

# Canada-United States Emissions Cap and Trading Feasibility Study: Consistency Versus Flexibility

“Confidence Through Compliance in Emissions  
Trading Markets”

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International Network for Environmental Compliance and  
Enforcement (INECE)

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# Canada-U.S. cooperation on air quality is long-standing.

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- Transboundary issues between Canada and the U.S. include acid rain, smog and regional haze
- 1991 Canada-U.S. Air Quality Agreement
- 2003 Border Air Quality Strategy
- Feasibility Study:
  - To assess the feasibility of cross-border cap and trading of sulphur dioxide (SO<sub>2</sub>) and nitrogen oxides (NO<sub>x</sub>) emissions



# The U.S. has a successful track record using cap and trade programs in the electricity sector.

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- Cap
  - Protects the environment
  - Provides predictability to market participants
- Accountability
  - Accurate and complete emissions measurement
  - Transparency of emissions and trading information
  - Automatic penalties for noncompliance
  - Evaluation of environmental efficacy
- Simplicity of design and operation
  - Minimal, but effective government role
  - Facilitates market and maximizes cost savings



# The basis for the feasibility study was Canada “dovetailing” with U.S. NOx and SO2 cap and trading programs.

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- U.S. Acid Rain program was in place and has been demonstrated to be effective - capping SO2 emissions from +4000 electricity generating units by 32% from 1990 levels and allowing trading.
- U.S. NOx cap and trade (NOx SIP and OTC) programs were in place and were on the road to being effective in improving air quality with caps and trading.
- Did not assess the level of emissions caps. Did not look at CO2 or mercury.



# The Feasibility Study study took two years to complete.

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- Collaboration between the federal governments in Canada and the U.S. to complete the study
- In 2003, Canada-U.S. team established.
- Study was comprehensive: foundation analysis, economic analysis and modelling and air quality modelling



# **We covered all elements of the cap and trade programs in the study.**

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Terms of Reference: review /compare:

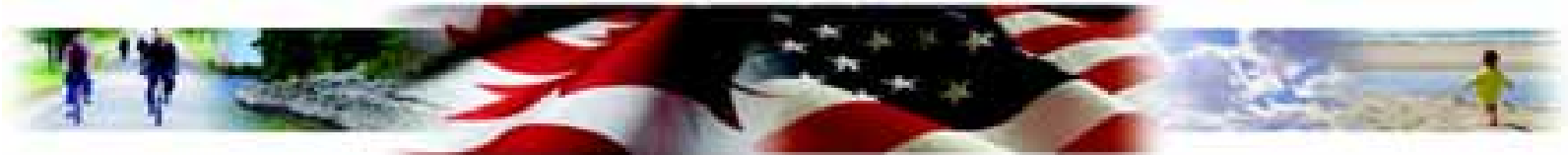
- Applicability (to which sectors cap and trade tool could be applied);
- Emissions Measurement, Monitoring, Reporting and Tracking;
- Allowance Use and Allowance and Emission Tracking Systems;
- Compliance and Enforcement
- Economic modelling of electricity sector to predict possible impact of cross-border trading vs. no cross-border trading
- Air quality modelling to determine likely impacts of cross-border trading on air quality and the environment



