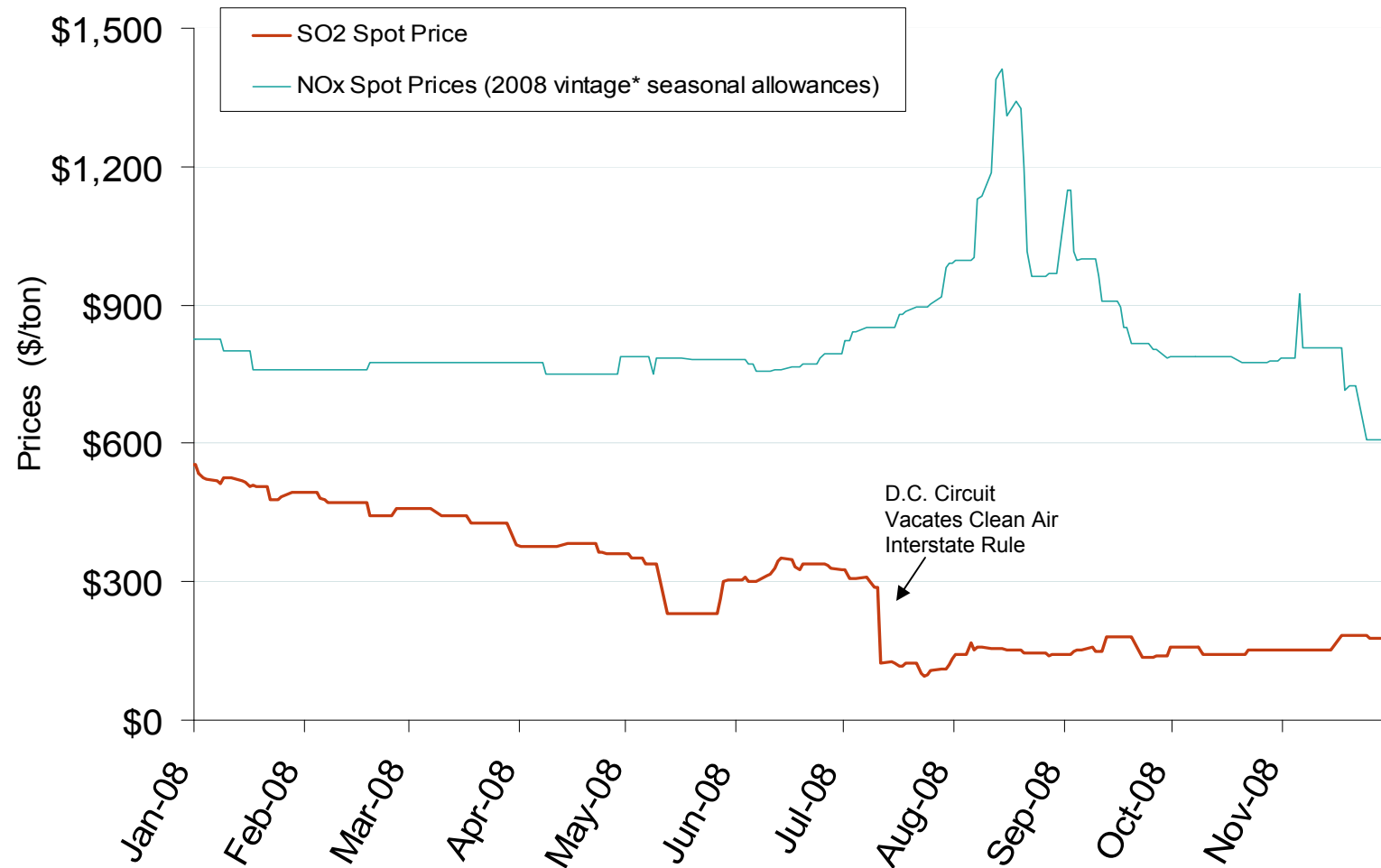


SO₂ Allowance Spot Prices and NO_x Seasonal Allowance Spot Prices



Source: Derived from *Cantor Fitzgerald* data.

