



IETA

INTERNATIONAL EMISSIONS
TRADING ASSOCIATION

***Economics of Greenhouse Gas Trading:
Reaching Environmental Goals Cost Effectively***

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Overview

- Background on Cap and Trade and Emissions Trading
- Advantages of Emissions Trading
- US Experience with SO₂ Emissions Trading and NO_x Trading
- EU Experience with CO₂ and Greenhouse Gas Emissions Trading

Cap and Trade – What It Isn’t!

- **“...cap and trade is too volatile, complex and susceptible to manipulation to sustain the needed investment milieu.”**
 - Richmond Times-Dispatch: “Backlash from House Bill is driving Senate Delays”, August 30, 2009.

- **“...oppose creating any carbon market.”**
 - Senator Byron Dorgan (D-ND) Bloomberg.com: “Goldman, JPMorgan Face Carbon Market Curbs in Senate Proposals”, August 13, 2009.

- **“...concerned about the potential for excessive speculation in carbon credits to distort their value.”**
 - Former Agriculture Committee Chairman Tom Harkin (D-IA) Agriculture Online: “Carbon trading needs to be transparent, lawmakers told”, September 10, 2009.

- **IN FACT, EVIDENCE SUGGESTS THAT EMISSIONS TRADING HAS NEVER BEEN SUBJECT TO MANIPULATION AND PRICING IS LESS VOLATILE THAN OTHER ENERGY COMMODITIES.**

What is Emissions Trading?

- **Emissions Trading = Flexible “Market” compliance**
 - Saves Money but Provides the Same (and Often Better) Environmental Outcome.

- **In an emissions trading system, a regulated company or entity is:**
 - Required to meet an “Emissions Cap”
 - *Typical Cap = Annual Tons Emitted per year*
 - Issued “Emission Allowances” Each Year
 - *Number of Allowances Issued = Emissions Cap*
 - At the end of the year, entity must hold Allowances = Actual Annual Emissions.

- **Allowances may be bought or sold (“traded”)**

- **Allowances can be saved (“banked”) for use in later years**

How Does Emissions Trading Work?

- **XYZ Electric Company:**
 - Current Emissions = 100,000 Tons SO₂ Per Year
 - 2010 Emissions Cap/Allowances = 50,000 Tons SO₂
- **ABC Electric Company:**
 - Current Emissions = 70,000 Tons SO₂ per Year
 - 2010 Emissions Cap/Allowances = 35,000 Tons by 2010
- **XYZ has low cost reduction opportunities:**
 - Over-complies by reducing its emissions to 40,000 Tons SO₂ in 2010
 - Sells its excess 10,000 allowances (i.e. 50,000 Allowances-40,000 Emissions)
- **ABC has higher cost reductions:**
 - Reduces its emissions to 45,000 Tons. (Cap/Allowances = 35,000) Means Deficit of 10,000 Allowances
 - Buys 10,000 Allowances from XYZ Company

