Control Strategy Tool for Multipollutant Analyses

AQMP Workshop

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What is the Goal of this Briefing?

- Share information on:
  - purpose & scope of the Control Strategy Tool
  - functionality for *multipollutant* cost analyses
  - future enhancements
- Get feedback on:
  - functionality for *multipollutant* cost analyses
  - sources of *multipollutant* control measure data

What is the Purpose/Scope of CoST?

- Support for preparation and analysis of future year emission control strategies for point, area, and mobile sources
- Facilitate multi-pollutant analyses, including criteria pollutants & precursors, HAPs, GHGs
- Track information on control measures, their costs, and the emission sources to which they apply
- Covers the U.S.
- Engineering costs only, no economic impacts

What questions are we trying to answer with CoST?

- Start with a control strategy related goal
  e.g., reduce 2030 NOx emissions in Southeast by 100,000 tons/yr
- Use Control Strategy Tool to answer questions like:
  - What set of controls can achieve the goal and what are the impacts on other pollutants?
  - What is the optimum scenario for achieving multipollutant goals?

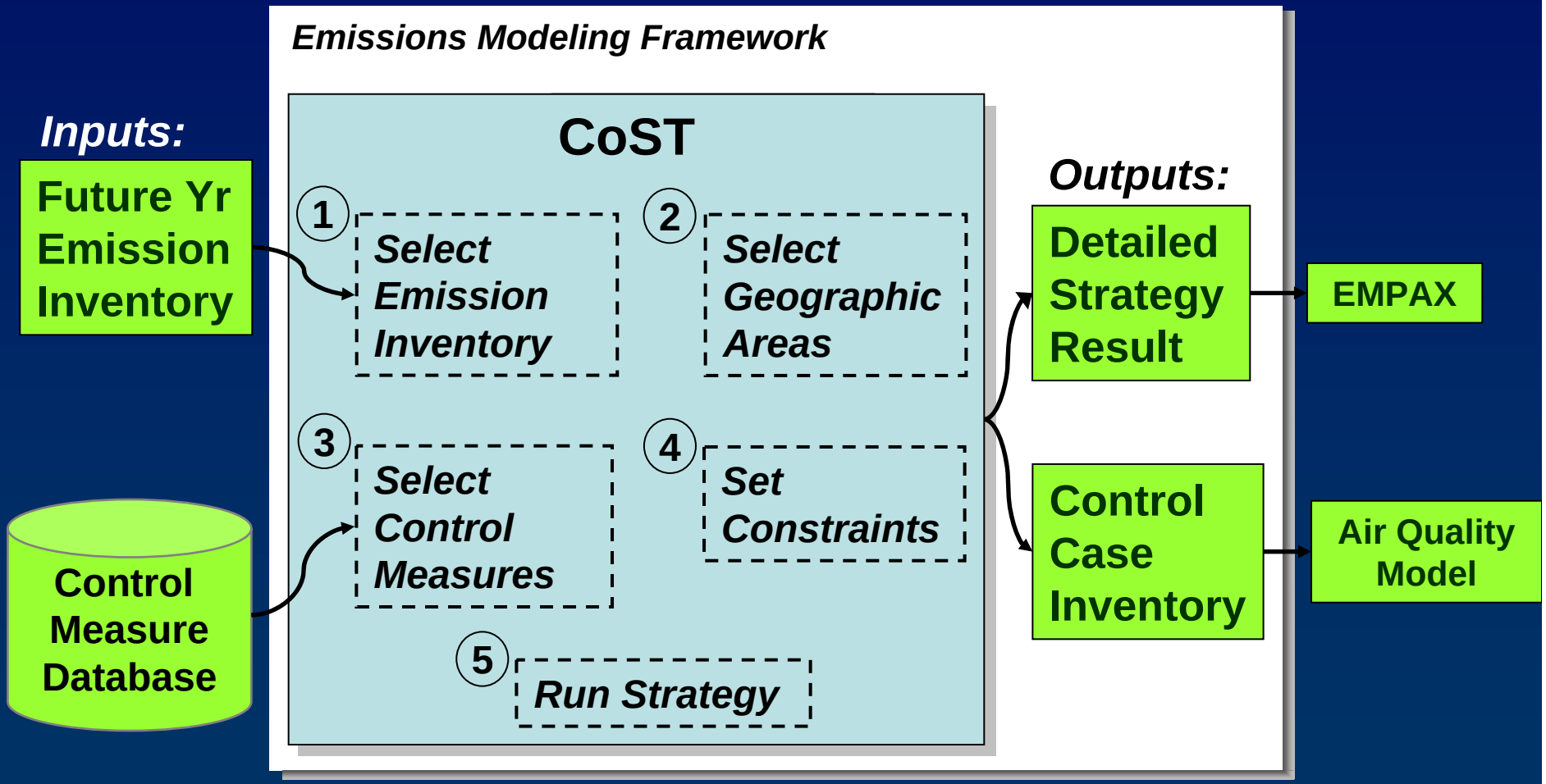
What questions are we trying to answer with CoST *(continued)* ?

