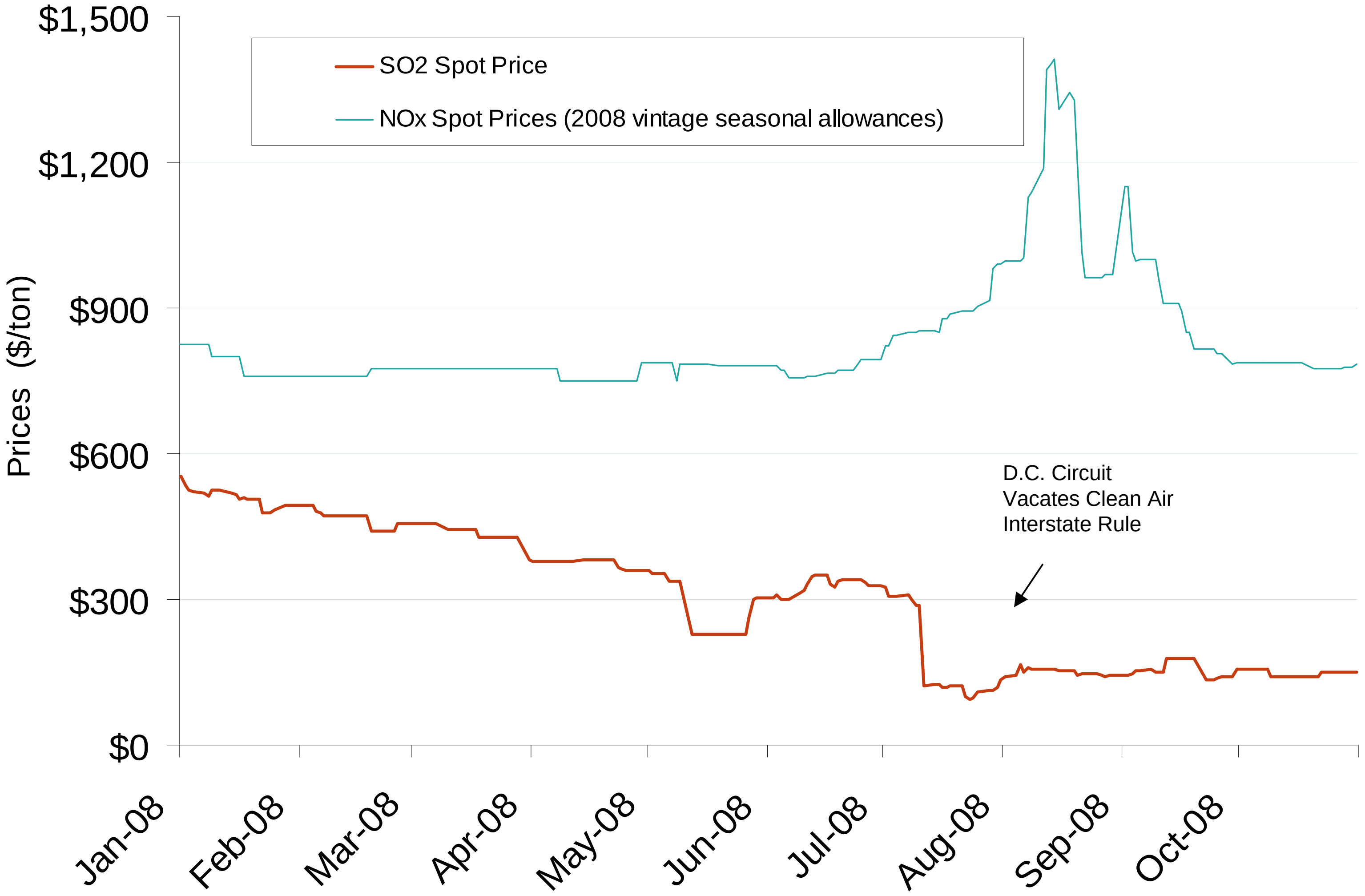
SO_2 Allowance Spot Prices and NOx Seasonal Allowance Spot Prices