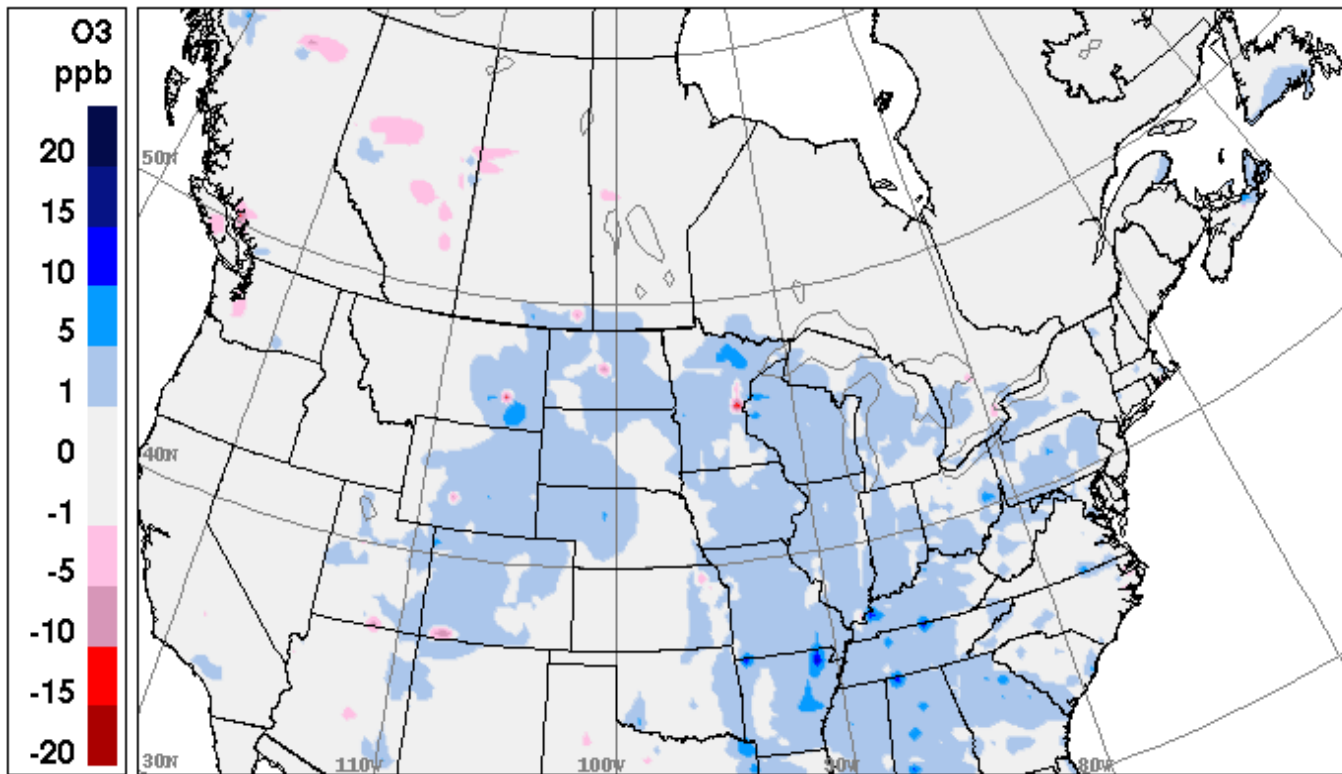
# The starting premise was that air quality and the environment must be improved through cap and trading.

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- The key conclusions of the economic and air quality modelling were:
  - Acid rain, smog and regional haze are problems in both countries and would be improved if SO<sub>2</sub> and NO<sub>x</sub> emission caps were implemented in Canada's electricity sector at levels comparable to U.S. caps
  - Cross-border trading would not alter the overall level of emission reductions and the consequent benefits to air quality and the environment
  - The costs to the electricity sector of complying with the caps would be cheaper with trading than without trading



# Ground-level ozone improvements were modelled to be widespread with caps and cross-border trading (July 1995 episode)



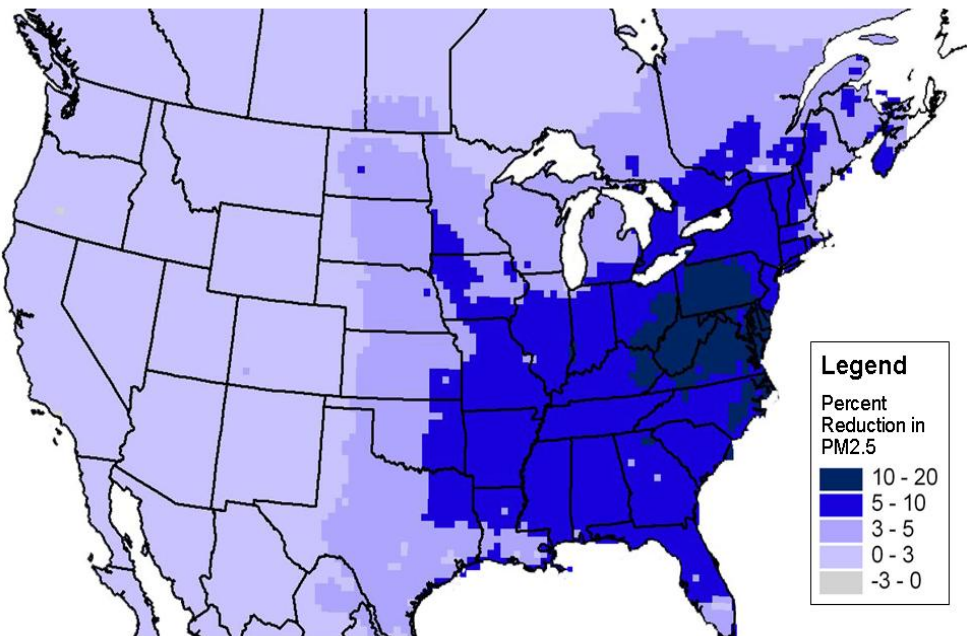
Absolute  
Change in  
Daily  
Maximum  
Ozone  
(ppb)

