E.H. Pechan & Associates, Inc.

Using Historical Information to Improve Emission Projections

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Overview

- Background
  - Two Forecasting Components – Emission Activity & Emission Rates (via Emission Control %)
  - EPA 2006 PM NAAQS Regulatory Impact Analysis
- Ongoing LADCO Region Study
  - Review Historical Data to Inform Forecasts of Emission Activity and Emission Rates
  - Methods/Sample Analyses
  - Next Steps

Background

- Equation Typically Used:

  Forecast Year Emissions =

  *Base Year Emissions * Emission Activity Change * Emission Control Change*

- Challenges
  - How Good are We at Projecting Future Activity Levels?
  - How Good are We at Projecting Future Emission Rates?

Background (cont'd)

- Emission Activity Projections
  - EGAS Defaults—Typically Use Regional/National Fuel Consumption Projections from DOE or State-level Industry Sector Sales Projections from REMI
  - How Closely Do Growth Surrogates Match Each Emission Activity?
  - How Well Do the Surrogate Forecasts Project Actual Emission Activity Changes?

Background (cont'd)

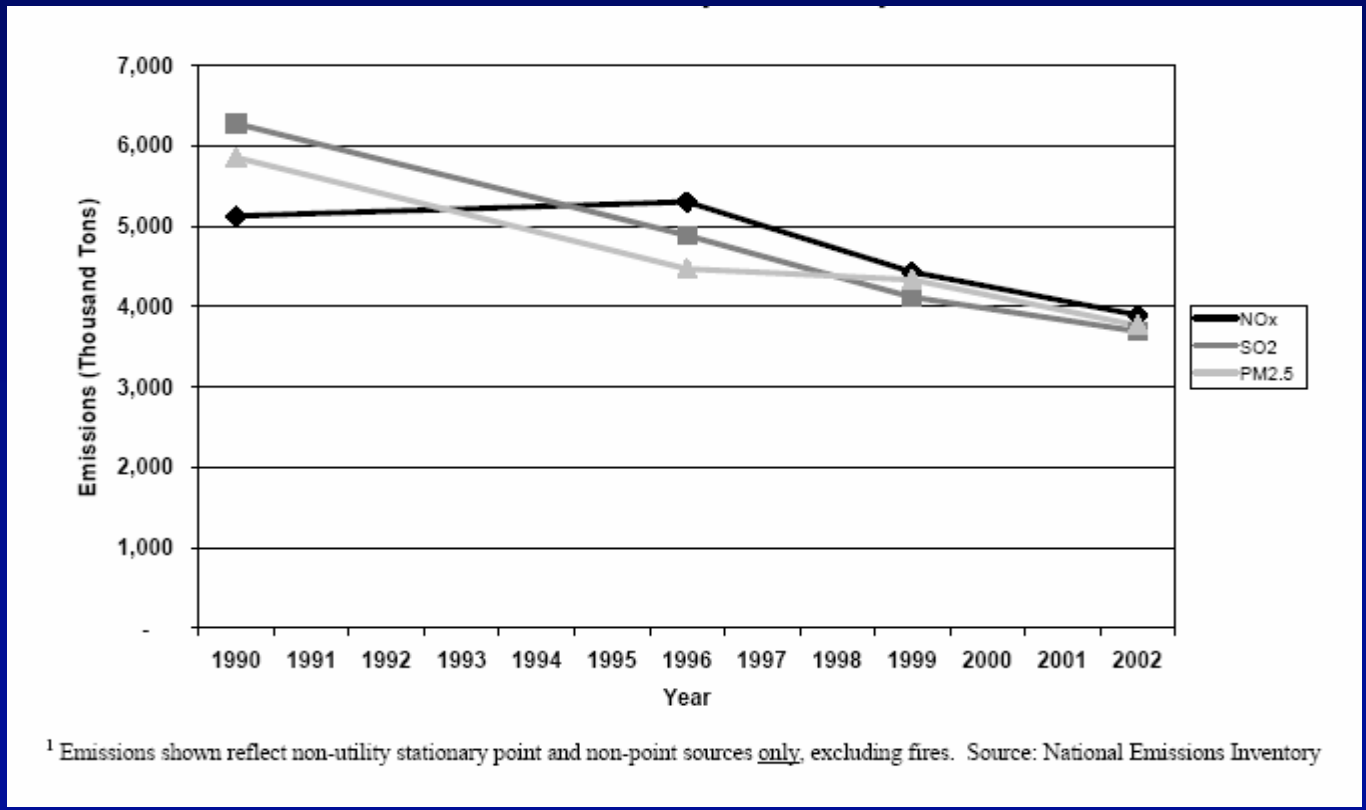
- Emission Rate Projections
  - Model Available Estimates of Emission Reductions from "On-the-Books" Controls
  - Limitations
    - Reduction estimates not available for certain controls (e.g., New Source Performance Stds.)
    - Unanticipated control programs
    - Other emission rate reductions (i.e., reductions from technology/process changes not mandated by emission control programs)