- What will be the final emission reductions for the target pollutants?
- What will be the final emission reduction or increases of other pollutants of interest?
- What will be the engineering costs of controls, including additional controls for unintended pollutants emitted?
- What is the *least cost* set of controls for achieving multipollutant goals?

Why are we moving to CoST from AirControlNET?

- Greater flexibility - regarding addition and editing of emissions inventories & control measures
- New software platform - to better respond to changing needs
- More transparency - easier access to underlying data and assumptions

How does CoST fit into Control Strategy Assessments?



Note: EMF = Emissions Modeling Framework; EMPAX = Economic Impact Model

Mobile Source Analysis for Ozone NAAQS RIA

- CoST reproduced results of an independent analysis
- Different than previous analyses because multiple measures were to be applied to the same source in a specified order
  - order of application impacts estimated costs, but not reductions
- Developed a new strategy analysis type to support this project
  - "Apply Measures in Series": applies all measures that are applicable to each source based on its SCC

Onroad Mobile Measures Used

- Plug-In Hybrids
- Aftermarket Catalyst
- Eliminate Long Duration Idling
- Lower Reed Vapor Pressure (RVP)
- Onroad Scrappage and Retrofit
- Continuous Inspection and Maintenance Programs
- Commuter Programs (vanpooling, etc)
- Tier 3 Standard

Example Nonroad Mobile Measures Used

- Lower RVP
- Bond Rule (CA and non-CA)
- Nonroad Retrofits
- Diesel Marine National Rule
- Ocean Going Vessel Standards
- Commercial Aircraft Standards
- Diesel Locomotive Standards

