

# Accountability in a Multi-Pollutant Air Quality Management Environment : A Canadian Perspective

K. J Puckett  
Director, Air Quality Research Division  
Science and Technology Branch  
Environment Canada

NARSTO Technical Symposium  
Managing air quality from a multi-pollutant perspective  
April 10, 2008  
Mexico City, Mexico



Environment  
Canada

Environnement  
Canada

# Outline

---

- Recent Canadian Federal Government air quality initiatives
- Accountability in a multi – pollutant air quality management environment



# Recent Federal Government air quality initiatives

---

- Canadians are concerned about the quality of the air they breathe and their changing environment
- Harmful air emissions continue to affect our health, our environment, our economy as well as our quality of life

*“The government... will take measures to achieve tangible improvements in our environment, including reductions in pollution and greenhouse gas emissions.”*

*- Speech from the Throne, April 4, 2006*



# Canada's Regulatory Framework for Air Emissions

---

- On October 21, 2006, the federal government proposed an integrated approach to the regulation of greenhouse gas and air pollutant emissions.
  - Greenhouse gases and air pollutants share many common sources
  - Coordinated approach to allow firms to maximize synergies in reducing their emissions.
  - Stakeholder consultations launched
- On April 26, 2007, the federal government announced *Turning the Corner: An Action Plan to Reduce Greenhouse Gases and Air Pollution* and made public the regulatory framework for air emissions
- The regulatory framework for air emissions presents mandatory and enforceable reductions in emissions of greenhouse gases and air pollutants



# Intensive consultations followed release of Framework in April 2007

---

- Immediately following the release of the regulatory framework, work commenced with provinces and territories, industry sectors, and with non-governmental organizations on:
  - Validation of sector-specific air pollutant targets including their date of coming into force
  - Allocation of air pollutant and implementation of GHG targets within each sector
  - Broad parameters of compliance mechanisms



# Next Steps

---

- Greenhouse Gas Regulatory Framework has recently been finalized [March 10, 2008].
  - GHG debate well-advanced (since 1997)
  - Draft regulations to be published for public comment this fall
  - Regulations expected to enter into force January 1, 2010
- Consultations on the air pollutant elements have been extended
  - Air pollution elements to be added to the draft regulations once the regulatory framework for air pollutants is finalized (likely 2008)
- By 2010: complete the full set of industrial sector regulations
  - All regulations published in Canada Gazette
  - Provisions coming into force gradually (2012-2015)



# These industrial sector regulations will.....

---

- Achieve measurable reductions in air pollutants and greenhouse gas emissions to benefit the health and environment of Canadians.
- Focus on Canada's largest emitters, where significant emission reductions can be achieved for the greatest potential return on resource investment.
- Apply a multi- pollutant approach to efficiently deal with all priority pollutants from common sources.
- Regulate to create across the board, legally-binding emission reductions for industrial sectors, and bring sectors up to U.S. and the highest international standards.



# Sectors and emissions to be regulated

---

The Regulatory Framework includes targets to reduce air emissions from the following industrial sectors:

- Electricity produced by combustion
- Oil and gas
- Forest products
- Smelting and refining
- Iron and steel
- Cement, lime, and chemicals production
- Some mining sectors

Regulations will place caps on total emissions of four acid rain and smog-causing pollutants:

- Nitrogen oxides (NO<sub>x</sub>)
  - Sulphur oxides (SO<sub>x</sub>)
  - Volatile organic compounds (VOCs), and
  - Particulate Matter (PM)
- And also regulate other emissions including mercury