Blue is an a  
improvement in air  
quality (i.e. a  
decrease in  
ambient air  
concentration)

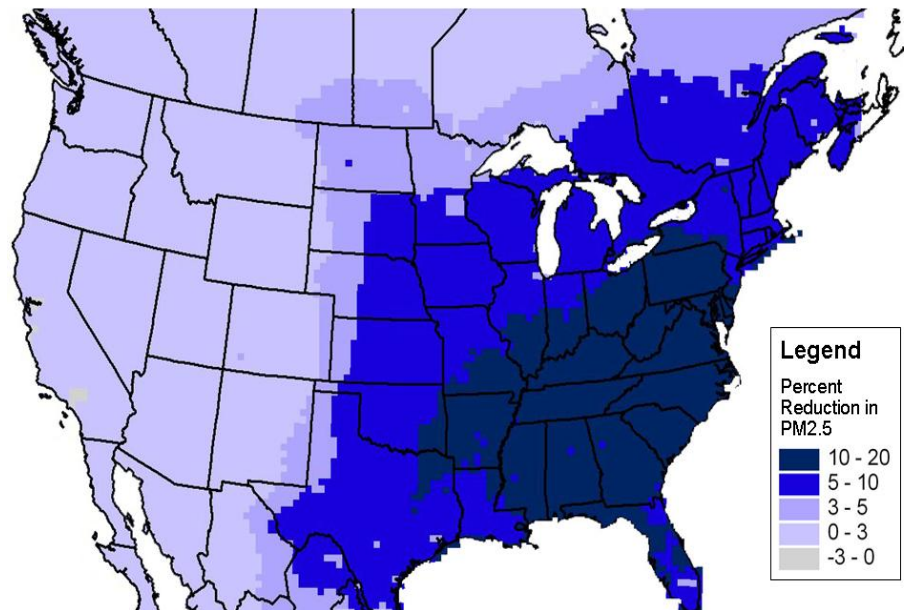


# Fine particle (PM) improvements were widespread with caps and cross-border trading in 2010 and 2020

Percent Change in Annual Fine Particles with Emission Reductions under Trading Scenario Compared to the Base Case in 2010