Background (cont'd)

- EPA 2006 PM NAAQS Regulatory Impact Analysis
  - Non-EGU Stationary Source Emissions
    - 1990, 1996, 1999, 2002 total NOx, SO2, PM-2.5
    - Comparison of total NOx and SO2: NEI actual vs. forecast from 1997 PM NAAQS RIA

EPA 2006 PM NAAQS Regulatory Impact Analysis

- Non-EGU Stationary Source Emission Trends



[1] Emissions shown reflect non-utility stationary point and non-point sources only, excluding fires. Source: National Emissions Inventory

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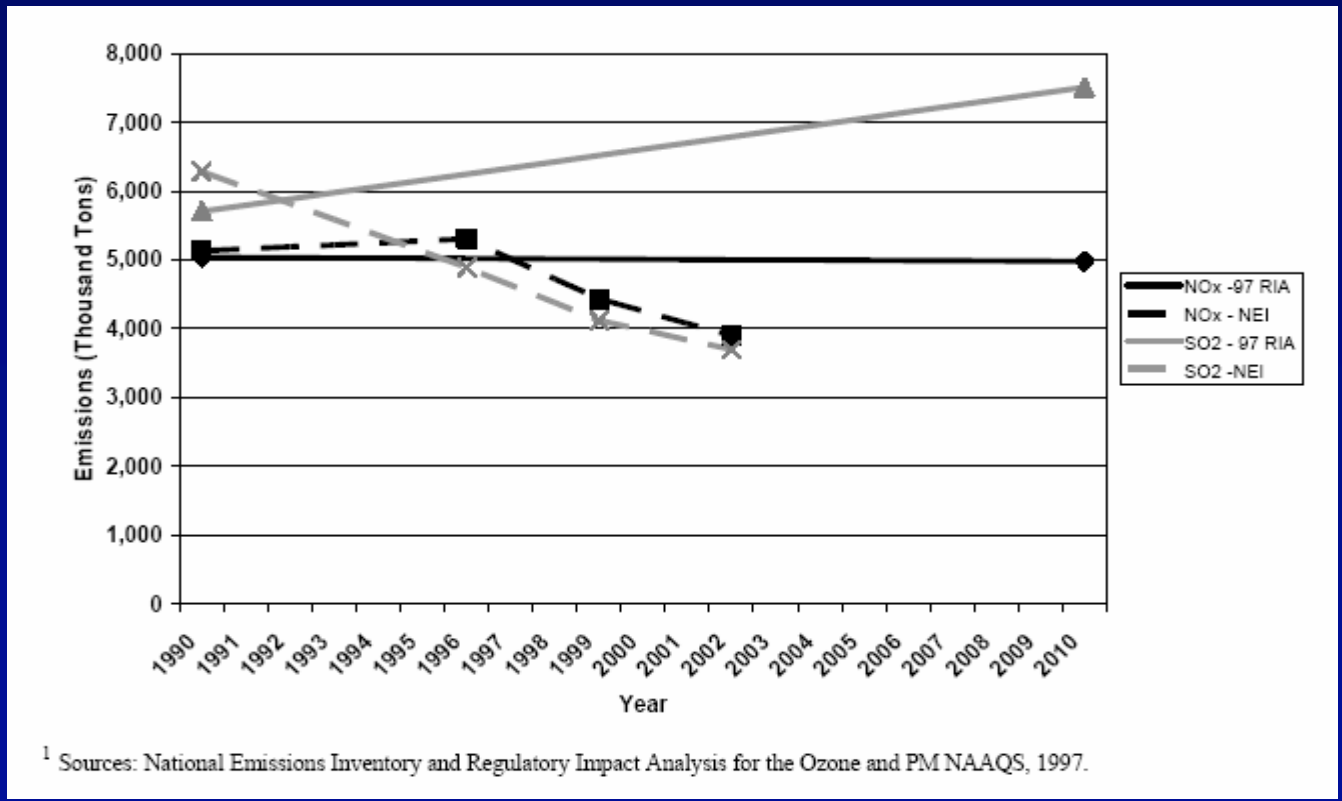
EPA 2006 PM NAAQS Regulatory Impact Analysis (cont'd)