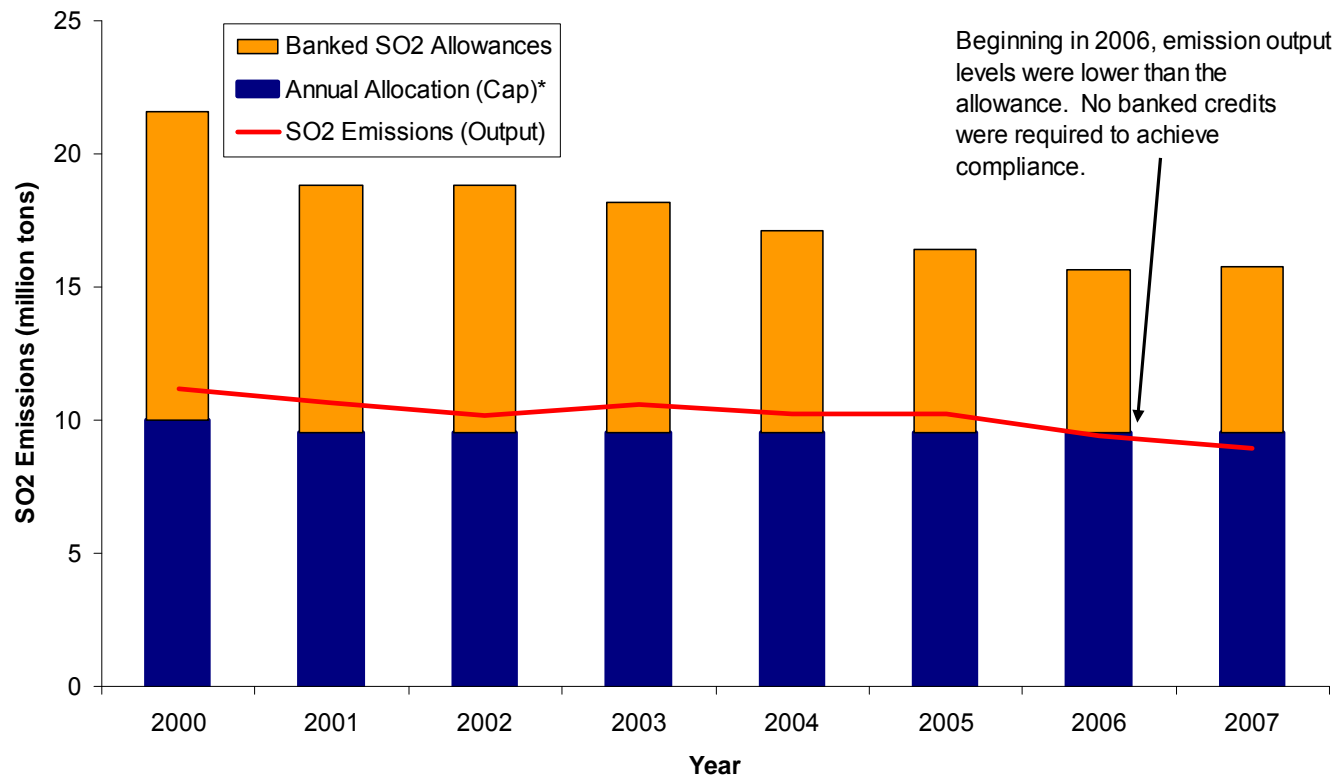
* Earliest year an allowance may be applied against emissions.