Advantages of Emissions Trading

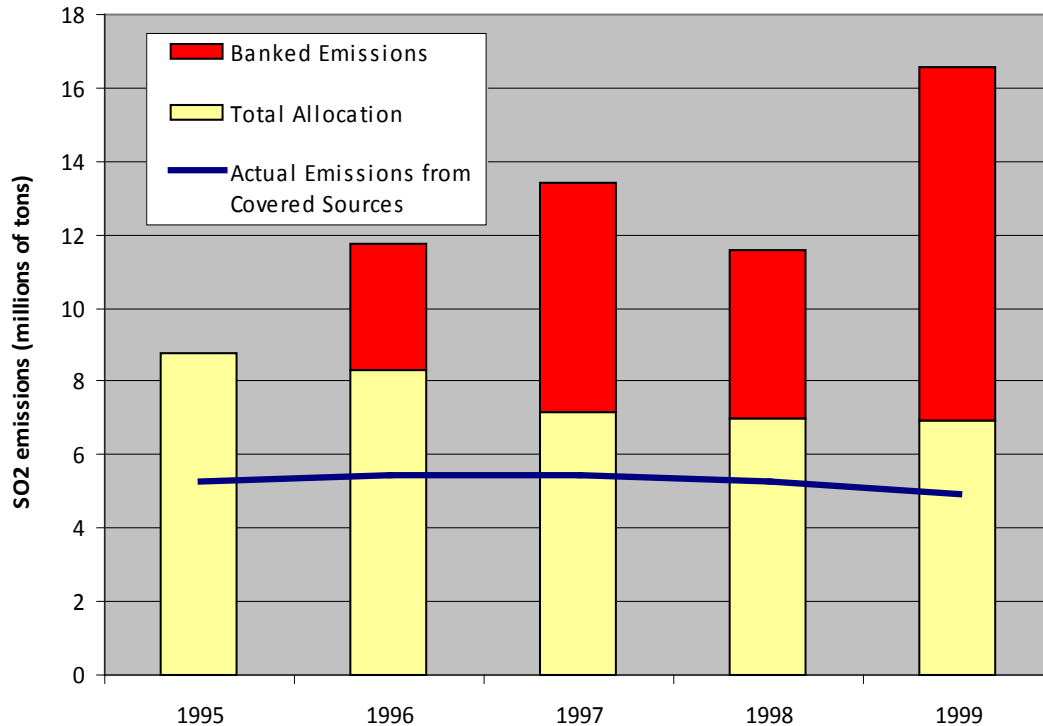
- **Emissions trading reduces costs.**
 - An unrestricted emissions trading system will provide the “most bang for the environmental buck”.
 - Flexibility to achieve reductions at lowest cost.
 - Competitive market forces drive down compliance costs.

- **Emissions trading provides more environmental benefits than plant-by-plant standards.**
 - Trading results in greater compliance than standards based system.
 - EPA found virtually 100% compliance for its SO₂ program.
 - Banking creates market incentives to reduce emissions more today while lowering long run costs.

Banking Promotes Additional Reductions

SO2 Emissions and the Allowance Bank

Phase I



Banking provides incentives to make additional reductions for future compliance periods, leading to both lower compliance costs and more total reductions.

Key Cost Containment Elements

- **“Where” Flexibility**
 - Intra and inter-company trading
 - Interstate and international trading
 - Trading with Offsets (uncapped sectors or entities)

- **“When” Flexibility**
 - Banking
 - Borrowing (in CO2 markets)
 - Trading with offsets (uncapped sectors or entities)

- **Other Mechanisms**
 - Strategic Allowance Reserves (in CO2 markets)

Background: US SO₂ Trading System

- **In 1990, U.S. Congress passed the Clean Air Act Amendments (CAAA) of 1990.**
 - Among other provisions, the CAAA required additional SO₂ reductions from electric utilities in the U.S. in two phases:
 - Phase I beginning in 1995
 - Phase II beginning in 2000 (Cap=50% Reduction in SO₂)

- **The CAAA also included an emissions trading program.**
 - Companies could buy, sell or bank emission allowances as long as they had enough allowances at the end of each year to cover their actual emissions.

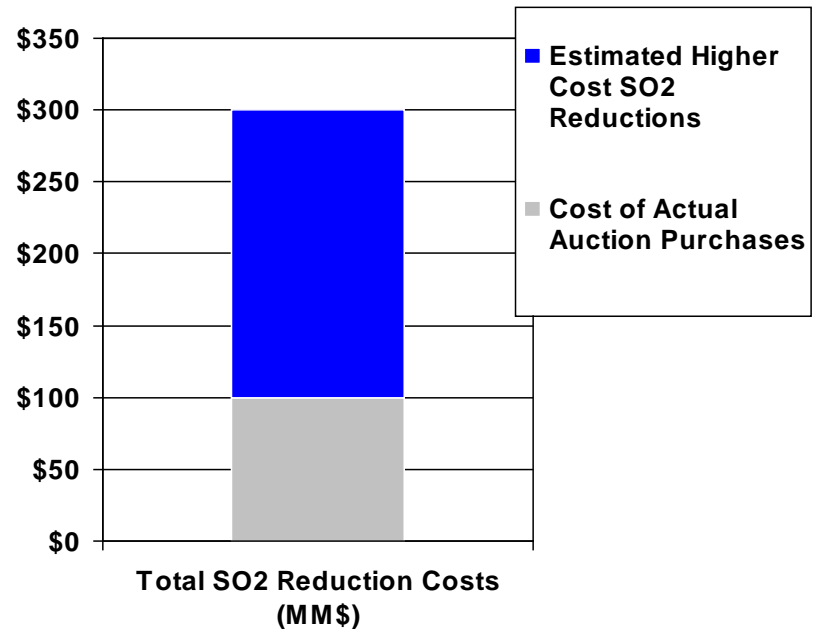
Results of SO₂ Program: Trading = Lower Costs