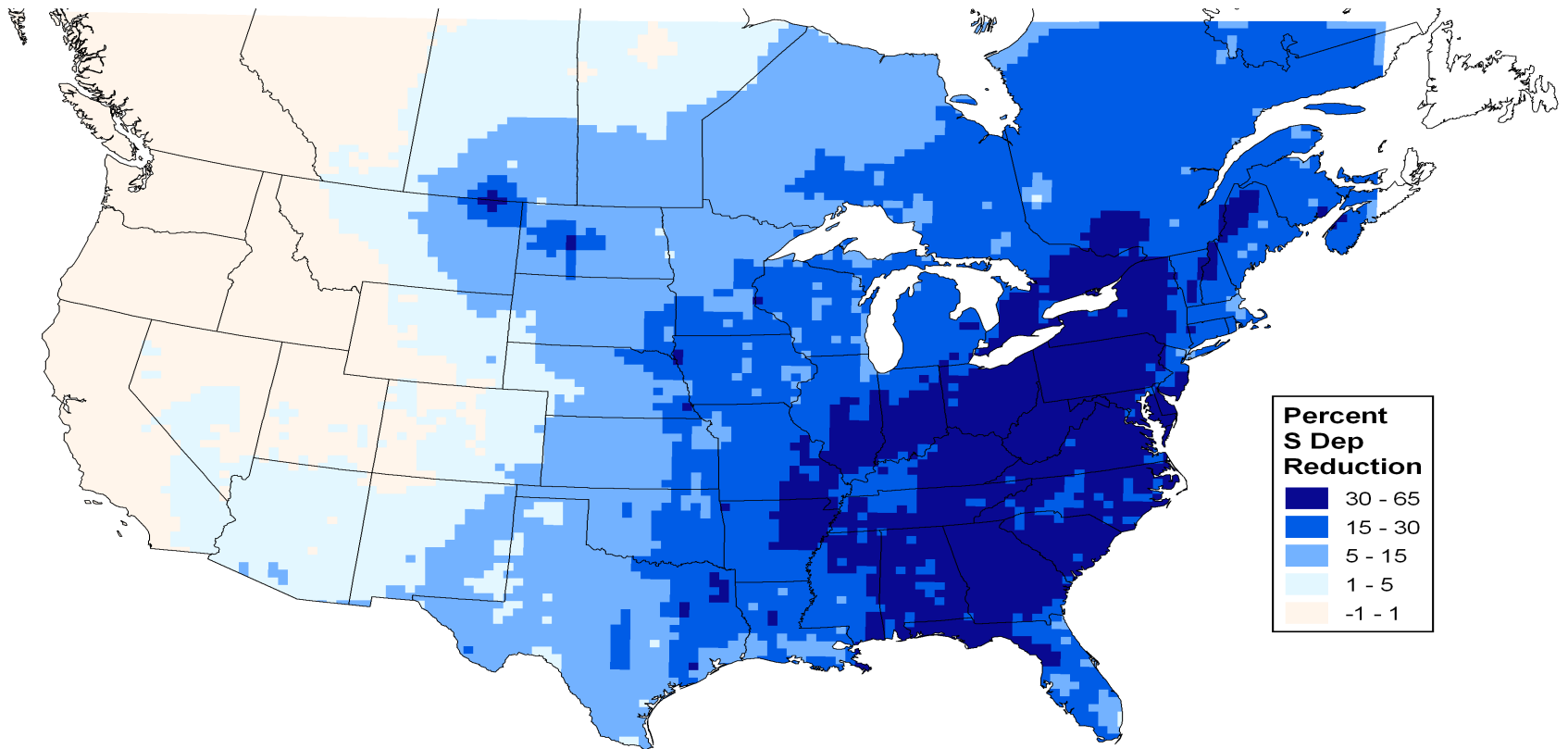
Percent Change in Annual Fine Particles with Emission Reductions under Trading Scenario Compared to the Base Case in 2020



# Caps and cross-border trading predicted reductions in sulphur deposition – less acidification

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**Percent Change in Sulfur Deposition with Emission Reductions under Trading Scenario Compared to the Base Case in 2020**



# The study concluded that caps and cross-border trading was feasible if certain critical elements were in place:

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- In Canada, enforceable SO<sub>2</sub> / NO<sub>x</sub> emission caps for the electricity sector comparable in stringency to emission caps in the U.S.
- In both countries, a commitment to pursue cross-border SO<sub>2</sub> / NO<sub>x</sub> cap and trade.
- In both countries, legislative and/or regulatory changes to give the allowances in each country equivalency so that they could be traded freely and used for compliance in either country.
- In Canada, regulations for emissions monitoring and reporting requirements for electricity generating units, and the electronic tracking systems for emissions and allowances.



# In terms of consistency and flexibility, the conclusions were the following:

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- Caps must be comparable.
- All sources that are capped and allowed to trade must meet the same monitoring and reporting requirements.
- Emissions and allowance tracking systems are the key compliance mechanism and they must be equivalent.
- Compliance and enforcement regimes must be harmonized.
- Certain trading rules need to be the same but others can be different.



