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U.S. Inventories – Uncertainties and Ways to Improve

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Large Stationary Sources

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Presentation Outline

- ❖ Current picture of U.S. emissions
- ❖ Plans for 2005 and 2008 data collection
- ❖ EGU point sources
 - » Historical emissions
 - » Forecasts

Presentation Outline (cont'd)

- ❖ Non-EGU point sources
 - » Historical emissions
 - » Forecasts
- ❖ The inconvenient gases

U.S. National (48 State) VOC Emission Estimates by Year (thousand tons)

Sector	1990	2000	2010
EGU	35	41	43
Non-EGU Point	2,609	1,441	1,493
Nonpoint	11,678	8,544	8,516
Nonroad	2,666	2,565	1,875
On-Road Vehicle	9,328	5,246	2,601
Total	26,317	17,839	14,530

U.S. National (48 State) NO_x Emission Estimates by Year (thousand tons)

Sector	1990	2000	2010
EGU	6,411	4,494	2,307
Non-EGU Point	3,134	2,278	1,976
Nonpoint	4,801	3,886	3,678
Nonroad	2,068	2,092	1,634
On-Road Vehicle	9,536	8,074	4,290
Total	25,951	20,825	13,887

U.S. National (48 State) SO₂ Emission Estimates by Year (thousand tons)

Sector	1990	2000	2010
EGU	15,832	10,819	6,366
Non-EGU Point	4,293	2,199	2,167
Nonpoint	2,470	1,875	1,878
Nonroad	163	177	17
On-Road Vehicle	500	254	30
Total	23,260	15,326	10,459

Points of Emphasis in Next Inventory Cycle

- ❖ PM Components
- ❖ Faster data collection and reporting

PM Definitions for the NEI

❖ **Filterable (PM-FIL):**

- » Particles directly emitted as a solid or liquid at stack or release conditions and captured on the filter of a stack test train. Filterable PM may be $PM_{2.5}$ or PM_{10} .

❖ **Condensible (PM-CON):**

- » Material that is vapor phase at stack conditions, but condenses and/or reacts upon cooling and dilution in the ambient air to form solid or liquid PM immediately after discharge from the stack. EPA considers condensible PM = $PM_{2.5}$.

PM Definitions for the NEI (cont'd)

- ❖ **Primary (PM-PRI) = (PM-FIL) + (PM-CON):**
 - » All particles directly emitted from a stack or an open source.
- ❖ **Secondary (PM-SEC):**
 - » Particles that form through chemical reactions in the ambient air well after dilution and condensation have occurred. Secondary PM formed downwind of source.
 - » Precursors to **PM-SEC** are in the NEI: SO₂, NO_x, NH₃, VOC
 - » **PM-SEC** should **NOT** be reported in the emission inventory

Sources of Filterable versus Condensible Emissions

- ❖ Combustion sources typically emit both filterable and condensible PM emissions
 - » Boilers
 - » Furnaces/kilns
 - » Internal combustion engines (reciprocating and turbines)

What to Report to EPA – New Guidance

- ❖ EPA can take all forms of PM, but prefer ~~Primary~~ Filterable!!
 - » ~~PM25-PRI~~ (or PM25-FIL and PM-CON individually)
 - Note that all PM-CON is assumed to be PM_{2.5} size fraction)
 - » ~~PM10-PRI~~ (or PM10-FIL and PM-CON individually)
- ❖ If submit other than Primary, then EPA creates PM10-PRI and PM25-PRI records

Implications

- ❖ Need to use the NIF 3.0 PM pollutant code extensions that identify the forms of PM (i.e., -PRI, -FIL, or -CON)
- ❖ Verify the form of the PM:
 - » Emission factors you use to calculate emissions; and
 - » PM emissions facilities report to you.
- ❖ Update your database management system to record these pollutant codes in NIF 3.0

Condensibles

- ❖ New test methods are coming
- ❖ EPA encourages more industry source testing
- ❖ Submit test data to EPA

Shortening the NEI Cycle

- ❖ AERR Proposal
 - » 2009 NEI – 12 month reporting deadline
 - » 2011 NEI and Beyond – 6 month reporting deadline for point sources
- ❖ 2008 NEI Goal – Complete NEI in 18 months
- ❖ Ultimate NEI Goal – Complete NEI in 12 months