- **U.S. EPA study and OMB studies found annual costs much less than expected.**
 - Initial estimate. \$6 billion vs. final estimates of. \$1-2 billion/year

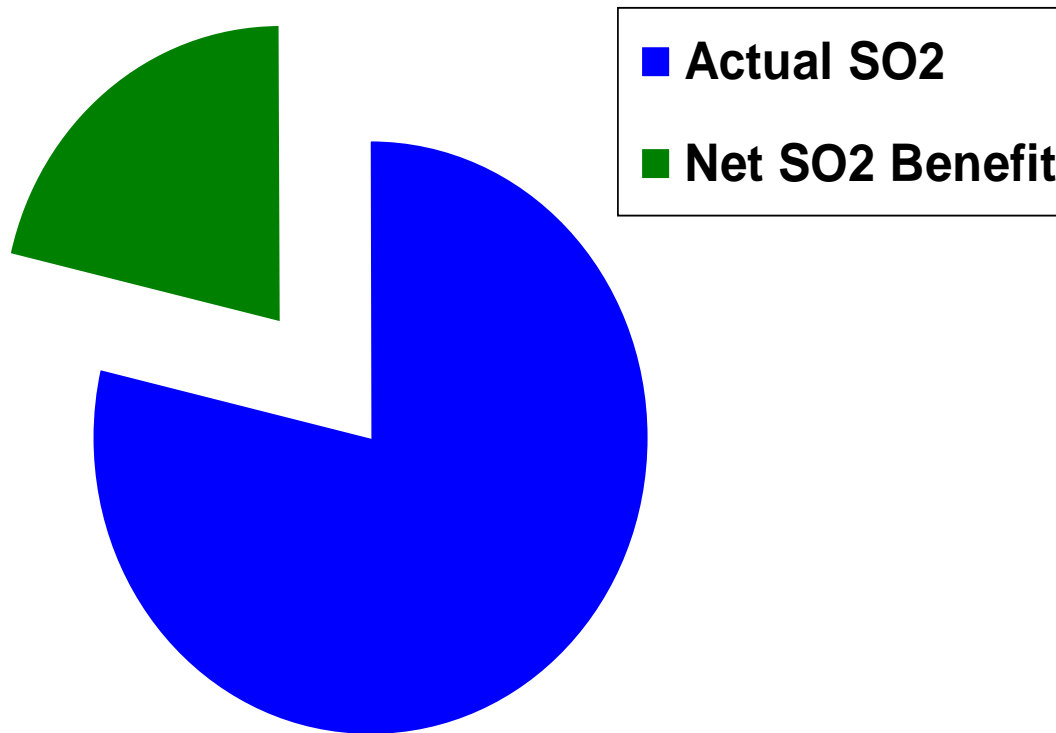
- **Why were annual costs only 25% of projections?**
 - Company averaging of reductions (“intra-company trading”) lowered costs vs. plant-by-plant limits.
 - “Banking” yielded significant net cost savings (and lowered emissions in near term).
 - More “lower cost” reductions (e.g. fuel switching) were made during Phase I, postponing or offsetting some “high cost” reductions (e.g. scrubbing) well beyond 2000.
 - “Inter-company trading”
 - Directly reduced costs
 - Provided price discovery
 - Increased fuel supplier and vendor competition

“Trading” Example: AEP Savings from Auction Purchases

- Between 2000-2004, AEP bought 0.76 MM allowances @\$132 per ton for \$100 MM.
- Purchased allowances displaced scrubber and fuel switching roughly estimated to cost an average of \$400 per ton.
- Thus, AEP’s 2000-2004 auction purchases reduced costs ~ \$200 million.



Trading and Banking Yield Significant Environmental Benefits



Due to early reductions and banking and credits, the SO₂ program resulted in *over 20% more* reductions in the US than required (~7 million tons).

