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Emissions Trading: The American Experience
L'expérience américaine

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Paris, March 7, 2006

Outline

- Acid Rain Program
  - 1990 Amendments to the U.S. Clean Air Act
- NO_x SIP Call
- Clean Air Interstate Rule
- Clean Air Mercury Rule
- Climate Change in the United States

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Acid Rain Program

- All 50 States in the United States
- Reductions in NO_x and SO_2
- Emission Allowance System for SO_2
  - Phase I began in 1995
    - Intermediate rate-based limit for worst units
  - Phase II began in 2000
    - 8.95 million tpy cap

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Acid Rain Program (ct'd)

- Free market trading system in SO_2 emissions allowances
- Allowances initially allocated per historic usage and specified emissions limits
- System achieves reductions in most cost-effective manner possible

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Acid Rain Program (ct'd)

- Continuous Emissions Monitoring Systems required for all affected sources
- Severe penalties for noncompliance
  - Fines
  - Forfeit future allowances to offset excess emissions

Acid Rain Program - Results

- Almost no Violations (> 99% compliance) of the SO_2 emissions allowance program
- In 2002:
  - SO_2 emissions = 10.2 million tons
  - 41% less than 1980 levels
- Full implementation (after 2010)
  - 8.95 million tpy cap

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NOx SIP Call

- Coverage - 22 States + District of Col.
  - Based on NAAQS for 1-hour Ozone
  - Based on finding that upwind states contributing significantly to downwind nonattainment of ozone NAAQS
- Requires reductions in NO_x
  - remove significant contribution
  - Equivalent to cost-effective reductions at $2000/ton

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NOx SIP Call (ct'd)

- Ozone NAAQS to reduce ground level ozone
  - NOx + VOCs + sunlight = O_3
- OTAG Modeling
  - Photochemical grid modeling
- Effective in 2004

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Clean Air Interstate Rule

- 28 States + District of Columbia
  - 8-hour ozone; 23 for $PM_{2.5}$
  - NAAQS (ambient stds.) for $PM_{2.5}$ and 8-hour Ozone
- Reductions in NO_x and SO_2, precursors that contribute significantly to formation of $PM_{2.5}$ or Ozone in downwind areas
- Two Phases
  - 2010 (2009 for NO_x)
  - 2015

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Clean Air Interstate Rule (ct'd)

- "Contribute Significantly" = highly cost effective reductions for EGUs
- Annual Emission Caps
  - Phase I - 2010 (2009 for NO_x)
    - 3.6 million tons SO_2
    - 1.5 million tons NO_x
      - 0.6 million tons - ozone season
  - Phase II - 2015
    - 2.5 million tons SO_2 (65% reduction)
    - 1.3 million tons NO_x (54% reduction)
      - 0.5 million tons - ozone season

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Clean Air Interstate Rule (ct'd)

- Implementation - Regionwide Cap & Trade Program
- Budgets Determined
- Allowances allocated
- Allocations in unit accounts must cover emissions
- Allowances bought and sold throughout region

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Clean Air Interstate Rule (ct'd)

- SO_2 Allowances
  - Phase I
    - Use Title IV Phase II Acid Rain Allowances
    - All affected Units
    - Cut allocations by 50%
  - Phase II
    - Cut allocations by 65%

Clean Air Interstate Rule (ct'd)

- NO_x Allowances - Annual
  - Phase I
    - Use Historical Annual Heat Input (mmBtu)
    - Multiply by 0.15 lb/mmBtu - Region Budget
      - State Budget (2009), based on average heat input and fuel type (favors coal)
  - Phase II
    - Same, but multiply by 0.125 lb/mmBtu - Region Budget
    - Then allocate to states

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Clean Air Interstate Rule (ct'd)

- NO_x Allowances (cont.)
  - Ozone Season
    - Same procedure but use 1999-2002 ozone season heat input

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Clean Air Mercury Rule

- Requires reductions in Mercury (Hg)
  - Coal-Fired Utility Units
  - But not nickel and not oil-fired utility units
- 3 Ways
  - Set NESHAPs
  - Cap & Trade under U.S. CAA § 111
    - Chosen Approach
  - Cap & Trade under U.S. CAA § 112

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Clean Air Mercury Rule (ct'd)