- Comparison of Total NOx and SO2: NEI Actual vs. Forecast from 1997 PM NAAQS RIA



[1] Sources: National Emissions Inventory and Regulatory Impact Analysis for the Ozone and PM NAAQS, 1997.

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EPA 2006 PM NAAQS Regulatory Impact Analysis (cont'd)

- Interim Forecasting Approach-No Emissions Growth
- Future Projection Improvements Based on Category-Specific Analyses

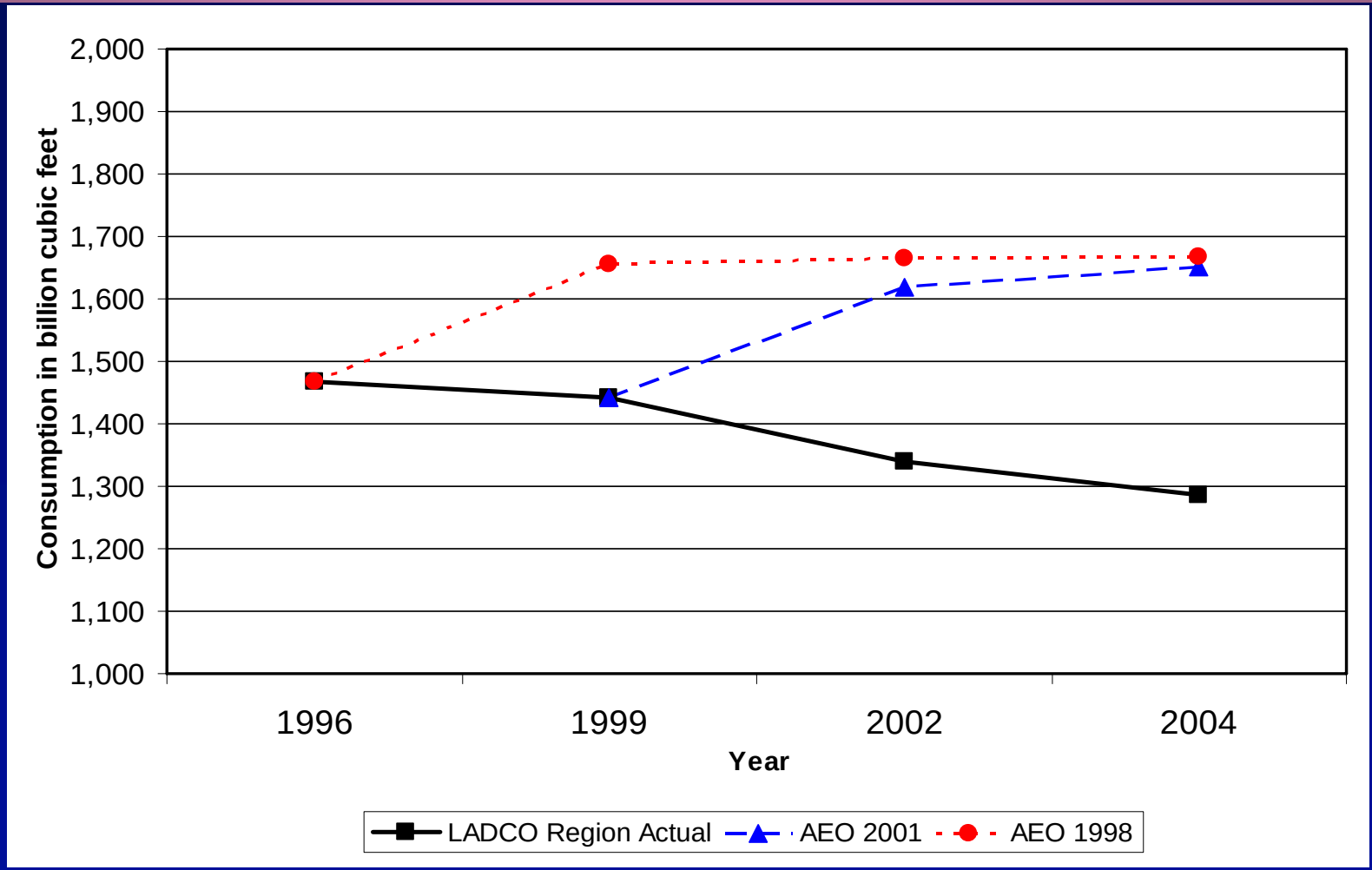
LADCO Emission Activity Trend Analysis

- Use as “Reality Check”/to Improve Upon Current Default Activity Forecast
  - Source Category Prioritization
    - Magnitude of projected emissions increase
    - Availability/ease of compiling historical data

LADCO Emission Activity Trend Analysis (cont'd)

- Activity Trend Analysis Data Sources
  - Inventory Throughput
  - Earlier Versions of Data Sources Used to Develop Base Year Inventory
  - Other, Including Government/Trade Association Sources (e.g., U.S. Geological Survey Cement Production Statistics

Sample Emission Activity Trend Analysis – Industrial Natural Gas



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LADCO Industrial Natural Gas Trend Analysis (cont'd)

Source	2004 Consumption (trillion cu ft)	% Difference vs. Actual
LADCO Region Actual	1,285	
Projected from 1996 (*AEO 1998*)	1,667	+30%
Projected from 1999 (*AEO 2001*)	1,651	+28%