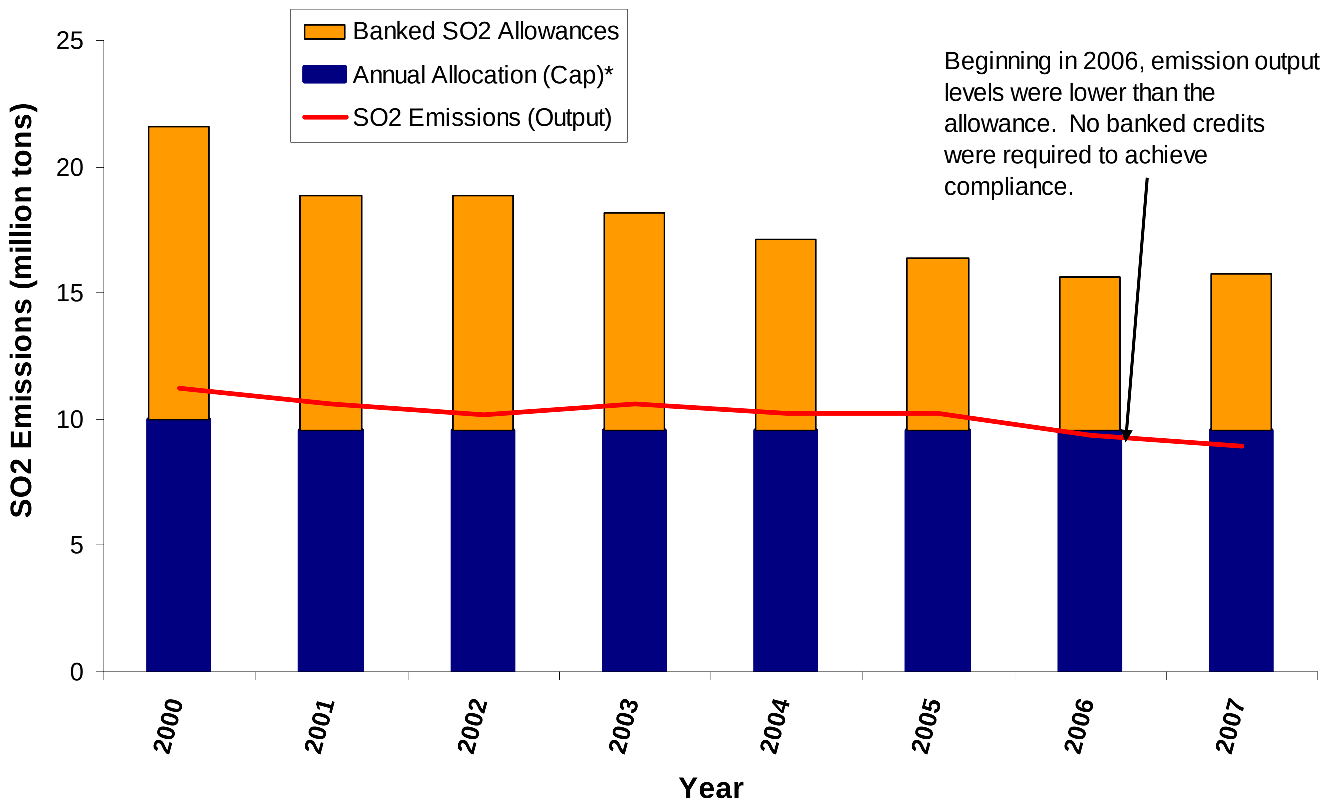


Source: Derived from *Cantor Fitzgerald* data.

Updated October 14, 2008

3004

SO2 Allowances Available for Compliance and SO2 Emission Output under Cap-and-Trade