Updated December 5, 2008

3004

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

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



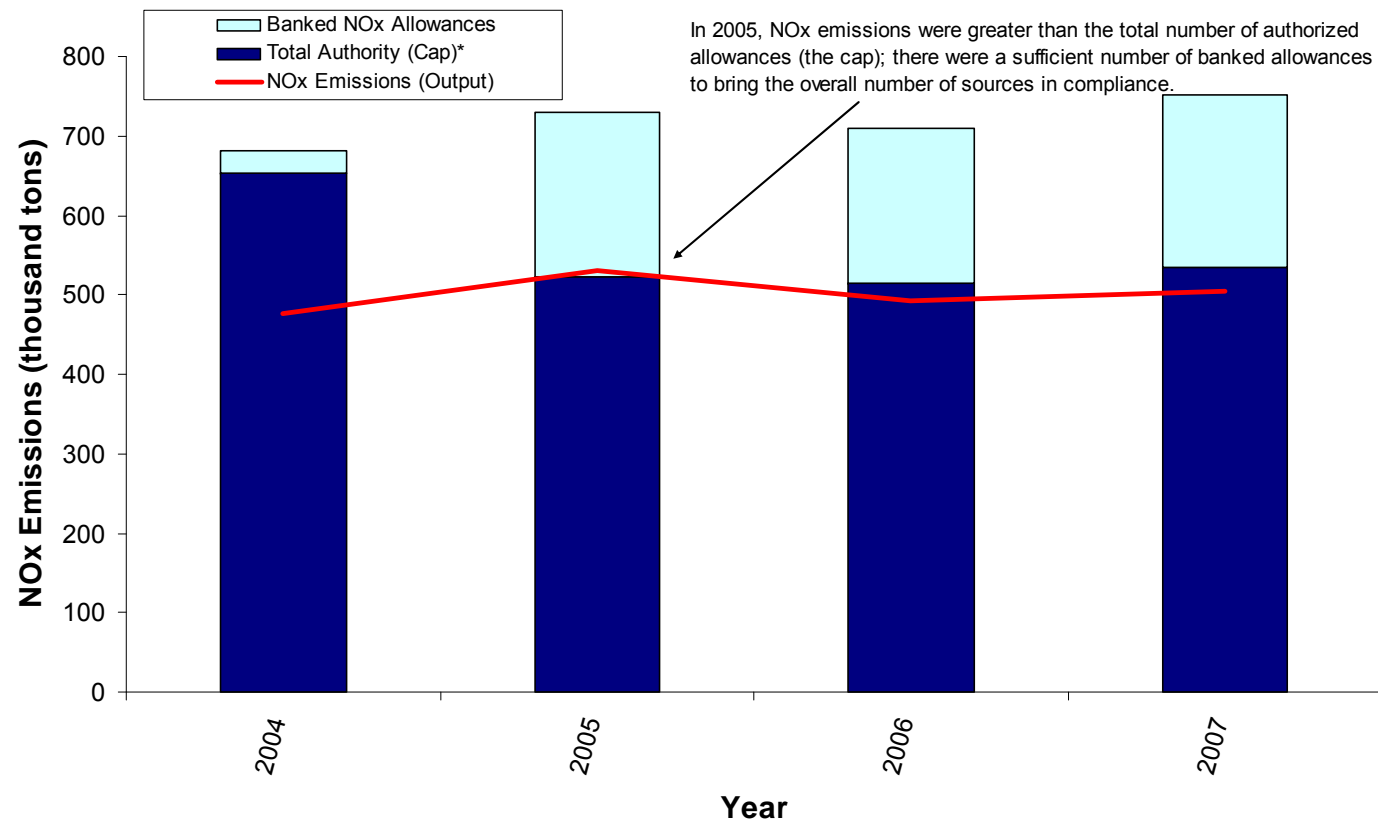
Source: EPA

See overview on following slide.

Updated December 5, 2008

3030

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



Source: EPA

See notes on following slide.

Updated October 9, 2008

3031

Brief Overview of the SO₂ and NO_x Emissions Markets

The electric power industry is a major source of sulfur dioxide emissions (SO₂) and nitrogen dioxide emissions (NO_x) – 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 SO₂ emissions and 20% of NO_x emissions. Currently US policy encourages reduction in SO₂ and NO_x emissions which can be achieved through a cap and trade program. This market based model also allows for relative flexibility in compliance options. An emitting source may choose pollution control technology such as add-on controls like flue gas desulfurization (FGD) for SO₂ and selective catalytic reduction (SCR) for NO_x, fuel switching, and/or participation in the respective cap and trade markets. The decision is primarily driven by the regulatory environment, fuel input type, the level of emission output, and compliance costs, the latter of which affects wholesale and retail prices.

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, requires reductions of SO₂ and NO_x emissions from the electric power industry. The Acid Rain Program was the first cap and trade program implemented nationwide to reduce SO₂ emissions.^[1] The SO₂ program set a permanent cap on the total amount of SO₂ 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, SO₂ sources must surrender one allowance to emit one ton of SO₂. 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, it can "bank" those unused allowances for future use or sell the leftover allowances to other emitting sources.

The NO_x 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 NO_x emission reductions by select coal units but under a rate-based regulatory program [<http://www.epa.gov/airmarkets/progsregs/arp/nox.html>].

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. RGGI Observers are not on its Board.

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% CO₂ reduction below 2005 levels by 2020
 - Phase I to take effect Jan 2012

Midwest Greenhouse Gas Reduction Accord:

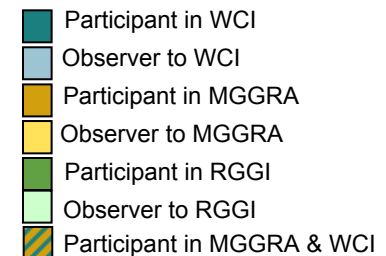
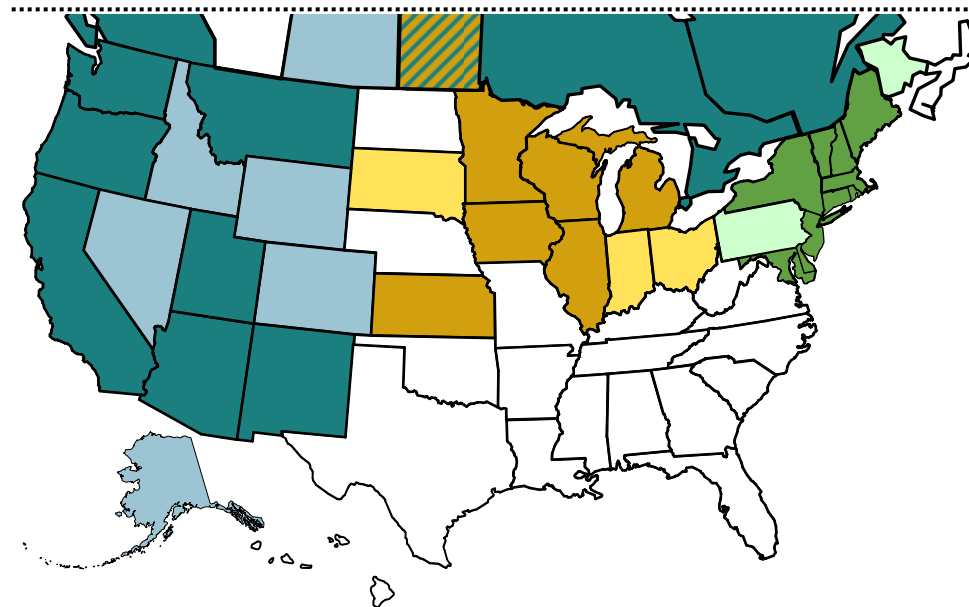
- Established November 2007
- Participants: 6 states, 1 province; 3 Observer states, 1 province
- *Preliminary* GHG policy recommendation: 15 – 25% reductions by 2020, 60 – 80% by 2050

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* CO₂ emissions.
- 10% CO₂ reduction by 2018 covers over 200 plants
- 188 million allowances to be sold in 6 auctions

Auctions:

1. **9/25**: 12.5 million allowances sold by 6 states, clearing at \$3.07/allowance.
2. **12/17/08**: first 6 states plus NY, NJ, NH, DE to participate in sale of 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



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 and Quebec are Partners to WCI and Observers to RGGI; Ontario is also an observer to RGGI. Sources: Regional initiatives: www.rggi.org, www.midwesternaccord.org, www.westernclimateinitiative.org, trade press, Pew Center.

Collaborative Greenhouse Gas Programs

Multiple parties call for national GHG standards:

- President-elect Obama pledged support for an emissions cap-and-trade system; he has said he would establish annual targets to reduce emissions to 1990 levels by 2020 and reduce them an additional 80% by 2050.
- Rep. Henry Waxman, Chair-elect of the House Energy and Commerce Committee, joined 150 House Democrats in Oct in outlining “principles” for climate change legislation, including emissions reductions of at least 15% by 2020.
- The Western Governors Association (WGA) sent President-elect Obama a letter urging him to “establish an aggressive and achievable national [GHG] reduction goal,” and to “propose a mandatory national system for reducing [GHG] emissions that makes maximum use of market mechanisms.”

RGGI to hold Second Auction on December 17:

- Participants: CT, DE, MA, ME, MD, NH, NJ, NY, RI, VT
- Observers: PA, D.C., Ontario, Quebec, New Brunswick
- Six states from 1st auction will auction 1/6 of allowances in remaining 2008-09 auctions: CT, MA, ME, MD, RI, VT.
- DE, NH, NJ, and NY will participate in Auction 2, having passed necessary legislation since Auction 1. They will auction 20% of their allowances in each of 5 auctions.
- Auction 2 includes 31.5 million allowances at a base price of \$1.86/allowance.
 - The number of allowances is higher in Auction 2, because NY and NJ have larger quantities to auction.
 - In Auction 1 (9/25), 12.5 million allowances cleared at \$3.07/allowance, raising \$38.5 million. The base price of \$1.86/allowance was the same.
- The auction will begin on Dec 17th; results are expected by Dec 19.
- About 90 participants are said to have applied to bid at Auction 2, compared with 59 entities that bid in Auction 1.

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 WGA in Feb 2007 to reduce regional GHG collectively and cooperatively.
 - Partners: AZ, British Columbia, CA, Manitoba, MT, NM, Ontario, OR, Quebec, UT, WA
 - Observers: AK, CO, ID, KS, NV, Sask., WY
- WCI announced design for a market-based, *multi-sector* cap-and-trade program (Sept 2008):
 - 15% CO₂ reduction below 2005 levels by 2020
 - Covers 90% of regional emissions
 - Phase I to take effect Jan 2012
 - Phase II will begin 2015