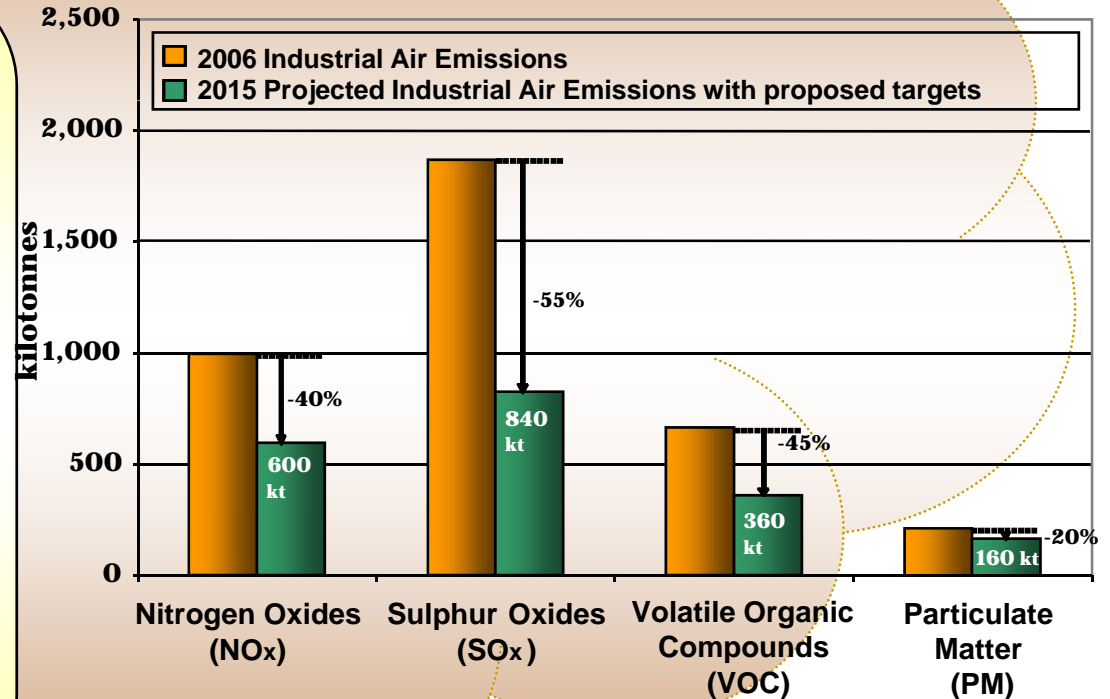
# Air pollutant emission targets - multi-pollutant in nature

## Targets

NATIONAL CAPS for 2012 to 2015  
(% reduction from 2006 emissions)

- NO<sub>x</sub> - 600 kt Cap (~40%)
- SO<sub>x</sub> - 840 kt Cap (~55%)
- VOCs - 360 kt Cap (~45%)
- PM - 160 kt Cap (~20%)

+  
INDUSTRIAL SECTOR SPECIFIC CAPS  
for 2012 to 2015



# Air Pollutants Targets – Base Metal Smelters and Cement Sectors

## Base Metal Smelters

	2006 Estimated Emissions (tonnes)	2006 Projected Emissions (tonnes)	2015 Emissions Target (with reduction) (tonnes)	% Emission Change in 2015 from 2006 with Target	Basis for Target or Jurisdiction
<b>SO<sub>x</sub></b>	667,822	621,396	220,000	-67%	CEPA P2 Plan, * April 2006
<b>PM</b>	7,222	7,315	3,600	-50%	CEPA P2 Plan
<b>Mercury</b>	1.80		0.80	-56%	CEPA P2 Plan / CCME **

\* CEPA P2 Plan: *Canadian Environmental Protection Act* Pollution Prevention Plan

\*\* CCME: Canadian Council of Ministers of the Environment

## Cement

	2006 Estimated Emissions (tonnes)	2015 Projected Emissions (tonnes)	2015 Emissions Target (with reduction) (tonnes)	% Emission Change in 2015 from 2006 with Target	Basis for Target or Jurisdiction
<b>NO<sub>x</sub></b>	46,188	51,020	26,266	-44%	GVRD *
<b>SO<sub>x</sub></b>	40,564	44,808	21,451	-45%	GVRD
<b>PM</b>	4,732	5,227	865	-82%	GVRD

\* GVRD: Greater Vancouver Regional District



# RMAF and Accountability

---

- In keeping with a new emphasis on government and corporate accountability in Canada.
- Government of Canada Treasury Board mandates the preparation of Results–Based Management and Accountability Frameworks [RMAF] for new GOC spending initiatives.



# RMAF

---

- This Results-Based Management and Accountability Framework (RMAF) is composed of five elements:
  - A profile of the organization, including its mandate, structure, strategies and activities
  - A results chain that provides a graphic illustration of the linkages between activities and desired outcomes
  - An ongoing performance measurement strategy that identifies indicators and methodologies for routine measurement of progress on outputs and immediate outcomes
  - An evaluation strategy that identifies a set of issues, questions and methods needed to complete the assessment of the relevance, success and cost-effectiveness of the organization's activities
  - A reporting strategy that outlines the vehicles and responsibilities to ensure timely, accurate and appropriate release of information on performance



# RMAF and Regulatory Framework for Industrial Air Pollutant Emissions

---

- Clean Air Agenda Results-Based Management and Accountability Framework
- Work in progress [Draft: January 2008]
  - Outcomes
  - Monitoring and Evaluation Plan



# Strategic Outcomes [Draft]

---

- Canada's emissions of air pollutants have been reduced from 2006 levels, as early as 2012 and no later than 2015.
- Canada's emissions of greenhouse gases have been reduced from 2006 levels, as early as 2010 and no later than 2012.
- Human health and environmental quality are improved due to reduced emissions of air pollutants.



