Emission Inventories and Modeling

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Maryland Department of the Environment
Topics Covered

• Background

• The key role of inventories

• Issues
  – Speed
  – Weight of Evidence
  – Growth
  – Cap-and-trade and other market-based and non-traditional programs
  – Chemistry/meteorology
  – The enemy of the good

• The future
  – Continued collaboration
Background

• My perspective
  – I’m a regulator
    • Inventory basics:
      – Where are we starting from
      – How to reduce emissions to achieve goals and standards
      – Basic building block for State Implementation Plans (SIPs)

• Modeling
  – More focused on regulatory modeling
  – Also work with U of M on research modeling

• The key role of inventories

“ALL MODELS ARE WRONG; SOME ARE USEFUL”

- George Box, mentor of W. Edwards Deming
Inventories – The Basic Building Block

• What causes our air pollution?
• Where are we starting from?
• Where do we need to get to?
• Will this or that solve our problem?
• How to insure progress?
Inventory Issues

From a Modeling Perspective

• Speed
• Weight of Evidence
• Growth
• Cap-and-trade and other market-based and non-traditional programs
• Chemistry, meteorology and other tech issues
• The enemy of the good
Faster and Faster

• Policy process continues to become more dynamic
  – Answers in days and weeks not months and years
  – OTC’s use of CALGRID as a screening tool and CMAQ for the SIPs

• Inventory world needs to be able to react to this dilemma
  – Use of best available inventory for desired purpose
  – Need for iterative policy making process
  – Ability to characterize the uncertainty of the inventory in a way that is relevant to the policy issue under consideration
# Weight of Evidence

## or ... the fuzzy SIP

### Philadelphia 8-Hour Ozone NAA WOE Attainment Demonstration

**Without Voluntary Measures & With Voluntary Measures**

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<th>Site Name - County, State</th>
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Dealing With Uncertainty

• Weight of Evidence
  – EPA guidance
  – More generally …
    • Addressing uncertainty qualitatively and quantitatively

• Tougher standards will make simple “bright line” attainment demonstrations more difficult
  – Is the bright line test really honest?

• Inventory world help
  – Minimally, explaining uncertainty
  – How about multiple inventories?
    • As an example, different growth scenarios
Growth

• One of the key inventory/policy issues that Maryland is looking at

• How do we capture the benefits - in SIPs – from non-regulatory efforts
  – Climate change initiatives
    • Reduced energy consumption
    • Alternative transportation concepts
  – Education programs

• Again, should we be using several plausible growth scenarios in SIPs
  – Best case
  – Less than best case
IPM got it right … sort of

• Cap-and-trade and other market based programs present great challenges for both the inventory and modeling worlds

• Need tools like IPM and Haiku to forecast how trading may work

• Also, however, need some kind of a reality check process connected to the projections

• Again
  – Should there be several plausible scenarios for how emissions may look in the future

• Encourage continued serious debate and innovation on this issue
Tough Technical Issues

• Model dynamics drive us to push for inventory improvements in many areas
  – Already an active dialogue on most of these technical issues

• Chemistry
  – Speciation, biogenics, difficult but important pollutants like ammonia, condensables, etc.

• Meteorology
  – Aloft chemistry, transport of precursors, etc.

• Both
  – Spatial and temporal profiles
Perfection

- This is a tough one

- I hire emissions people who are detail and perfection oriented

- Sometimes the inventory only needs to be “good enough”
  - Screening
  - Other more important pollutants
  - Routinely ask … “How good does this really need to be”
    - Document
Key Issues For the Future

- Regional Processes
  - Coordination and collaboration are critical
  - Inter-RPO discussions on emissions and modeling have been highly successful and should continue
  - Sharing emissions data and modeling inventories is becoming increasingly important
  - Because of transport
    - I care as much about your state’s emissions as my own states
Regional Cooperation

- State resources more limited than ever

- Need to insure that regions work together on key technical issues and results benefit all
  - Bigger bang for the buck

- RPOs have worked very hard on this and we need to continue cooperation
QUESTIONS?