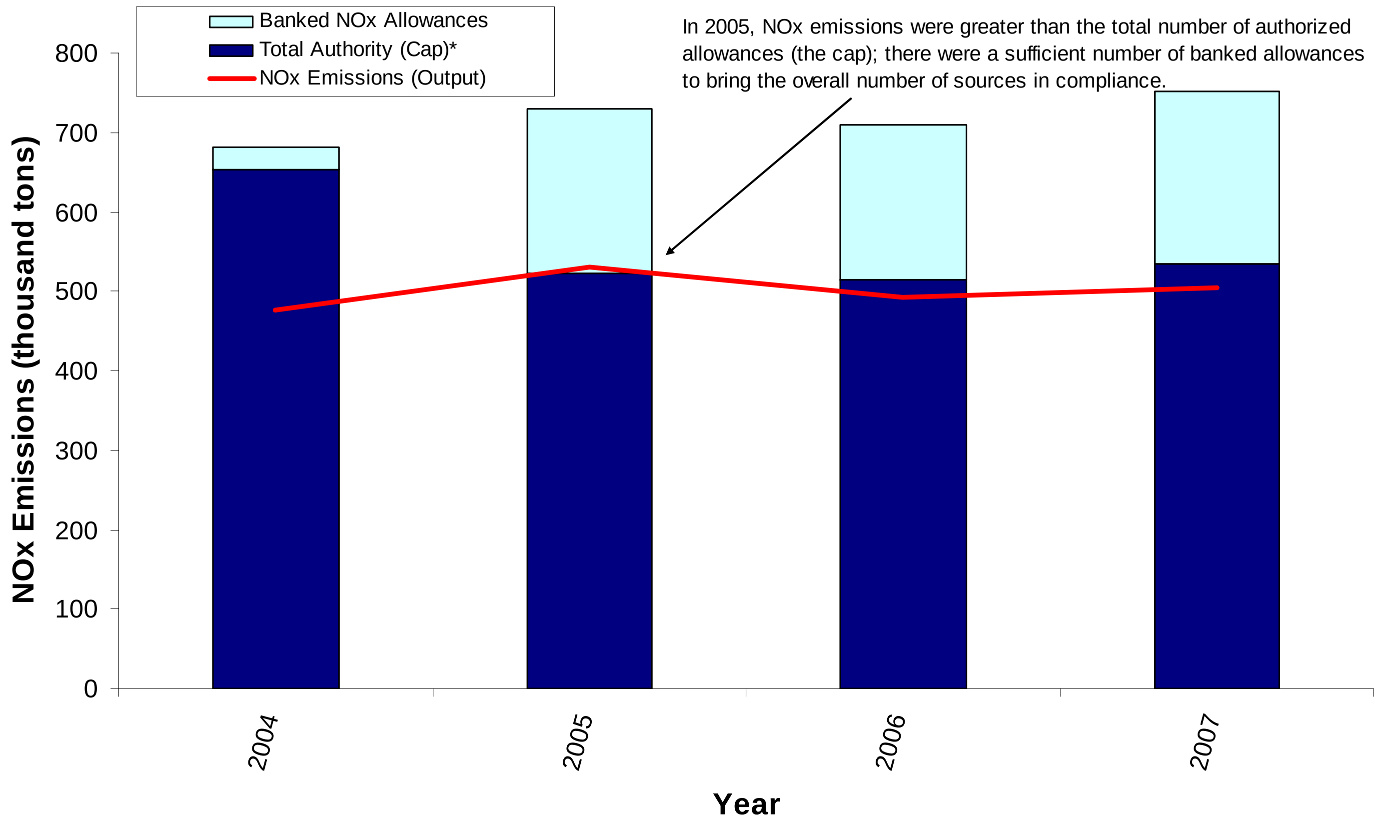


Source: EPA

See overview on following slide.

Updated October 9, 2008

NOx Allowances Available for Compliance and NOx Emission Output under Cap-and-Trade



Source: EPA

See notes on following slide.

Updated October 9, 2008

Brief Overview of the SO_2 and NO_x Emissions Markets

The electric power industry is a major source of sulfur dioxide emissions (SO_2) and nitrogen dioxide emissions (NO_x) emissions – both precursors of acid rain and smog. According to the Environmental Protection Agency's (EPA) 2006 Acid Rain Progress Report, the power sector is responsible for 70% of SO_2 emissions and 20% of NO_x emissions.

Reduction in SO_2 and NO_x emissions can be obtained through a cap-and-trade program, which is a market-based compliance option that also provides an emitting source with relative flexibility in compliance options. These options include pollution control technology such as flue gas desulfurization (FGD) for SO_2 and selective catalytic reduction (SCR) for NO_x (i.e., scrubbers), fuel switching, and/or participating in their respective cap-and-trade markets. Compliance measures can be capital-intensive and the decision to use pollution controls and/or emission allowances is primarily driven by the regulatory environment, fuel input type and the level of emission output by emitting sources. The associated costs with this decision contribute to the price of wholesale power and ultimately, the retail price.

