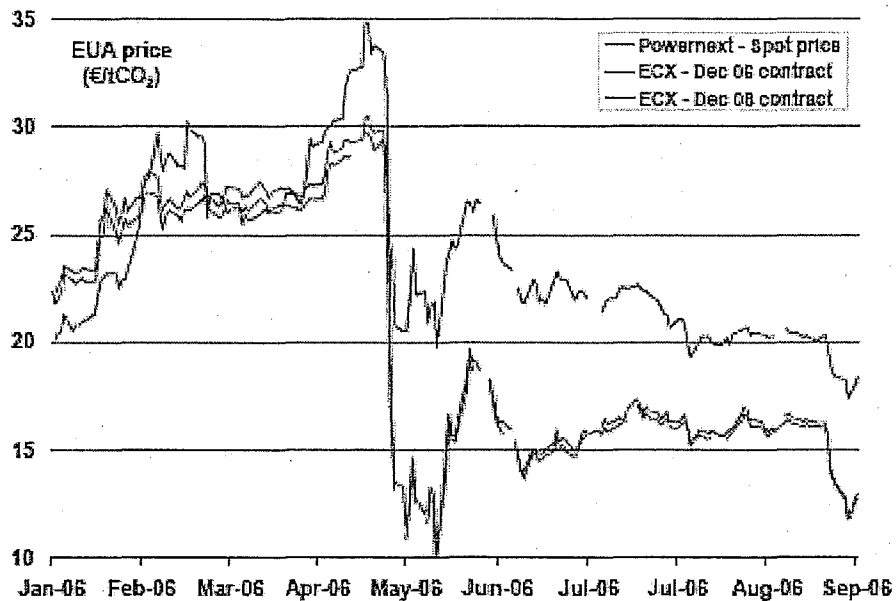


Figure 2: Spot and Futures Prices for EUAs Jan. to Sep. 2006 (Source: Powernext, ECX).

Trends – future development: Following evidence of overly generous allocations in the first period, the European Commission has tightened up allocations for the second period.⁷ The Commission has determined that multiple criteria affect allowance price over time including: reduction potential and costs to reduce emissions, allocations, reported actual emissions, access to and availability of JI (joint implementation) and CDM (clean development mechanism) credits, fossil fuel prices, weather patterns (temperature, precipitation), degree of participation across different sectors in the market, and political developments.⁸

Going forward, the Commission plans to review four categories of issues as it revises the ETS for the third trading period (starting in 2013). The Commission will consider expanding the ETS to other sectors and other greenhouse gases besides carbon dioxide, linking with other trading schemes (such as RGGI and California), increasing harmonization and predictability, and

⁷ European Commission “Emissions trading: Commission decides on second set of national allocation plans for the 2008-2012 trading period,” Press release January 16, 2007

⁸ Communication From The Commission To The Council, The European Parliament, The European Economic And Social Committee and the Committee of the Regions; “Building a global carbon market – Report pursuant to Article 30 of Directive 2003/87/EC”, November 13, 2006.

improving compliance and enforcement.⁹ The Commission has already agreed to expand the ETS to include aviation.¹⁰

Comparisons Between the EU ETS and RGGI

The RGGI allowance market, on its own, will be much smaller than the EU ETS. The regional cap is approximately about 150 million short tons of CO₂ (136 metric tons).¹¹ However, linkage with a California market and/or the EU ETS obviously would expand the market (likely the earliest linkage would not begin until 2013).

Some market elements have emerged as important factors in the design of the carbon allowance market.¹² These include:

- (1) good data on actual emissions and projected emissions is essential to having credible targets,
- (2) regulatory certainty and long time horizons enhance predictability,
- (3) quarterly reporting enhances market transparency,
- (4) enforcement must be strong and penalties discouraging,
- (5) flexibility mechanisms are desirable from a markets point of view.¹³

Experience in the EU ETS has also raised questions about whether allocating allowances for free makes sense. Following the plunge in market prices in April 2006 auctions emerged as an important tool for avoiding windfall profits for emission sources.¹⁴

⁹ European Commission, "Climate Change: Commission sets out agenda for revising the EU emissions trading scheme from 2013." November 13, 2006.

¹⁰ European Commission, "Climate change: Commission proposes bringing air transport into EU Emissions Trading Scheme" Press release December 20, 2006.

¹¹ Environment Northeast: "The Regional Greenhouse Gas Initiative An Overview of the RGGI Program and its Importance," distributed at CT Department of Environmental Protection RGGI meeting in December 2006..

¹² See, e.g. Capoor K, and Ambrosi P, "State and Trends of the Carbon Market 2006 – Update" presentation to the International Emissions Trading Association, November 13 2006. The Economist "The greening of America" January 25th 2007, page 9.

¹³ However, flexibility mechanisms are not always consistent with public policy objectives, and should thus be carefully designed.

¹⁴ BBC News, "Power firms could make a £1bn windfall profit from the EU Carbon Emissions Trading Scheme, BBC News has learned" May 1, 2006. The Economist "The greening of America" January 25th 2007, page 9.