Rapid Inventory Development Pilot Implications for State/Local

- ❖ Reporting deadline
 - » 12 months attainable
 - » 6 months not attainable
- ❖ S/L agencies which have their reporting deadlines after 1Q may need to change their deadline
- ❖ Electronic data collection necessary to meet tighter deadlines
- ❖ Concerns regarding nonpoint and mobile emissions

2008 Reporting Schedules

- ❖ Published schedules are goals
- ❖ Not settled on reporting dates
- ❖ EPA working on these with STAPPA

History of EGU Emission Estimate

Transition from DOE- and State EI-based estimates to CEM data

1. Provided feedback for revising historical NO_x values
2. Reduced uncertainties
3. Better temporal information
4. Data management issues

EGU Emission Forecasting

Dominated by the Integrated Planning Model (IPM)

1. EPA has used and updated this model for regulatory analyses
2. RPOs have adapted for regional forecasts—incorporated more site-specific data
3. Also addresses Hg and carbon dioxide
4. Issues-proprietary/black box?

Relative Importance of Non-EGU Point Sources?

By 2010

1. Almost equal to EGU NO_x and $\text{PM}_{2.5}$
2. One third of EGU SO_2
3. Dwarfs EGU VOC and ammonia

Important Influences on Future Non-EGU Emissions

Current methods: Growth factor times
control factor

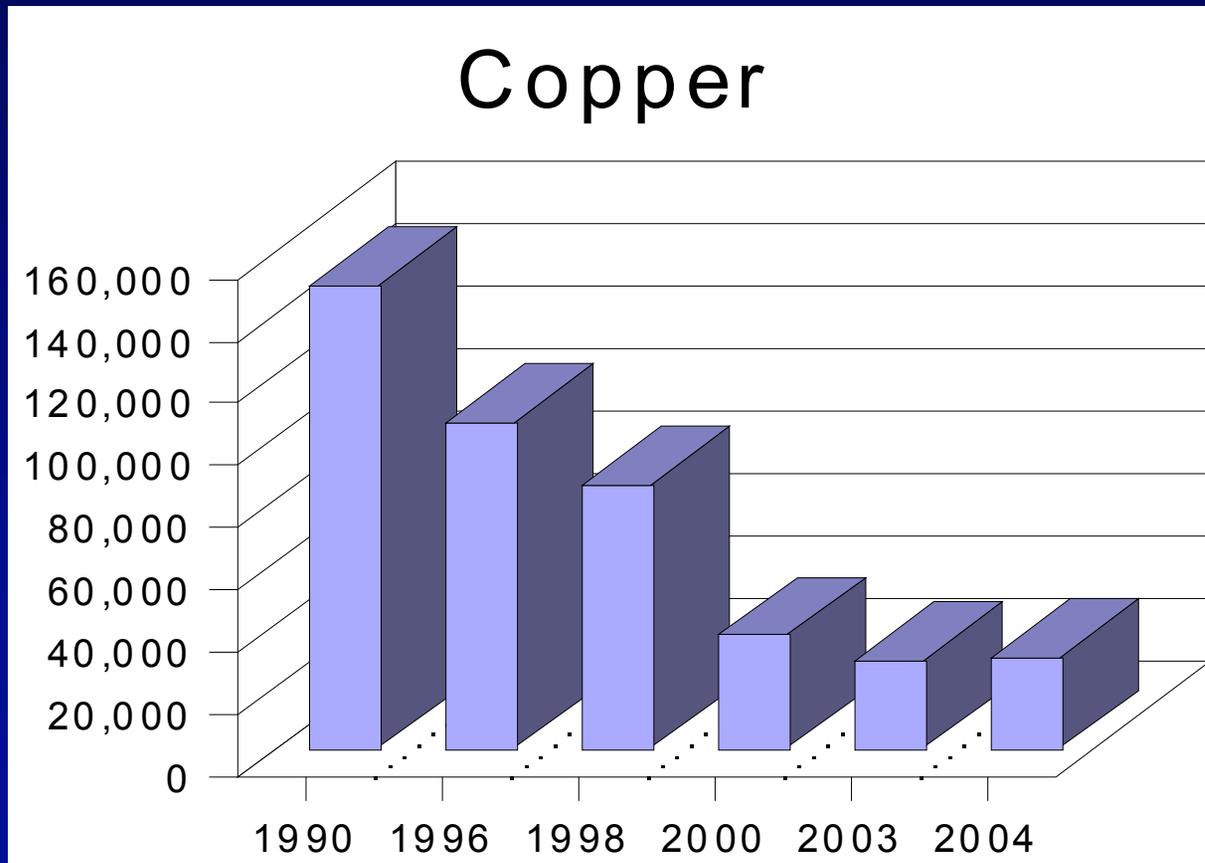
1. This works well when growth factor
closely tied to what drives emissions
2. And control factor correctly anticipates
regulatory effect
3. How often does this happen?