# Trading rules need to support “seamless” trading.

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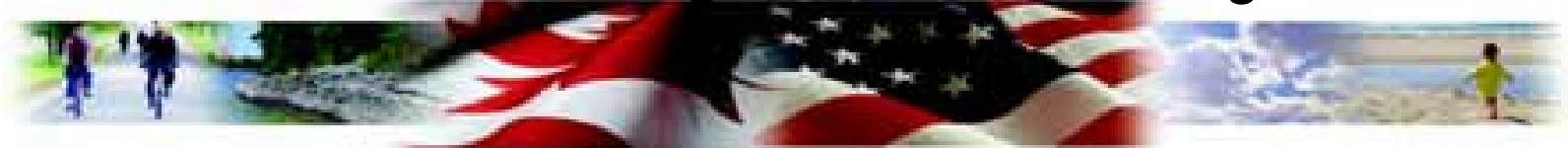
- Rules that must be the same or “harmonized”:
  - Number of allowances cannot exceed the cap
  - New sources must hold allowances
  - Number of years prior to control season that allowances are allocated (e.g. at least 3 years prior )
  - How allowances are identified (by serial number), measured (imperial or metric), as a legal entity i.e. “property right”, banking, etc.
- Flexibility:
  - Methods for allocating allowances (on the basis of input/output/hybrid)
  - Number of years allowances are allocated



# Sources that trade have to meet the same monitoring and reporting requirements.

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- Minimum required applicability:
  - The core sources would be all large electric generating units for both SO<sub>2</sub> and NO<sub>x</sub>
    - » U.S.: + 4000 units trade now in the cap and trade programs
    - » Canada: 207 electricity generating units
- Flexibility:
  - Smaller electricity generators and additional source categories that meet monitoring requirements
    - » Canada is assessing other source categories



# Monitoring and reporting requirements must be the same – they are the basis for compliance.

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- Continuous Emissions Monitoring is required (U.S. federal regulation 40 CFR part 75)
  - » Continuous Emissions Monitors (CEM) installed on each stack to monitor hourly emissions of SO<sub>2</sub> and NO<sub>x</sub>
  - » CEM hourly emissions are reported electronically
  - » Flexibility exists to use calculations instead of CEM for small, clean sources and when the CEM is not working but calculation methodology is conservative
- Quarterly reports made electronically to the Emissions Tracking System administered by government
- Emissions Tracking System reports are made available online to the public providing transparency



# **Electronic Tracking Systems need to be “equivalent” for borderless trading – they provide the information for compliance.**

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- In addition to the Emissions Tracking System is the Allowance Tracking System that tracks trading – also online for the public.
- The online emissions and allowance tracking systems compile the information that is used by government to determine compliance by facilities in terms of emissions.
- Once per year, each facility must have sufficient allowances to cover their emissions.
- Where a facility does not comply (ie. allowances are insufficient to cover emissions) the penalty is significant and automatic.



# Compliance and enforcement regimes must be harmonized.

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- Canadian and U.S. sources would continue to be subject to their own domestic laws
- Key features that would require harmonization are:
  - Tests for what is “in” and what is “out” of compliance with caps, emissions monitoring, reporting and verification
  - Compliance schedules
  - Penalty structures
- Flexibility:
  - non-compliance penalties could be increased



# In conclusion, the feasibility study was helpful in:

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Completing a first major step by the two federal governments in consideration of a cross-border emissions cap and trading program for SO<sub>2</sub> and NO<sub>x</sub>.

Outlining the benefits of caps and cross-border trading – especially in Canada.

Enunciating how compliance and enforcement is administered through caps implemented with trading.

Clarifying issues that would need to be addressed to implement NO<sub>x</sub> and SO<sub>2</sub> caps and cross-border trading in the electricity sector between Canada and the U.S..



# For Further Information

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- [www.ec.gc.ca/cleanair-airpur/Pollution\\_Issues/Transboundary\\_Air-WS587B56F8-1\\_En.htm](http://www.ec.gc.ca/cleanair-airpur/Pollution_Issues/Transboundary_Air-WS587B56F8-1_En.htm)
- [www.epa.gov/airmarkets/usca](http://www.epa.gov/airmarkets/usca)



# What was modelled

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Base Case – Includes all existing pollution reduction programs in place in 2004. There is no trading between Canada and the U.S.

- For the U.S., Base Case includes Title IV, NOX SIP call, NSR and state rules affecting NOx and SO<sub>2</sub>
- For Canada, Base Case includes emission caps in Quebec and Ontario as well as all current requirements for the power sector for SO<sub>2</sub> and NOx emissions.

Illustrative Trading Scenario – applies Clear Skies cap levels for SO<sub>2</sub> and NOx in both the U.S. and Canada with cross-border trading