The Acid Rain Program

http://www.epa.gov/airmarkets/progsregs/arp/index.html

EPA's Acid Rain Program (ARP), established under the 1990 Clean Air Act Amendments, required reductions of SO_2 and NO_x emissions from the electric power industry. The Acid Rain Program was the first cap and trade program implemented nationwide to reduce SO_2 emissions. The SO_2 program set a permanent cap on the total amount of SO_2 that can be emitted by fossil fuel-fired generating units and allows allowance trading so affected sources have some flexibility in their compliance method. Currently, SO_2 sources must surrender one allowance to emit one ton of SO_2. If a source falls short on the number of allowances it needs to comply with its individual cap, it can purchase allowances from another source that has a surplus of allowances. An emitting source may have a surplus of allowances for several reasons. For example, if it chose to install and/or run scrubbers then it can "bank" those unused allowances for future use or sell the leftover allowances to other emitting sources.

The NOx Budget Trading Program

http://www.epa.gov/airmarkets/cap-trade/docs/nox.pdf

In 2003, the cap-and-trade method was also implemented to reduce seasonal (primarily summer) NO_x emissions from fossil fuel-fired plants. While the EPA administers the program, states are required to share the responsibility for allowance allocation and enforcement. Currently, NO_x sources must surrender one allowance to emit one ton of NO_x.

[1] The Acid Rain Program also required NOx emission reductions by select coal units but under a rate-based regulatory program [http://www.epa.gov/airmarkets/progsregs/arp/nox.html].

Source – EPA

Updated October 9, 2008

3031

Collaborative Greenhouse Gas (GHG) Programs

Collaborative Regional GHG Programs:

- Three North American groups with goals to lower regional GHG emissions were initiated by state Governors.
- 32 U.S. states, D.C., eight Canadian provinces, and six Mexican states are Participants or Observers.
- Observer jurisdictions do not commit to group GHG reduction goals, but participate in proceedings should they opt to join later.

Midwest Greenhouse Gas Reduction Accord:

- Established November 2007
- Participants: 6 states, 1 province; 3 Observer states, 1 province
- *Preliminary* GHG policy recommendation: 15 – 25% reductions by 2020, 60 – 80% by 2050

Regional Greenhouse Gas Initiative (RGGI):

- Takes effect Jan 2009
- 10 Participant states; Observers: 1 state, D.C., 3 provinces.
- Market-based cap-and-trade effort to reduce *power-sector* CO_2 emissions.
- 10% CO_2 reduction by 2018 covers over 200 plants
- 188 million allowances to be sold in 6 auctions

Auctions:

1. 9/25/08: 12.5 million allowances cleared at $3.07/allowance, raising $38.5 million.

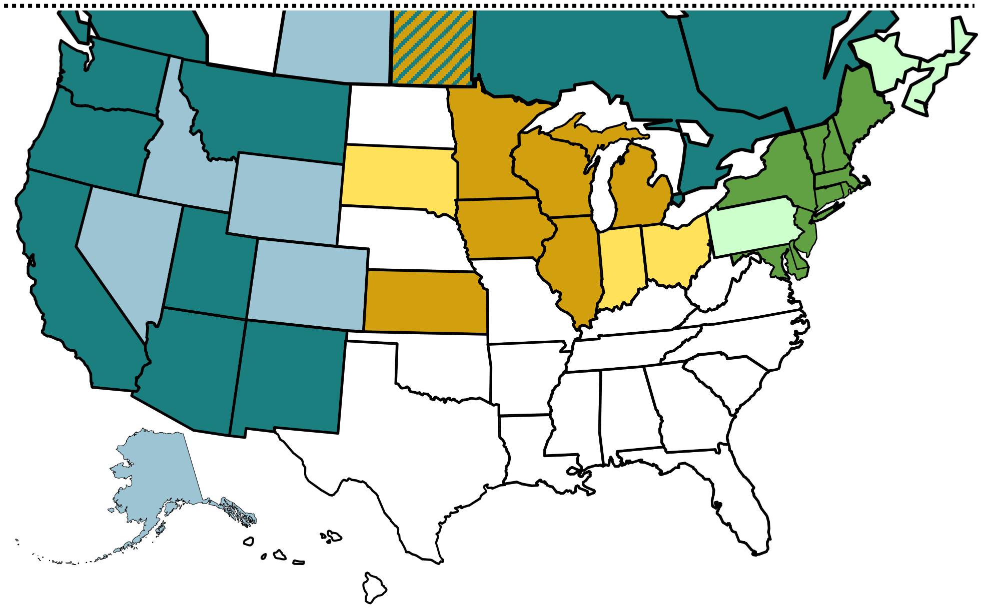
- 6 states participated: CT, MA, ME, MD, RI, VT; these 6 will offer 1/6 of allowances at next 5 auctions

2. 12/17/08: first 6 states plus NY, NJ, NH, DE to participate

- 31.5 million allowances

3 to 6: All ten states on same percent basis as prior auctions.

