Emissions Trading

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Outline

- What is Cap-and-Trade?
- Some History and Pictures
- Allocation, Allowance Value, and Electric Power Regulation

Two Types of Emissions Trading

Credit Trading, or Baseline-and-Credit

- Credit for over-control of some specified standard usable to excuse under-control elsewhere
- Trading in differences from pre-existing standard

Allowance Trading, or Cap-and-Trade

- Trading in limited "rights" from the "bottom up"
- No prescribed standard for individual sources
- Sources respond to the "new price" by reducing emissions where internal cost < market price

Evolution of Emissions Trading

- Credit Trading has evolved out of conventional regulation to provide flexibility
  - Pre-existing standard (baseline) already in place
  - High transaction costs have limited use
  - Now, more project, off-system reductions
- Allowance Trading is radically different
  - Decentralized, self-contained property rights system
  - Emerged in the U.S. out of political stalemate
  - Far more successful than expected

A Closer Look at the Cap-and-Trade Mechanism

- An absolute limit is decided for the environmental problem
- Emitters issued tradable permits = "cap" < previous emissions
- A fundamentally different "command" to the firm
  - Measure and report emissions and
  - Surrender allowances = emissions
  - No prescribed practice, technology, reduction, etc.
- Tradability enables market and single price to coordinate efficient abatement actions (equal marginal cost)

Three Unique Features

- Rights to emit must be created and allocated
  - Unique in being explicit and transparent
  - Free allocation to auctioning to "cap-and-dividend"
- Emissions must be measured and reported
  - Radical innovation in environmental regulation
- Maintenance of Registry or Tracking System
  - Analogous to a check-clearing system

Consequences and Reactions

Efficient, Decentralized Property Rights System,

But "Rights to Pollute"?

Transformed Regulator…Bank-like clerk

But Removes Administrative Discretion

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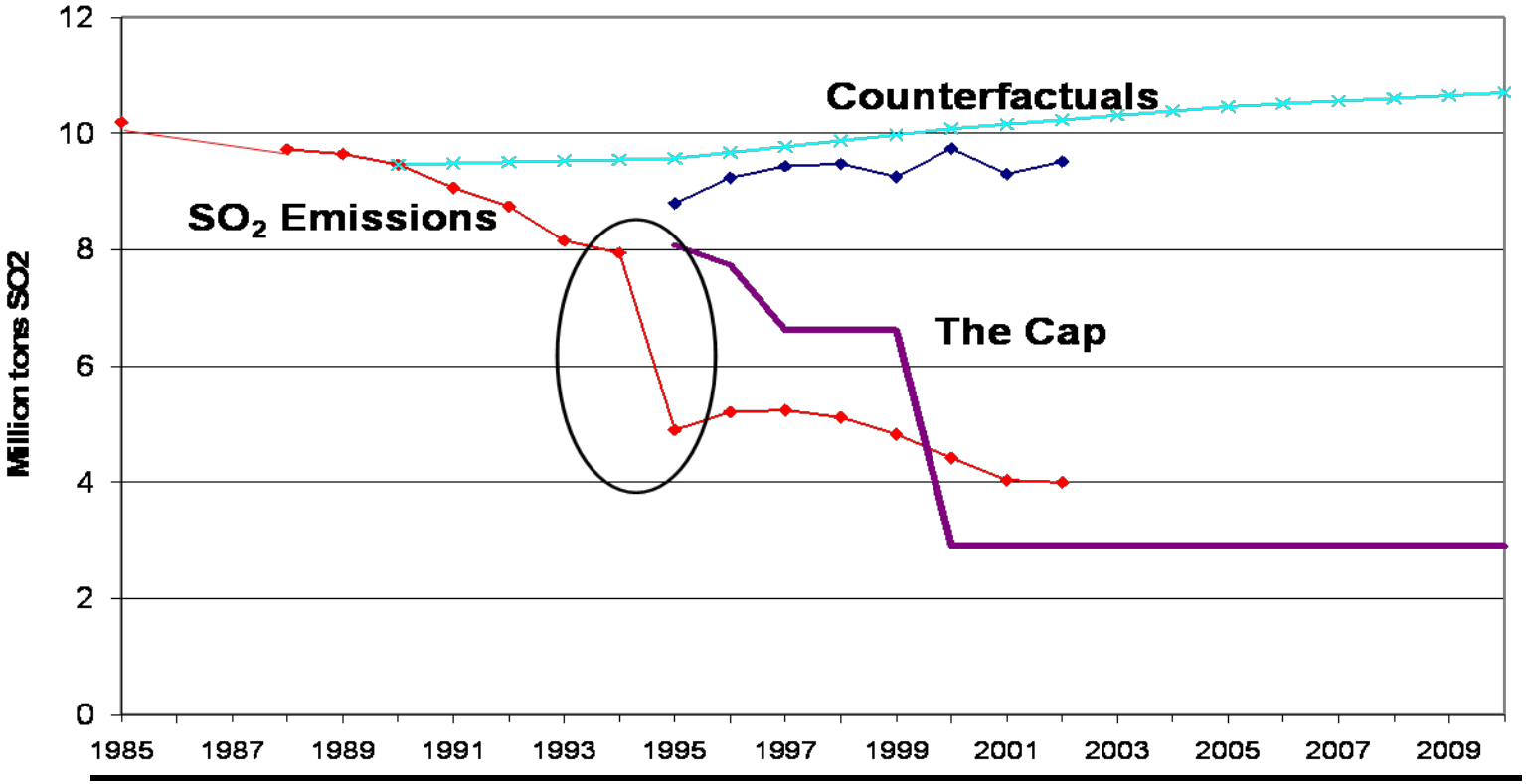
Some History (1)