NOx Trading Programs Were Also Successful

- **The U.S. OTC NOx Budget Trading Program reduced NOx emissions by over 60% between 1999 – 2002.**
- **The U.S. NOx SIP Call Program, 2002 – present, reduced NOx emissions by 62% compared to 2000 levels.**
 - 2008 NOx emissions were 9% below the 2008 emissions cap.
- **Rough proxy for compliance cost savings---actual allowance prices vs. allowance price projections.**
 - EPA has used \$2,600/ton as its highly cost-effective price.
 - Generally, NOx allowances have traded around \$1,000/ton.
 - This represents over 50% lower costs per ton than projected.

EU Emissions Trading Scheme Basics

- **Phase 2 part of EU-Wide Kyoto Commitment**
- **Cap and Trade program covering approximately 12,000 industrial installations**
 - Represents 40% of EU Emissions
- **Design based on US SO₂ Program**
- **Flexible mechanisms include banking, borrowing, allowance trading and international offsets**
 - Offsets-allow least-cost reductions to be sourced from outside the cap, lowering program cost
 - Allowances fully bankable into Phase 3 (2013- 2020)

A word on EU ETS Phase 1 Growing pains

- **Much made of 2006 price collapse during Phase 1 of EU-ETS but unrelated to policy mechanism or market manipulation**
 - What happened—too many emissions allowances were issued due to faulty emissions data
 - When emissions data released, market corrected to reflect oversupply of allowances
 - Poor coordination of data release exacerbated problems

- **Lessons learned and incorporated into Phase 2 and US legislation**
 - Carbon markets work like other real markets--scarcity is a prerequisite
 - Long-term bankability of allowances to preserve store of value
 - Coordinated, transparent release of emissions and other market moving data essential to market confidence

Phase 2 Program Performance

- **Installations covered under EU ETS achieving 100% compliance and EU Emissions on downward trend**
 - Program delivering quantitative certainty with respect to emissions
 - Phase 3 targets support long-term planning
- **Carbon price signal influencing production and consumption decisions**
- **Flexible mechanisms—banking, borrowing and international offsets provide supply elasticity**
- **Markets—spot, exchange traded futures, options and OTC derivatives—functioning without indications of market manipulation or abuse**

EU ETS Market Performance and Function

- **Carbon commodities have not exhibited excessive volatility relative to other commodities**
- **Within reasonable bounds volatility is essential to market function—allows producers and consumers to respond to price signals**
- **Flexible mechanisms create supply elasticity that dampens potential for price spikes**
- **Full range of market options allows firm-level management of risk exposure**

Volatility of Selected Commodities 2005-2007	
Range in %	
EUA Dec 06 Futures	27-161 (57)
EUAs Dec 08 futures	28-91 (62)
SO2 spot price (1995-2006)	8-44
Natural Gas (Zeebrugge)	55-138
Crude Oil (Brent)	24-32
Coal (ARA)	8-22
Baseload Electricity (Powernext)	35-96
Peak Electricity (Powernext)	42-105

Source: Ellerman, Denny, Joskow, Paul (2008), Mission Cliat, Caisse des Depots.

NOTE: The figures in parentheses for the two EUA products is the highest observed volatility when the second quarter of 2006 is excluded.

International Offsets Providing Key Benefits

- **Covered Installations using international offsets to lower compliance costs**
 - Prevents premature retirement of economic assets
 - Preserves capital to fund new, cleaner capital stock
- **EU Member States using international offsets to meet portion of their emissions reduction shortfalls**
 - Offsets serve as backstop to achieve overall emissions reduction target—including emissions not covered by EU ETS
- **Reduces societal cost by drawing on lower cost reduction opportunities in less developed countries**

Conclusions and Observations

- **Cap and Trade has proven track record: meeting environmental goals and beating cost forecasts**

- **Mechanisms are well understood**
 - Mandatory declining cap ensures environmental goal
 - Banking and long term certainty about targets enables efficient capital planning
 - Flexible mechanisms including full range of market instruments fosters price discovery, enables financing, risk management, competition and technological innovation
 - Offsets lower costs, allow emissions reductions to occur earlier, avoids premature capital stock turnover

- **Realizing benefits requires full suite of features**