Emission Inventories Introduction

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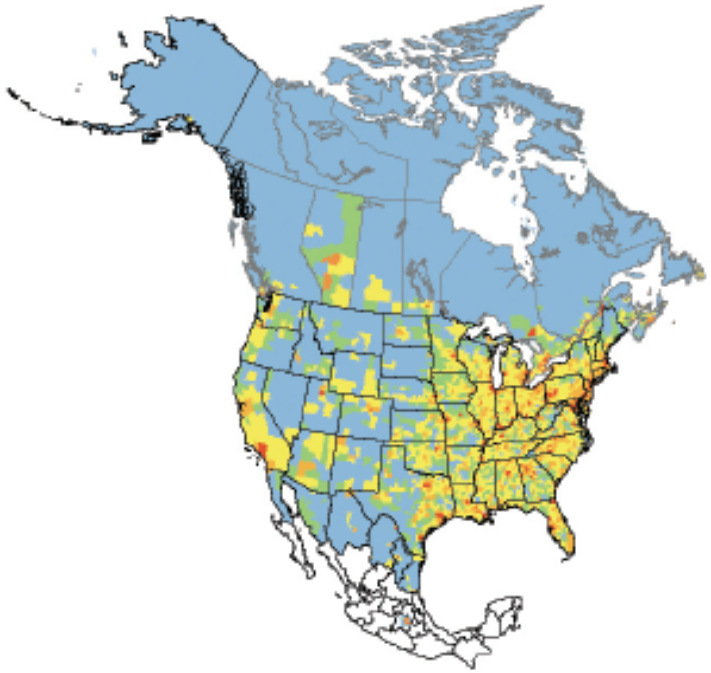
NARSTO Assessment www.narsto.org

NARSTO-05-001

Improving Emission Inventories for Effective Air Quality Management Across North America



A NARSTO Assessment

Prepared by:

The NARSTO Emission Inventory Assessment Team

Peer Review
of
Improving Emission Inventories for Effective
Air Quality Management Across North America

A NARSTO Assessment

Prepared by:

Peer Review Team
February 2005

Assessment Topics

- Vision for future inventories
- Current (2002) status of North American inventories
- Tools to develop inventories
- Strengths and weaknesses of current inventories
- Innovative and emerging technologies for emissions estimation
- Top down assessments
- Uncertainty assessments
- Recommendations for improvement

Emission inventory model

Component *i* emissions fluxes =

Σ_{ij} fraction of component *i* in source *j*

x emission factor (mass/activity) for source *j*

x particle size fraction (for PM)

x temporal profile

x activity of source *j*

x control efficiency

Emissions measurements are made for different purposes, but are adapted to others

- **Certification:** Verify process design to achieve emissions below a regulated limit. (e.g., FTP engine tests)
- **Compliance:** Determine that in-use processes are within permitted values (e.g., vehicle smog tests, periodic stack tests, opacity tests)
- **Emissions trading:** Relate emissions to allowances (e.g., continuous SO_2, NO_x, VOC, PM monitors).
- **Emission inventories:** Emission estimates for air quality planning and modeling (Real-world emissions).
- **Source apportionment:** Relate speciated emissions to source and receptor modeling.

Mobile source certification requires dilution Stationary sources require hot filter/impinger