- Early credit-based trading (U.S., late 1970s-1980s)
  - Some cost savings, but generally disappointing
- Leaded-gasoline phase-down (US: 1985-86)
  - 1st program w/o individual approval; successful
- Los Angeles RECLAIM Program (1994-)
  - SO_2 and NOx; local; multi-sector
- US Acid Rain (SO_2) Program (1995-)
  - Canonical cap-and-trade, very successful
  - National scope, power plants only

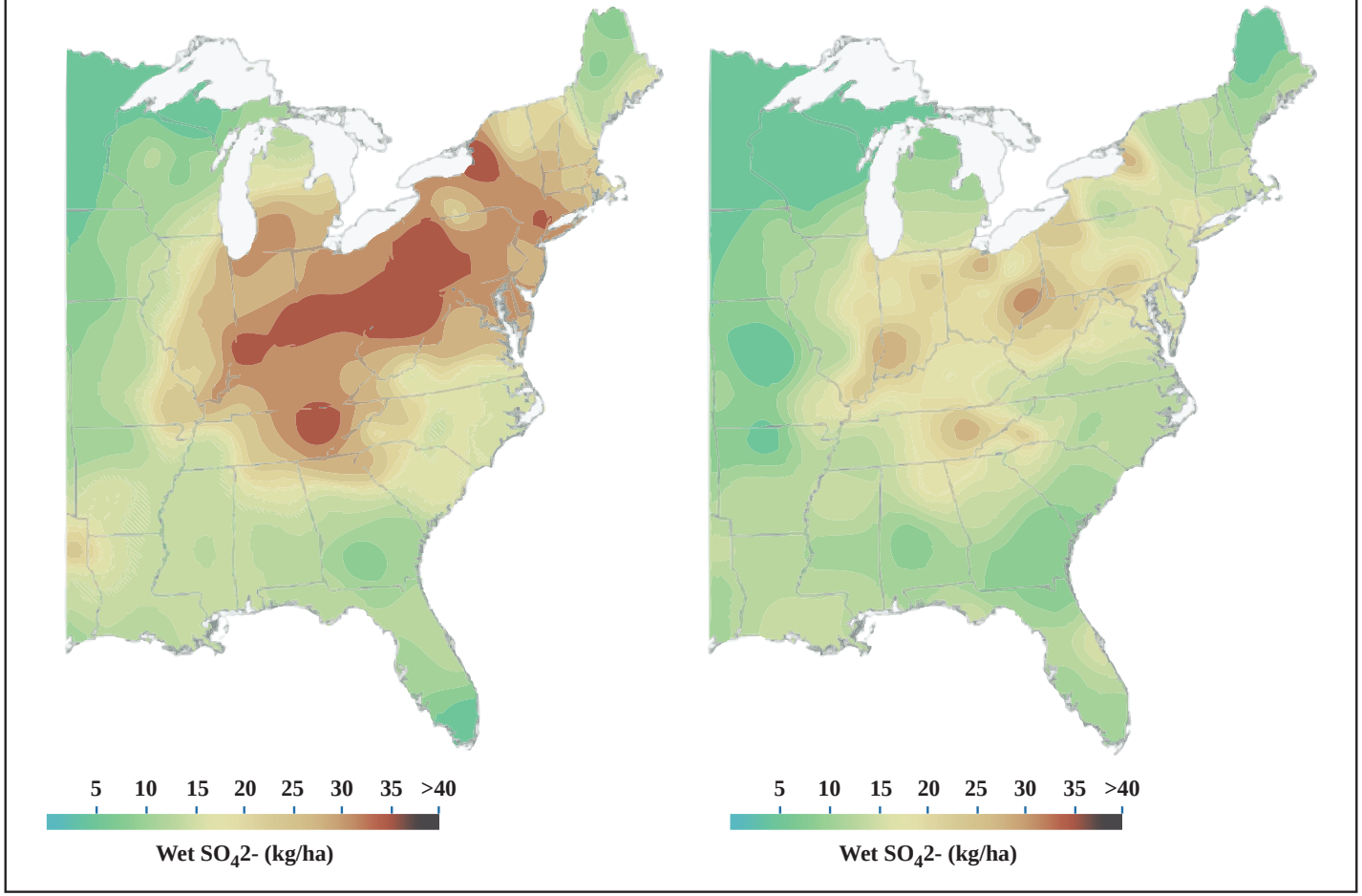
Some History (2)