- Cap & Trade Under §111
  - State Allocations
    - Historical heat input for 1998-2002 for Coal-fired utility units
      - Average 3 highest years
    - Adjusted for Coal Rank
      - 1.0 for Bituminous
      - 1.25 for Subbituminous
      - 3.0 for Lignite
    - Only 1999 used as determinate year for fuel

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Clean Air Mercury Rule (ct'd)

- Unit Allocations
  - Up to states
  - Model Rule
    - Average 3 highest heat input years (2000-2004)
    - Each year adjusted for coal type usage
      - same factors (1, 1.25 & 3.0) used
  - New Units (those operating after 01/01/01)
    - Takes 5 years to get into pool
    - Must rely on set-asides until then
      - 5% (2010 - 2014)
      - 3% thereafter

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Clean Air Mercury Rule (ct'd)

- Model Rule (cont.)
  - No Banking Restrictions
- Cap & Trade (continued)
  - Phase I in 2010
    - 38 tpy cap
    - Co-benefits through SCRs and FGDs
  - Phase II in 2018
    - 15 tpy cap
    - Not presently achievable
    - 70% Reductions from today's Hg emissions

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Clean Air Mercury Rule (ct'd)

- Cap & Trade (cont.)
  - CAA § 111 State must submit SIP
    - State allocates to units
    - EPA administers MATS (Hg Allowance Tracking System
    - Different rules in different states
  - Determinate Year
    - 1999 may not reflect current realities
  - Hg emissions hard to measure

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Why Cap & Trade?

- Fixed cap = firm control on emissions
  - Growth not a factor
- High rates of compliance
- Lower costs of compliance
- Incentives for early reductions possible
- Provides innovation and evolution of control technology
- Direct legal accountability
- Efficient use of administrative resources
- Transparent, accurate reporting of emissions

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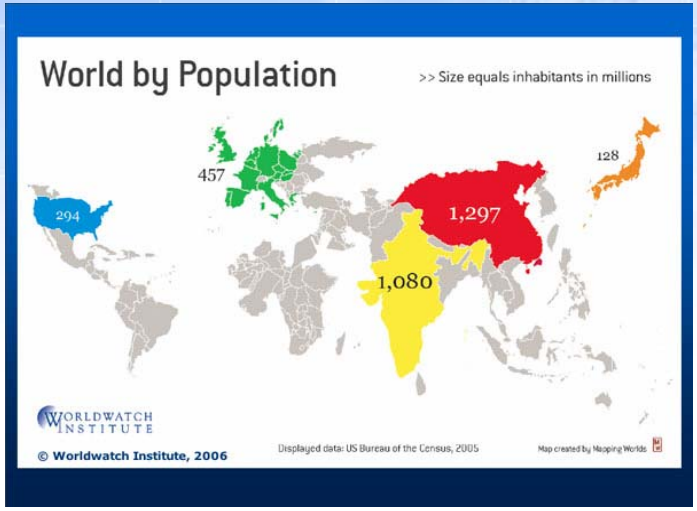
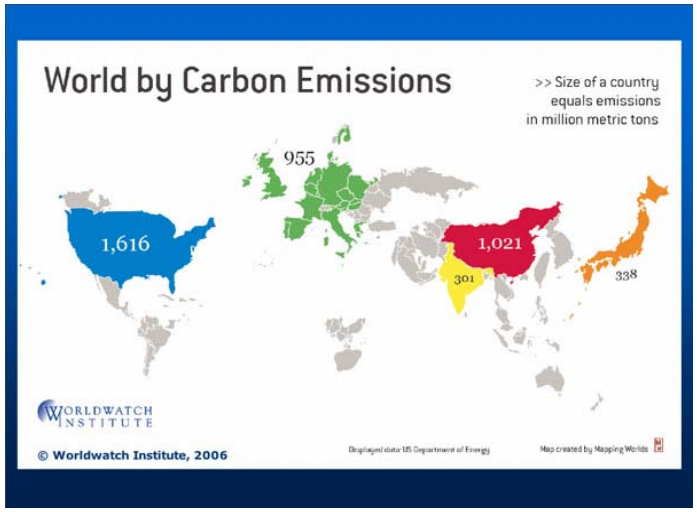
U.S. Emissions of Carbon