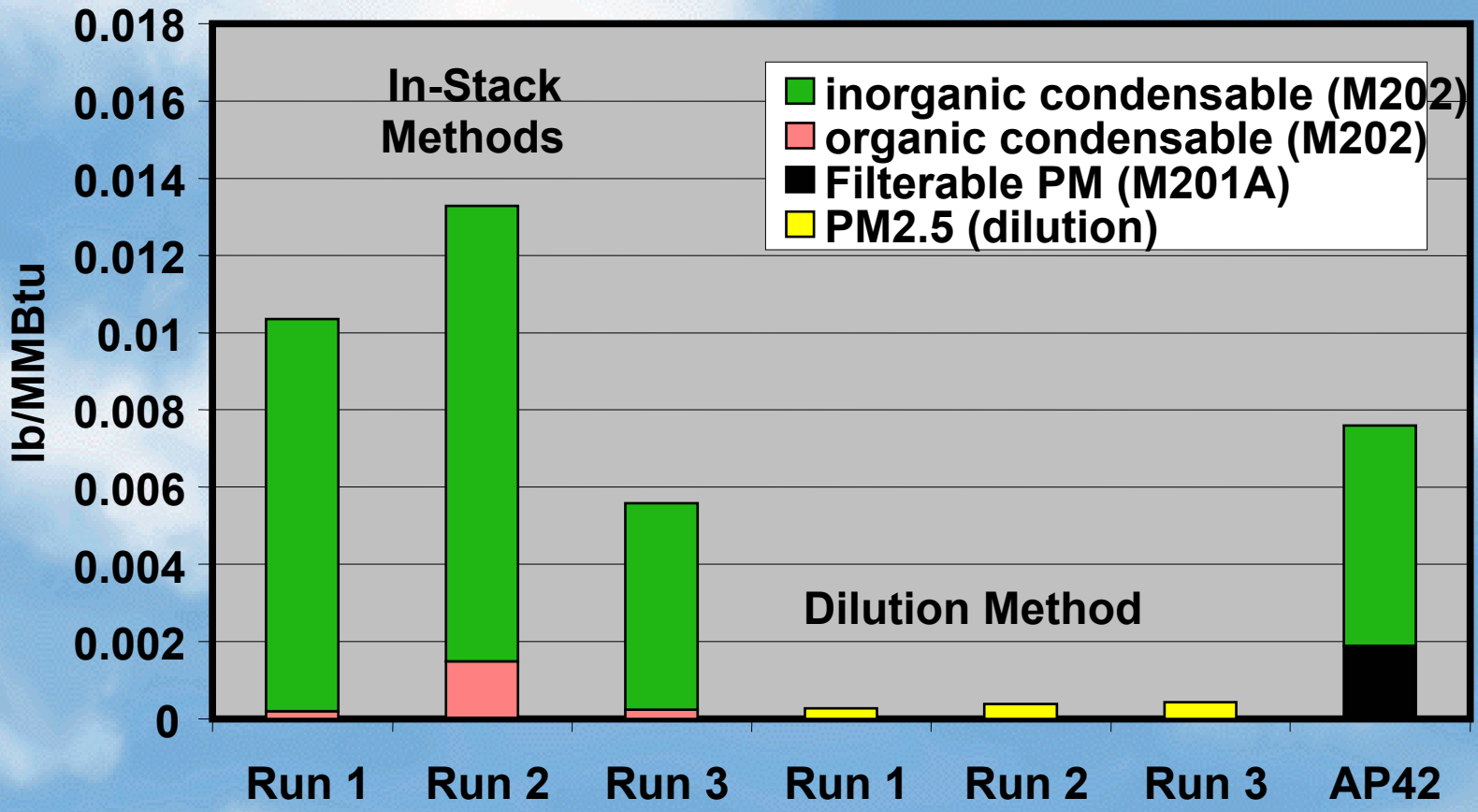
Dilution tunnel and sampling ports

Put generator on wheels and move it and it is certified by dilution sampling

Install the generator permanently and it is certified by hot stack sampling and has different emissions