Other Factors That Influence Future Year Emissions

1. Technological change-capital turnover
2. Firms trying to avoid triggering PSD/new source review
3. Fuel switching
4. Measurement changes/improvements
5. International competition

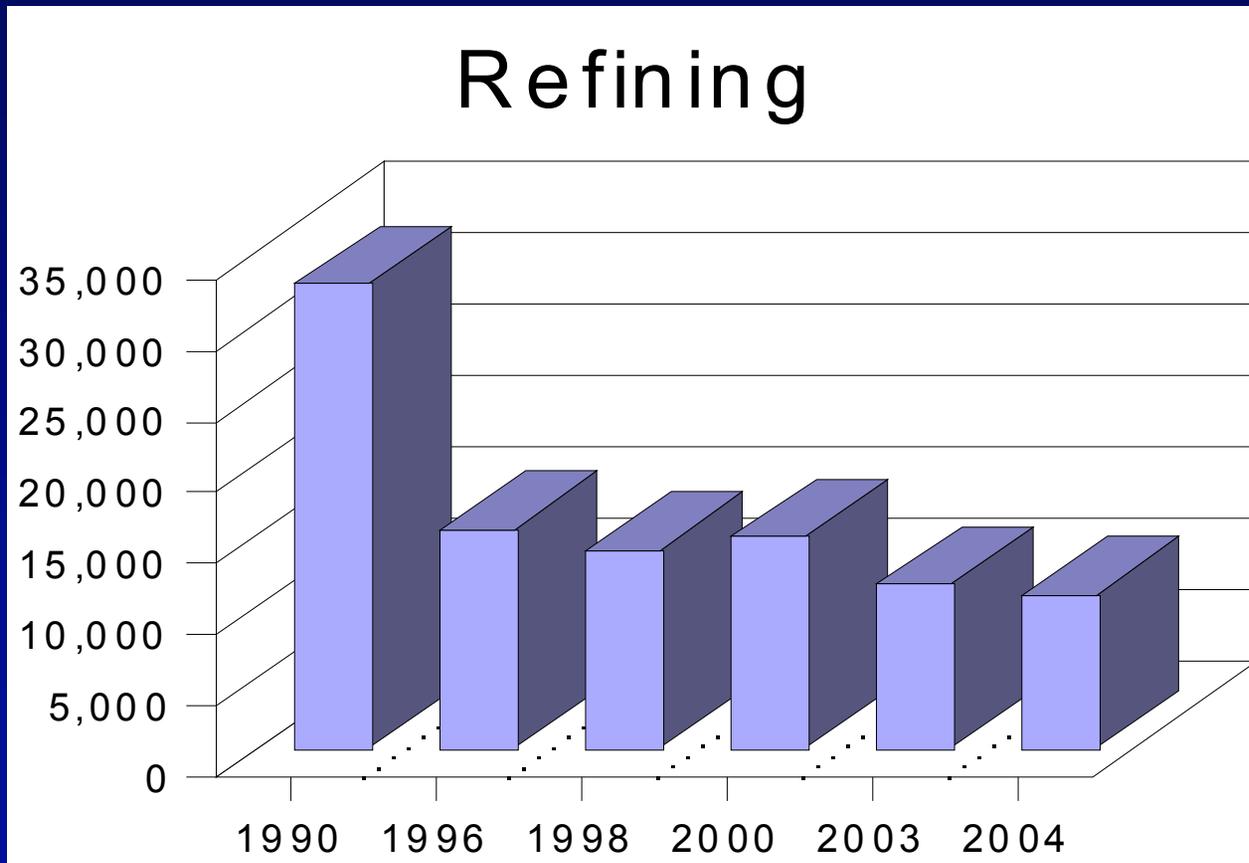
309 State SO₂ Summary

Copper



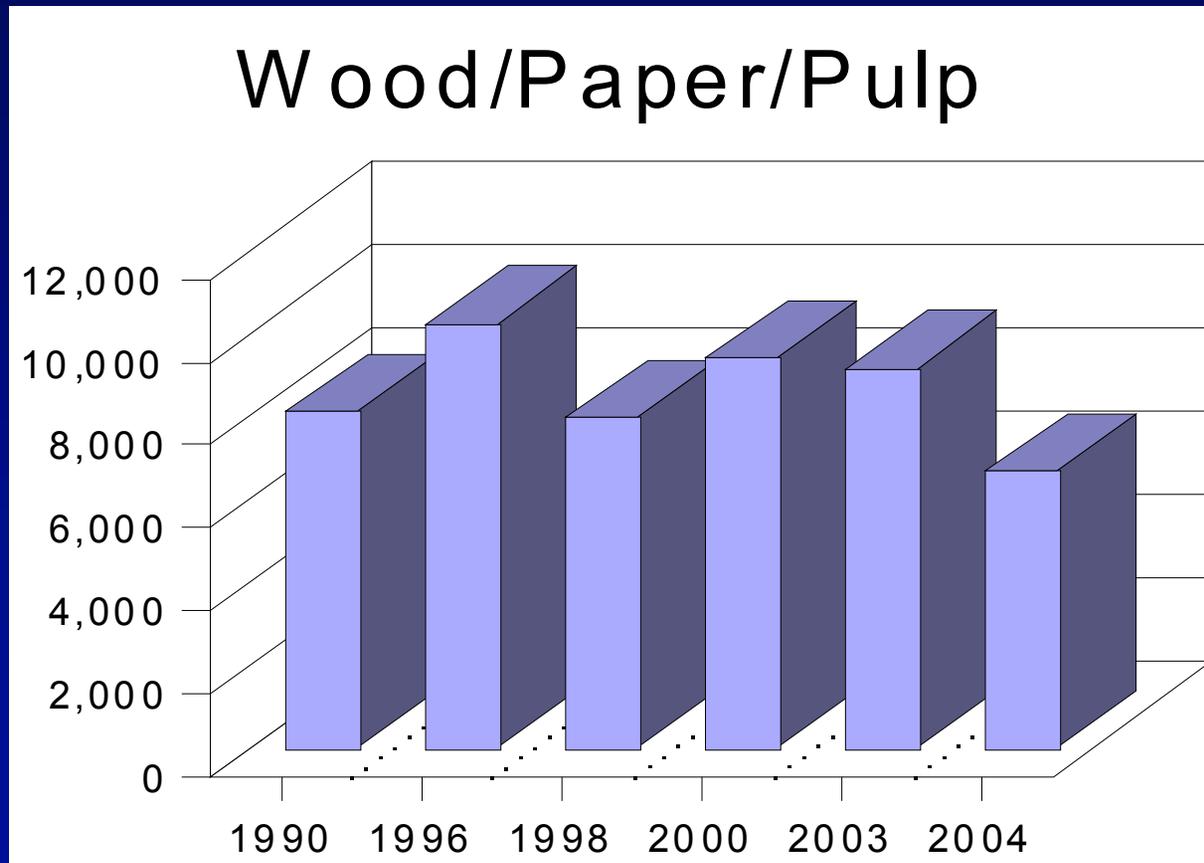
309 State SO₂ Summary

Refining



309 State SO₂ Summary

Wood/Paper/Pulp



Issues Presented by the Inconvenient Gases

1. State assessments of GHG emissions and mitigation options
2. GHG registries-by firm
3. Methods and evaluation tools can be different
4. Emphasis on state and sub-state-level
5. Protocols

NARSTO Emission Inventory Assessment

Action Plan for the United States

1. Enhance the EIS and associated tools (such as SPECIATE) for $PM_{2.5}$ and its precursors, especially for carbonaceous particles
2. Establish emission inventory reporting requirements for HAPs and integrate data into the NEI.

NARSTO Emission Inventory Assessment (cont'd)

Action Plan for the United States (cont'd)

3. Improve State, Local, Tribal capacity
4. Engage appropriate stakeholder groups
5. Increase support of research

Wrap Up

- ❖ Much Ado about 2002
- ❖ Wait and Hurry Up for 2008
- ❖ Condensed Version
- ❖ Monkey's off our back
- ❖ Utility function
- ❖ Kick it up a notch