# Monitoring and Evaluation Plan [Draft]

---

- An ongoing performance measurement strategy that identifies indicators and methodologies for routine measurement of progress on outputs and immediate outcomes
  - Improved health and environmental quality strategic outcomes are long term in nature
    - Need to identify short term indicators of progress
    - Indicators will provide evidence that the emission reduction framework is on track for achieving strategic outcomes
    - Work in progress



# RMAF and Science Outcomes [Draft]

---

- Program 5.0 Science in support of Regulatory Activities and Accountability
  - Research improves the understanding of the impacts of emissions, from regulated and non-regulated sources and provides guidance on the development of regulations to reduce air pollutant emissions
  - Scientific research and monitoring data allow the Federal Government to detect, confirm and verify changes to human health and environmental quality resulting from air pollutant controls





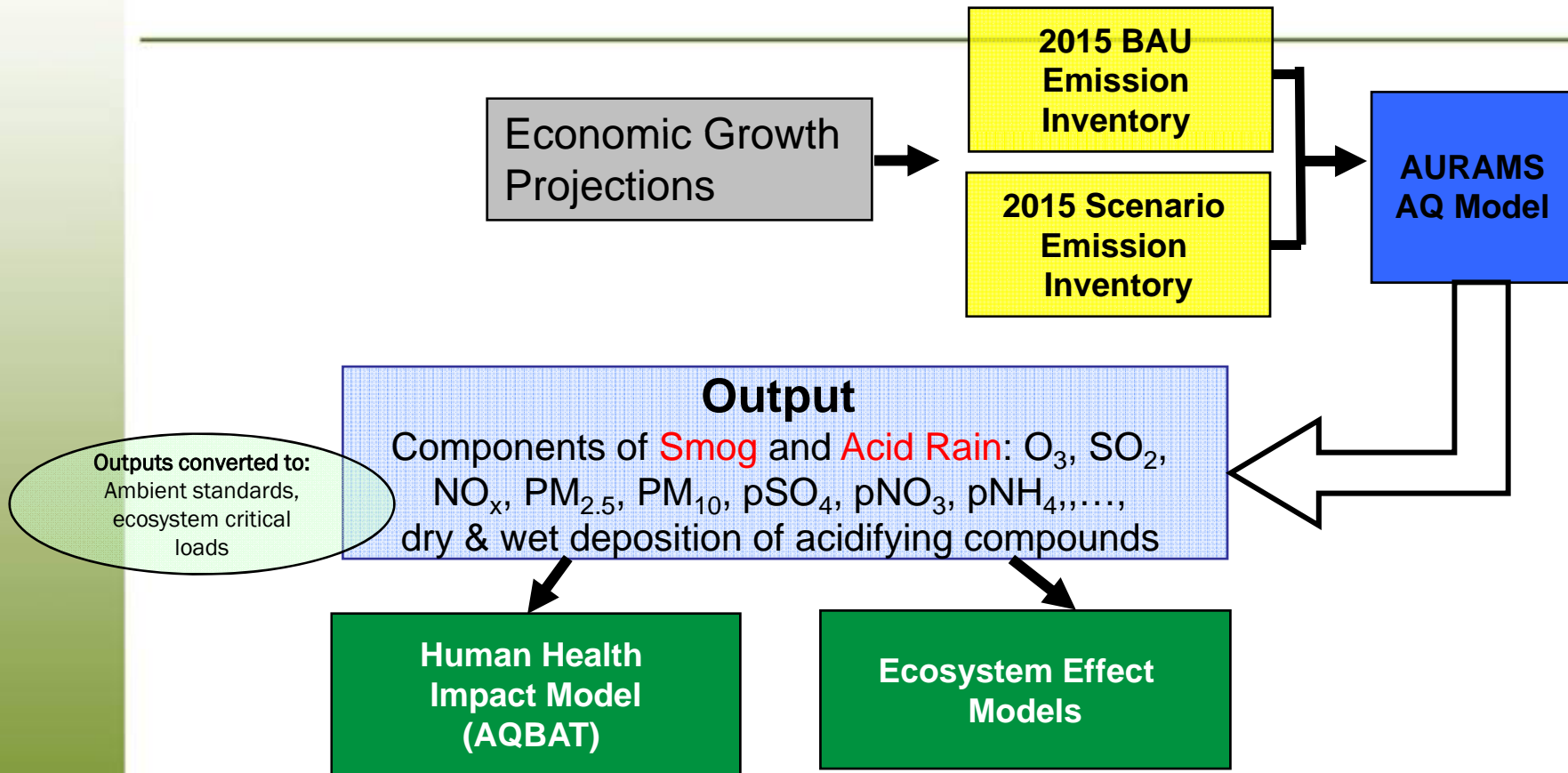
# Science Outcomes

---

- Work underway to create the scientific foundation for
  - Development of regulations
  - Implementing regulations
  - Setting the baseline against which to assess the effectiveness of the regulations [accountability] .



# Developing the regulations – a more integrated approach to defining the benefits

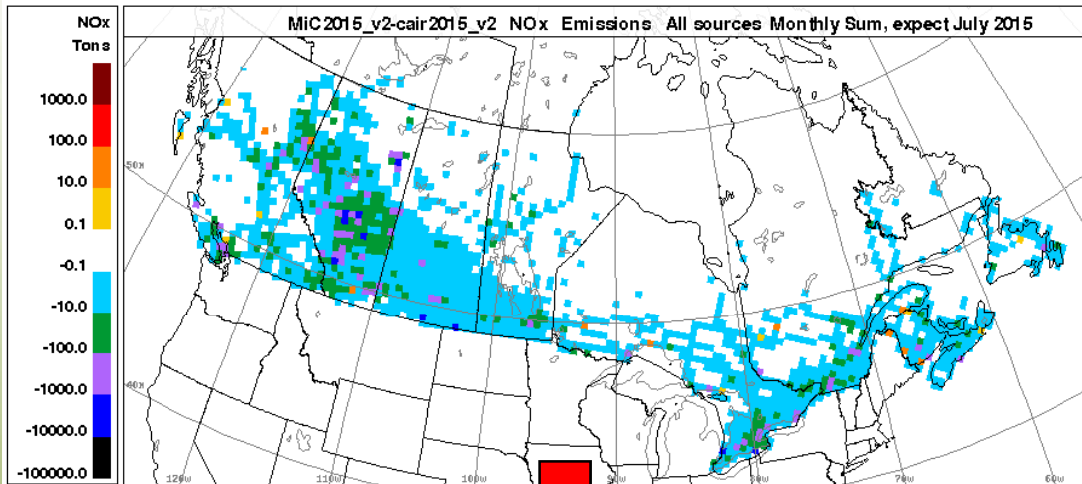


- Timeframe and tools used for determining benefits of proposed regulatory strategies