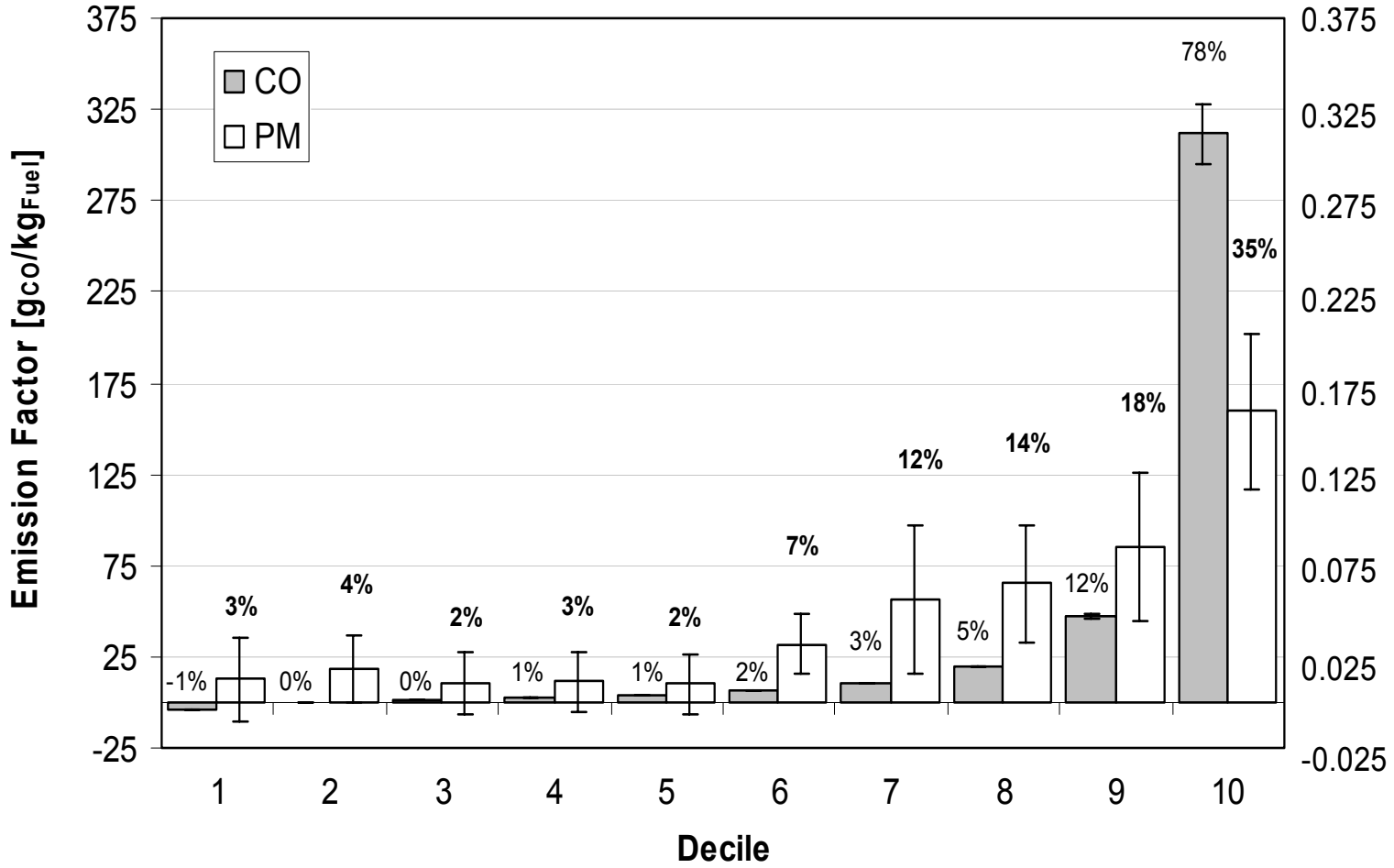
Difference in $PM_{2.5}$ Mass between In-Stack and Dilution Sampling

Gas-Fired Boiler - Field Data



Chang,M.C. and England,G.C. (2004) Development of fine particulate emission factors and speciation profiles for oil and gas-fired combustion systems, Update: Critical review of source sampling and analysis methodologies for characterizing organic aerosol and fine particulate source emission profiles. Irvine, CA: GE Energy and Environmental Research Corp.

Average emissions factors don't represent skewed distributions



Bottom Lines

- The emission inventory process needs to become more of a scientific than a bookkeeping effort
- Better value could be obtained by harmonizing emissions estimation methods currently applied for different purposes
- New technologies for emission assessments and dissemination need to be introduced more rapidly