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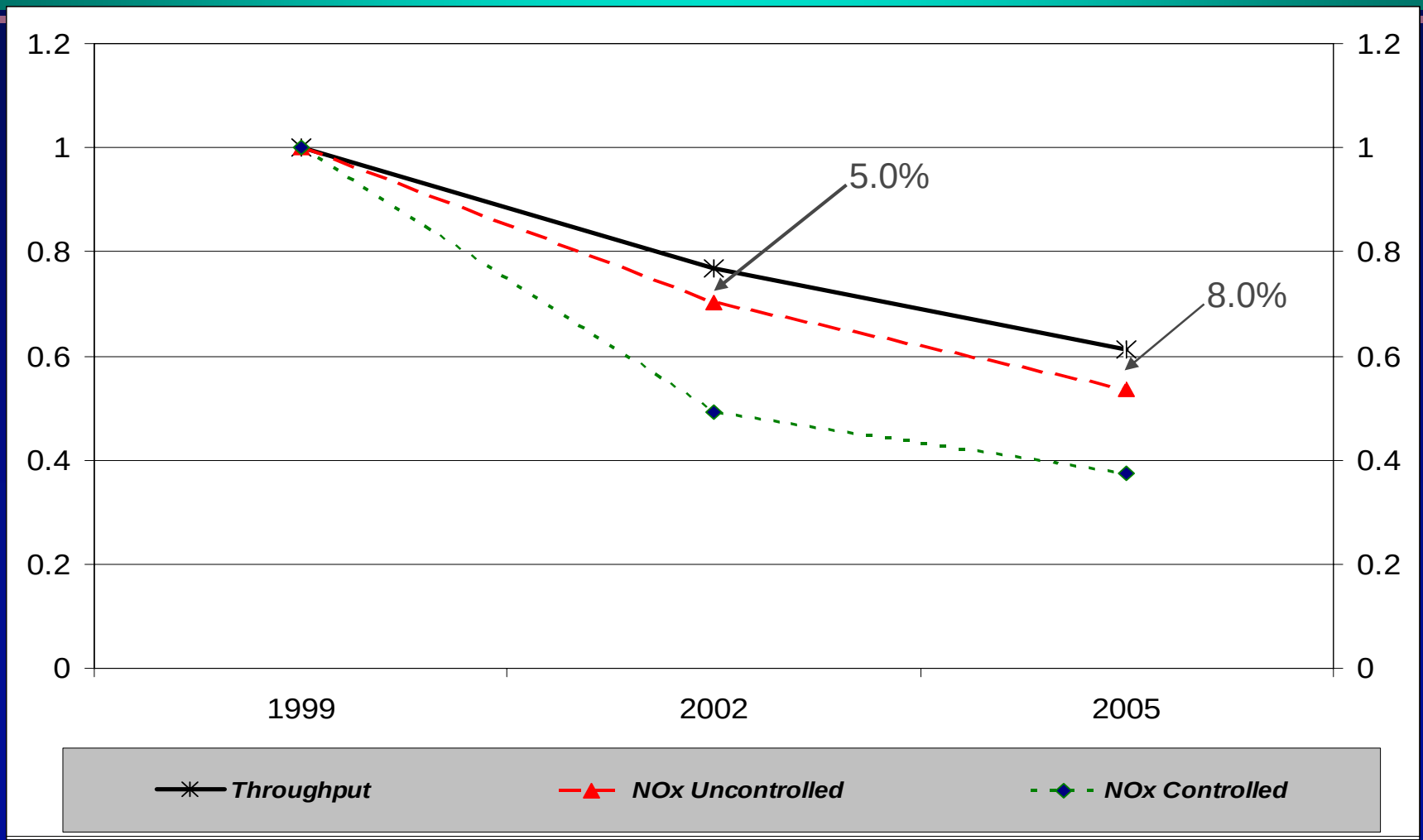
LADCO Emission Trend Analysis

- Use as “Reality Check”/to Improve Upon Current Modeling of Emission Rate Changes
- Source Category Prioritization
  - Point sources
  - Size of historical emission reductions
  - Existence of control in historical period
  - Known emission estimation changes

Sample LADCO Emission Trend Analysis



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Next Steps

- Emission Activity Trend Analysis
  - Compile Historical Activity Data and Compare Historical Trend with Forecast Trend; Revise where Historical Trend is Clear/Persistent
- Emission Trend Analysis
  - States Quality Assure Emissions and Throughput, & Estimate Effect of Post-1999 Control Programs
  - Compute Historical Change in Emission Rate
  - Research Potential Reasons for Change and Apply in Forecast unless Reason to Contrary

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Conclusions

- Importance of:
  - Accurate Forecasts for Policymaking
  - Historical Information for Informing Forecasts
  - Throughput Data in Analyzing Historical Trends
- Future Research
  - Analysis of Sales-Emission Activity Link
  - Further Analysis of Emission Rate Changes Not Currently Modeled in Forecasts
    - Explanations/identification of drivers for changes (e.g., attainment vs. nonattainment areas)

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