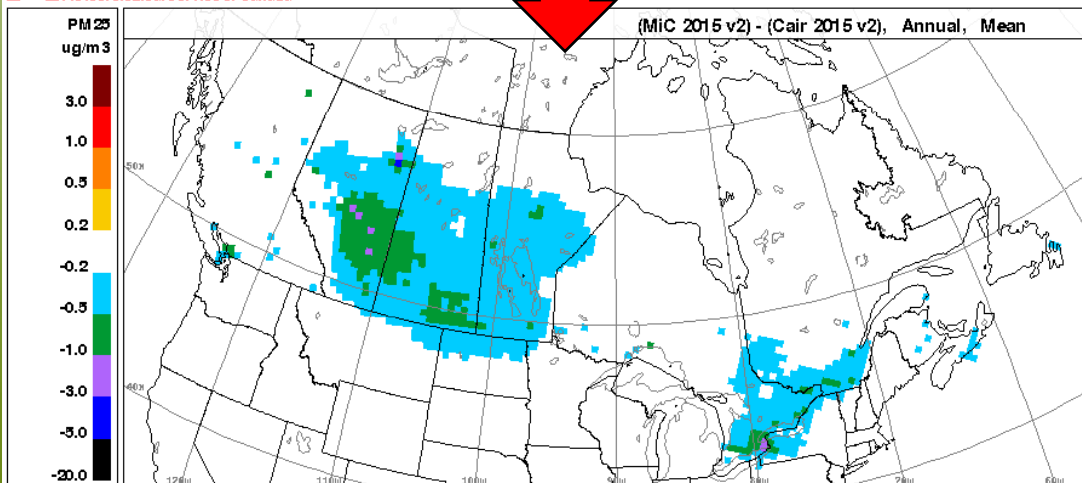


# Developing the regulations

Service Météorologique du Canada  
Meteorological Service of Canada



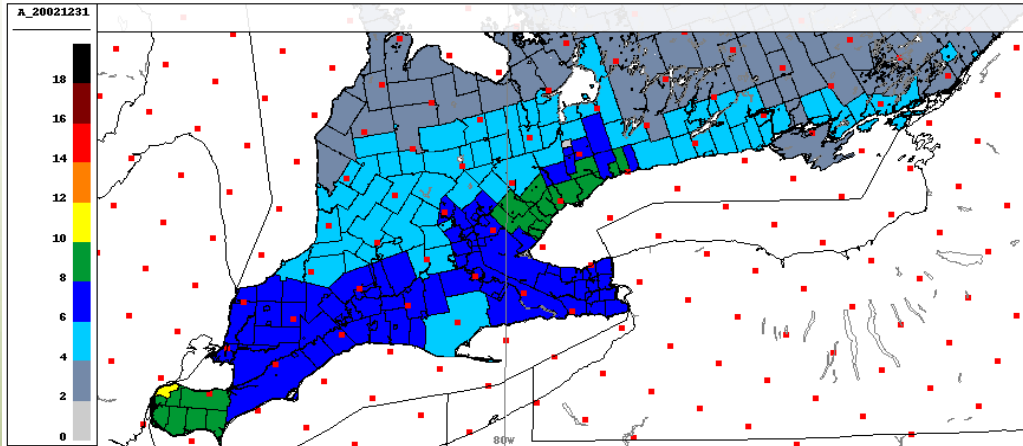
Service Météorologique du Canada  
Meteorological Service of Canada



- Predicting where and by how much air quality will be improved and the associated benefits to Canadians, their health and their environment.
- Emission reductions from Cdn industrial sectors for NOx, SO<sub>2</sub>, VOCs.
- Translated into AQ changes for PM, O<sub>3</sub>, deposition

# Predicted Health Benefits

Service Météorologique du Canada  
 Meteorological Service of Canada



- Reduction of exposure-weighted PM<sub>2.5</sub> by 8%, O<sub>3</sub> by 3%
- 1200 avoided premature deaths
- Total annual health benefits approximately \$6.4 billion

Health Outcome	Mean
Premature Deaths	1,200
Chronic Bronchitis Cases	920
Hospital Admissions	260
Emergency Visits	1,000
Child Acute Bronchitis Episodes	5,600
Asthma Days	170,000
Restricted Activity Days	1,000,000
Minor Restricted Activity Days	210,000
Minor Symptom Days	3,400,000

# Setting the baseline

---

- Assessing the adequacy of technical tools to quantify the effectiveness of regulations
- Further characterising the risk to Canadians and their environment
- Science to support the definition of national air quality objectives [NAQO's]
- Developing new techniques to monitor the effectiveness of regulations



# Assessing the adequacy of technical tools to quantify the effectiveness of regulations

---

- NARSTO Assessment charge
  - State of science evaluation of the tools, opportunities, gaps and limitations addressing accountability and the North American approach to technical support for multi-pollutant air quality management
- NARSTO definition of accountability A formal iterative, process for evaluating the effect of air quality management on receptor exposure. This process includes a systematic evaluation of: -
  - Reduction of emissions
  - Improvement in air quality related to emission changes
  - Reduction in exposure as the result of improved air quality
  - Responses in public and ecosystem health resulting from reduced exposures



# Setting the baseline [accountability]

---

- Further characterising the risk to Canadians and their environment
  - A greater national perspective
    - Acid deposition in the West
    - Developing critical load exceedance estimates for Canada.
  - More emphasis on defining impact of sectoral emissions
    - Mercury from base metal smelter and electricity sectors
  - More focused health studies
    - Estimating neighbourhood- scale exposure conditions for Canadians in the vicinity of particular source types.



# Accountability – External influences

---

- Achieving the benefits
  - Consequences of global emission changes on the Canadian environment
  - Influence of proposed emission reductions in a changing climate
    - Technical studies to determine the impact of global emission growth and a changing climate on air quality in Canada





# Immediate future

---

- Finalisation of sector-specific regulations for air pollutant emissions, including sector targets and timelines.
- Continued development of the Results- based Management and Accountability Framework
- Continued development of science work plan for foundation and accountability activities.



# Summary

---

- In Canada, there is a growing emphasis on accountability.
- New initiatives on air pollutant emission management demand that formal accountability frameworks be developed
- Scientific activities are recognised as an integral part of the accountability framework
- Work is underway to develop appropriate ways to identify and quantify the health and environmental benefits expected as a result of reduced air pollutant emissions

