



**An Overview of the NARSTO  
Emission Inventory Assessment:  
Improving Emission Inventories for Effective  
Air-Quality Management Across North America**

**September 2005**



## What is NARSTO?

- A multi-stakeholder, public-private partnership of government, private sector, & academia across Canada, Mexico, & U.S.
- NARSTO's activities provide input for science-based decision-making and determination of workable, efficient, and effective strategies for reducing air pollution.



## Some History

- **Past NARSTO and NRC Assessments as well as the 2003 NARSTO Emission Inventory Workshop call for Improvements**
  - **Emission inventories are critical elements in air quality management activities.**
  - **Inventories are not as good as they could be.**
  - **The NARSTO community can facilitate improvement of the inventory development process.**



# Current Inventories Capably Support Regulatory Activities but there are Shortcomings

- Quality assurance is uneven and uncertainties are not documented
- Significant uncertainties exist in mobile source inventories (e.g., VOC and PM speciation, CO, and NO<sub>x</sub> trends)
- Emission estimates for many important categories (e.g., PM, biogenics, NH<sub>3</sub>, biomass, etc.) are inaccurate
- Estimates are based on small numbers of measurements
- Spatial and temporal resolution not compatible with modeling needs
- Inventories not updated in a timely manner
- Speciation tools out of date
- Lack of standards make merging across political boundaries difficult.



# **NARSTO Was Asked To Assess the State of N.A. Emission Inventories and Suggest Improvemnts**

- **Objectives of the Assessment:**
  - **Promote efficient and effective use of current inventories;**
  - **Set the stage for improving future emission inventories;**
  - **Establish a roadmap for the future.**
  
- **Target Audience:**
  - **Decision makers**
  - **Users of emission inventories**
  - **Developers of emission inventories**



# **NARSTO Emission Inventory Assessment**

- **Vision of the Future: An emission inventory that includes all significant emissions from all sources, time periods, and areas with quantified uncertainties and timely accessibility.**
- **Goal of this Vision: To make inventories complete, accurate, timely, transparent, and affordable.**



# **NARSTO Emission Inventory Assessment**

## **Report Outline and Content:**

- 1. Introduction, background and objectives**
- 2. Vision for emission inventory programs**
- 3. Current status of North American emission inventories**
- 4. Tools for developing emission inventories**
- 5. Strengths, weaknesses, and lessons learned**
- 6. Evolving technology and methods**
- 7. Top-down assessments of emission inventories**
- 8. Uncertainty and sensitivity analysis**
- 9. Recommendations and conclusions**



# Principal Assumption Driving the Assessment

- **Increased investment in emission inventories can make controls more effective.**
- **An example: In Houston, emissions from petrochemical facilities are particularly important. When these estimates were improved, a new control strategy was developed that should result in more effective air-quality management and yield savings of \$20B (over a 10 year period) compared to the original strategy.**



# Key Findings and Recommendations

## Focus Immediate Attention on Areas of Greatest Known Uncertainty

- Fine particles and their precursors
- Toxic and hazardous air pollutants
- Onroad motor vehicles
- Agricultural sources, especially ammonia
- Biogenic sources
- Petrochemical and other industrial facilities
- Offroad mobile sources
- Open biomass burning
- Residential wood combustion
- Paved and unpaved road dust



## **Within This Focus**

- 2. Improve Emission Inventory Speciation Estimates**
- 3. Improve Existing and Develop New Emission Inventory Tools**
- 4. Quantify and Report Uncertainty**
- 5. Increase Emission Inventory Compatibility and Comparability**
- 6. Improve User Accessibility**
- 7. Improve Timeliness**
- 8. Assess and Improve Emission Projections**



## Implementation Issues

**In order to meet current and future needs, emission inventory programs require significant additional resources to be provided to all stakeholders. Progress will require long-term commitments to improve tools and techniques and to increase the emission inventory workforce.**

**Emission inventory improvements will require investments on the order of 2-10 times current expenditures.**

**Justifying and achieving such increases will require cooperation, collaboration, and impetus from all stakeholders**



# Implementing The Recommendations

## An Initial (3-5 year) Action Plan for U.S.:

- Enhance the emission inventories and associated tools (e.g., SPECIATE) for PM<sub>2.5</sub> and its precursors
- Establish emission inventory reporting requirements for hazardous air pollutants and integrate data into the NEI.
- Improve the capacity of state, local, and tribal agencies to develop inventories to meet regulatory requirements.
- Engage appropriate stakeholder groups to develop action plans to implement the full range of recommendations.
- Increase support of research to develop and improve emission inventories.

**Estimated Additional Cost: ~\$35M**



# Summary

- **Accurate emission inventories are the foundation of cost-effective air quality management.**
- **Uncertainties in emission inventories must be addressed to avoid the potentially significant consequences of inaccurate information.**
- **NARSTO Emission Inventory Assessment shows how progress can be made to improve emission inventories in the future for enhanced quality, timeliness, and cost.**
- **Significant investment by government agencies and the private sector is needed.**
- **For more information and a copy of the current draft, reference: <http://www.cgenv.com/narsto>.**