- OTC/NOx Budget Program (1999-)
  - Regional, mostly power plants
- EU ETS (2005 -)
  - First CO_2 and multi-national system
  - Largest cap-and-trade market and program
- Kyoto Protocol (2008 -)
  - Government trading; essentially voluntary
- Regional Greenhouse Gas Initiative (2009 -)
  - 1st mandatory US program; very low prices

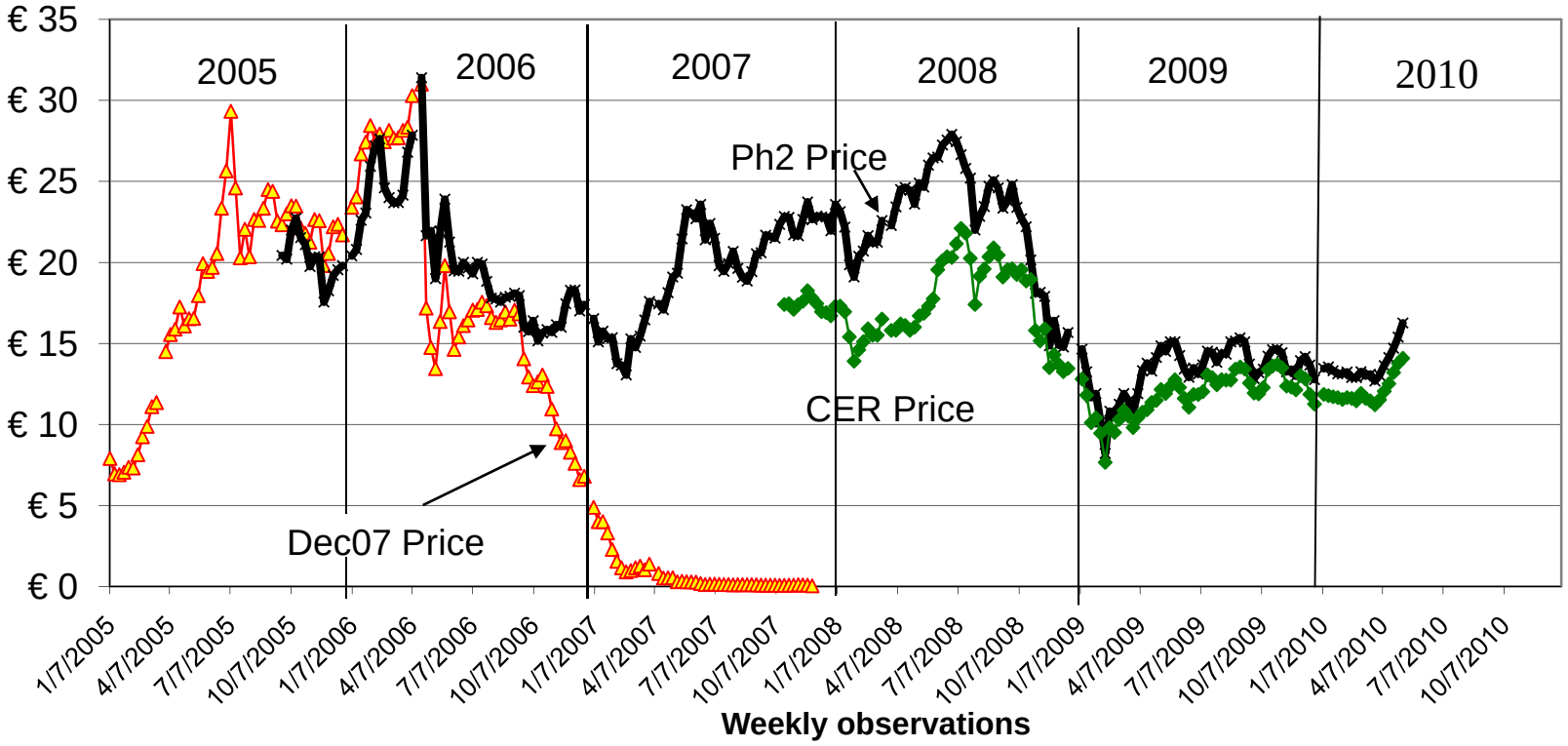
Why the SO_2 Program was Successful



Monitored reduction in wet sulfate deposition due to Acid Rain Program



CO_2 Prices in the EU ETS



What have we learned?

- More effective and lower cost than conventional regulation
  - Firms do respond to prices
- Many new, unexpected ways to reduce emissions
  - Many more ways than could be mandated
  - No favored approaches/technologies
- Cheapest reductions tend to where there are the most emissions: “Dirtier is cheaper”
  - A matter of amortizing fixed costs: Paid by the ton

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The Allocation Problem

- Cap creates a scarcity rent embodied in allowances. Who should receive it?
- **Prior Use Claims**—incumbent emitters
  - Also, compensation and political uses
- **Public Use Claims**—the government
  - Expenditures or tax/debt reduction
- **Cap-and-Dividend**—Per capita to households
- Always recycled. Issue is how & to whom?

Free Allocation vs. Auctioning

- The usual dichotomy in allocation debate
  - Allowance value to gov't or corporations
  - Auctioning often coupled with "double dividend"
- But ignores who is the ultimate recipient
  - Both govt and corp are legal shells
  - Quite different distributional outcomes
- US debate now focused on ultimate recipients

Cost Implications

- Free allocation raises **opportunity cost** issue
  - Typically fixed and historical; independent of current emissions or production
  - Allowance use incurs an opportunity cost
  - Do emitters recognize opportunity cost?
- Straight-forward with auctioning/purchase
  - Pay as for any other input into production

Interaction with Electric Power Regulation

- Liberalized power markets ⇨ marginal cost pricing
  - Allowance cost incorporated into price
  - Free allocation over-compensates *assuming* opportunity cost is recognized and passed on
- Cost-regulated markets ⇨ average cost pricing
  - Only incurred costs are included
  - Free allocation reduces consumer price effect

Summary

- A known, tested, and tried concept
  - Creates a price on emissions and reduces emissions with few other side effects
- A highly desirable form of environmental regulation
  - Radically different from conventional “command-and-control”
  - Object is to reduce and limit emissions ***only***
  - Trading is means for least-cost compliance,
  - Profit is by-product, not the object of trading

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