- 2009 dates: 3/18, 6/17, 9/16, 12/16



- Participant in WCI
- Observer to WCI
- Participant in MGGRA
- Observer to MGGRA
- Participant in RGGI
- Observer to RGGI
- Participant in MGGRA & WCI

Western Climate Initiative (WCI):

- Created February 2007
- Partners: 7 states, 4 provinces; Observers: 5 states, 1 province*
- WCI announced its design for a market-based, *multi-sector* cap-and-trade program, Sept 2008:
  - 15% CO_2 reduction below 2005 levels by 2020
  - Phase I to take effect Jan 2012

Updates at: **http://www.ferc.gov/market-oversight/mkt-electric/overview/elec-ovr-ghg.pdf**

Notes: Kansas is a MGGRA participant and WCI observer. Ontario is a Partner to WCI and MGGRA Observer.
Sources: Regional initiatives: www.rggi.org, www.midwesternaccord.org, www.westernclimateinitiative.org , trade press, Pew Center.

Updated November 7, 2008

3032

Collaborative Greenhouse Gas Programs

Regional Greenhouse Gas Initiative (RGGI):

- First U.S. mandatory cap-and-trade program for CO_2 emissions and targets only *power plants*
- Established Dec 2005. Takes effect January 1, 2009
- Cooperative effort by northeastern states to reduce CO_2 emissions:
  - Participants: CT, DE, ME, MD, MA, NH, NJ, NY, RI, VT
  - Observers: PA, D.C., and 4 Canadian provinces.
- Allowances will be auctioned, not allocated, although sources may trade allowances. One allowance is the right to emit 1 ton of CO_2.
- States' allowance shares apportioned from overall cap.
- By law, at least 25% of auction proceeds must support consumer benefit programs such as renewable energy, energy efficiency, or low-income energy assistance. In fact, 4 states will so allocate 100%; the rest at least 75%.
- Auction timing: two pre-compliance auctions in 2008, four quarterly auctions in 2009. There will be quarterly auctions in subsequent years.

Second RGGI auction, December 17, 2008:

- Six participating states from 1st auction will auctioned 1/6 of allowances: CT, MA, ME, MD, RI, VT.
- DE, NH, NJ, and NY will also participate in Auction 2, having passed necessary legislation or regulations.
- Four new states will auction 20% of allowances in 5 auctions
- 31.5 million allowances in auction
- Base price of $1.86/allowance, same as 1st auction.

Midwest Greenhouse Gas Regional Accord:

- Signed Nov 2007 at Midwestern Governors Association Energy Summit to establish emission reduction targets consistent with members' policies.
  - Participants: IA,IL, KS, Manitoba, MI, MN, WI
  - Observers: IN, OH, Ontario, SD
- Expects to release draft design in Dec. To be decided:
  - Which sectors should cap-and-trade cover?
    - electric power and large industrials (nearly ½ of regional emissions)
    - or include transportation, too (1/4)
  - Target reductions from 2005 levels:
    - 15% - 20% - 25% reductions by 2020
    - 60% - 80% reductions by 2050
  - recommendations subject to modeling outcomes conducted by ICF on costs and other impacts of cap-and-trade under different scenarios, including complementary policies in sectors outside the cap.

Western Climate Initiative (WCI):

- Launched by Western Governors Association Feb 2007 to reduce regional GHG collectively and cooperatively.
- Partners: seven U.S. states and four Canadian provinces: AZ, British Columbia, CA, Manitoba, MT, NM, Ontario, OR, Quebec, UT, WA
- Observers: AK, CO, ID, NV, Sask., WY
- WCI announced design for a market-based, *multi-sector* cap-and-trade program (Sept 2008):
  - 15% CO_2 reduction below 2005 levels by 2020
  - Covers 90% of regional emissions
  - Phase I to take effect Jan 2012
  - Phase II will begin 2015