- U.S. has 5% of world population



- U.S. emits 24% of world carbon

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Projected U.S. Emissions Increases

- Energy Information Administration of the U.S. Department of Energy ?
  - U.S. CO_2 emissions up 2% in 2004 v. 2003
  - 28% increase predicted 2010
  - and over 50% by 2025
    - v. 1990

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UNFCC, Kyoto Protocol, Montreal

- UN Framework Convention on Climate Change **(1992)**
  - U.S. a party; Goal to stabilize GHG emissions
- Kyoto Protocol **(1997)**
  - US signs but does not ratify
  - CO_2 reductions by industrial countries (2008 – 2012)
  - Developing countries not committed
  - Market mechanisms allowed
- Montreal (December 2005)
  - Protocol parties discuss setting limits for post - 2012

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European Union Emissions Trading

- European Union Emissions Trading (2003)
  - Established GHG allowance trading (01/10/05)
  - Each country allocated allowances
  - Covers activities in various industrial sectors
  - Penalties for noncompliance
  - Credits can be generated through qualifying projects

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U.S. Approach: Asia- Pacific Partnership

- Asia-Pacific Partnership on Clean Develop &Climate
  - Australia, China, India, Japan, Korea, and U.S.
  - 50% of GHG emissions
- Vision Statement (July 2005)
  - Strive to create a partnership
  - Projects for greater energy efficiency, lower air pollution and GHG intensities
- Charter (January 2006)
  - Nonbinding partnership to share technology
- Work plan (January 2006)
  - Focus on power generation and key industry sectors

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US Approach: Private Voluntary Action

- President Bush calls for voluntary action to cut GHG intensity (= amount emitted per unit of economic activity)
  - By 18% by 2012
- Example programs:
  - Climate Vision - Presidential public-private partnership launched by DOE (2003)
    - Focus on energy-intensive industries to reduce emissions intensity
  - Climate Leaders - voluntary EPA partnership
    - Develop long-term comprehensive climate change strategies

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Energy Policy Act & Climate Change

- Specific provisions on climate change in EPAct:
  - Establishment of “Committee on Climate Change”
    - To develop national strategy
  - Funding for demonstration projects
  - Report ID’ing
    - 25 largest GHG emitting developing countries and providing assistance

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Climate Stewardship Act

- McCain-Lieberman Climate Stewardship Act introduced in 2003
  - Reintroduced in 2005
  - Patterned after the acid rain program
  - Comprehensive C&T system
    - GHG emission allowances req'd
      - Commencing in 2010
      - 2010 Cap = 2000 emissions
  - Applies to various sectors emitting > 10,000 tpy
  - Have national and international trading
  - ERCs possible

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The U.S. Senate Today

- Non-binding "sense of the Senate" resolution passed (June 22, 2005). States that:
  - Growing consensus that human activity is a "substantial cause" of the accumulation of GHG,
  - Mandatory steps to slow/stop growth required
- Senate hearings have commenced on mandatory climate change legislation.
- Senator Bingaman:
  - "We can enact a mandatory program to control greenhouse gas emissions within the next year or two."
  - Speech in Montreal at the UN Climate Change Conference (December 2005)

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State and Local Activities

- Pressures for action:
  - International climate change (carbon cap & trade) programs
  - Energy independence and adequate supply
  - Air quality benefits
- Regional Greenhouse Gas Initiative
- California
- Western Governors Association
- Massachusetts
- New Mexico
- U.S. Mayors Climate Protection Agreement

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Regional Greenhouse Gas Initiative

- First mandatory C&T program for GHGs
- 7 States (Conn., Del., MA., N.H., N.J., N.Y., Vt.)
- MOU signed December 20, 2005
- Draft Model Rule –public comment March 2006
  - Guide for RGGI state rulemakings
  - Applies to > 25 MW & > fossil fuel EGUs
  - Current levels for GHGs from 2009 – 2015
  - 10% reduction by 2019

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California

- California's PUC votes for GHG emission cap
  - February 16, 2006
  - IOU's and Load-Serving Entities
  - But not municipal utilities (yet)
  - Will be like RGGI
- Governor's plan soon
  - Gas tax to fund alternative fuels research

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