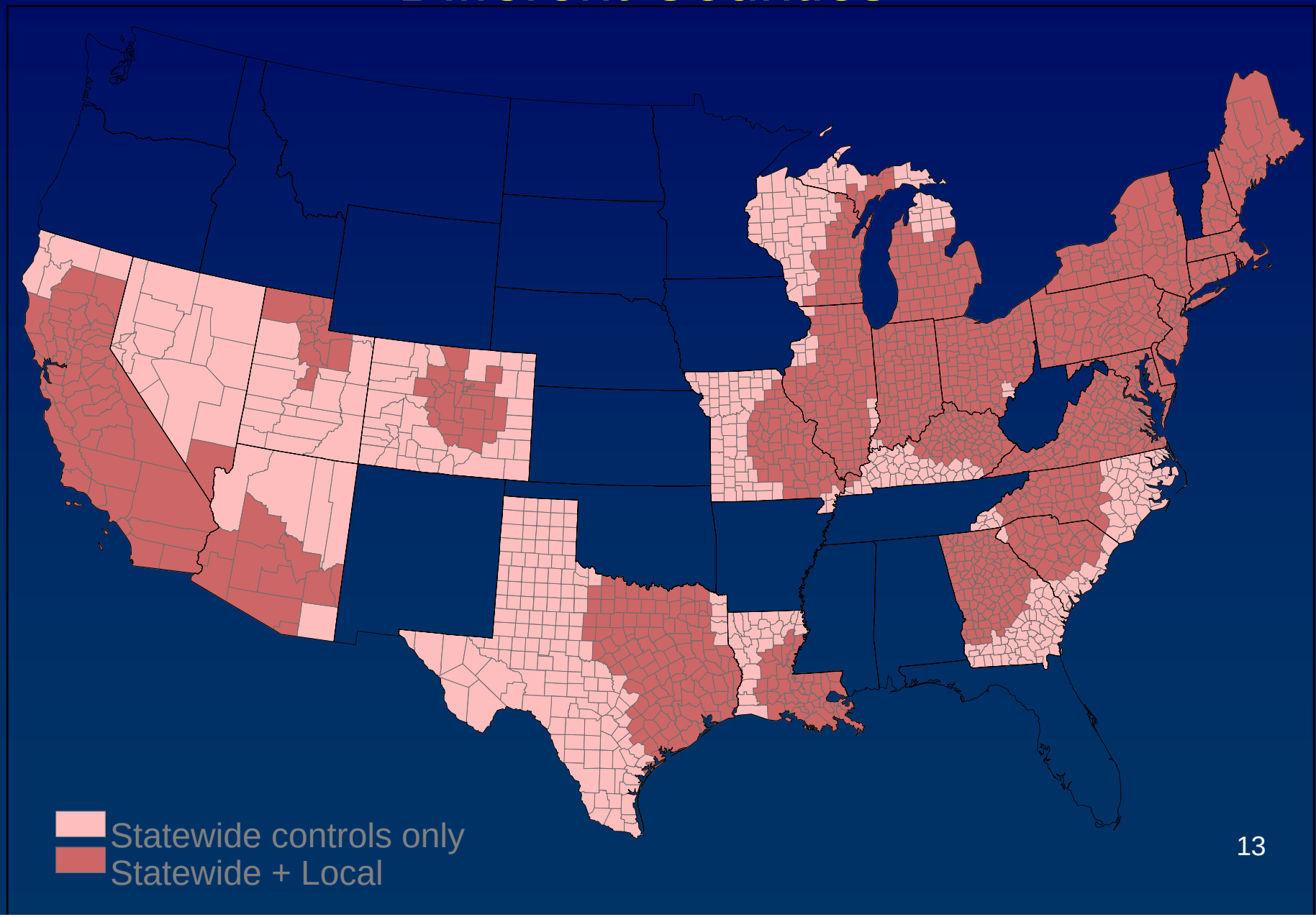
Control Measure Characteristics

- Measures had particular months to which they apply to emulate seasonal variations in effectiveness
- When measures affected multiple pollutants, cobenefits were specified
- Costs were sometimes distributed across multiple pollutants
- County and SCC-specific measures meant large data volume:
  - Over 500,000 records each for onroad and nonroad measures
  - Inventories for each month were approx. 2 million records (onroad) and 3 million records (nonroad) and used average day values

Control Strategy Challenges

- Data volume required direct SQL processing in DB instead of in Java
- Needed to specify twelve monthly average day inventories to use (not just a single annual inventory)
- Wanted to override rule penetration used by the measures for a particular run
- Needed to apply each measure in a different set of counties

Different Measures were Applied to Different Counties



Currently Available Strategy Analysis Types

- Maximum Emissions Reduction
  - Determine the most reduction of target pollutant that is possible using the specified measures
- Least Cost
  - Determine the minimum cost way to achieve a specified reduction of the target pollutant
- Least Cost Curve
  - Runs least cost analysis for a series of reductions
- Annotate Inventory
  - Find measures that provide specified efficiencies
- Apply Measures in Series
  - Applies all specified measures in chosen order

Applications of Control Strategy Types

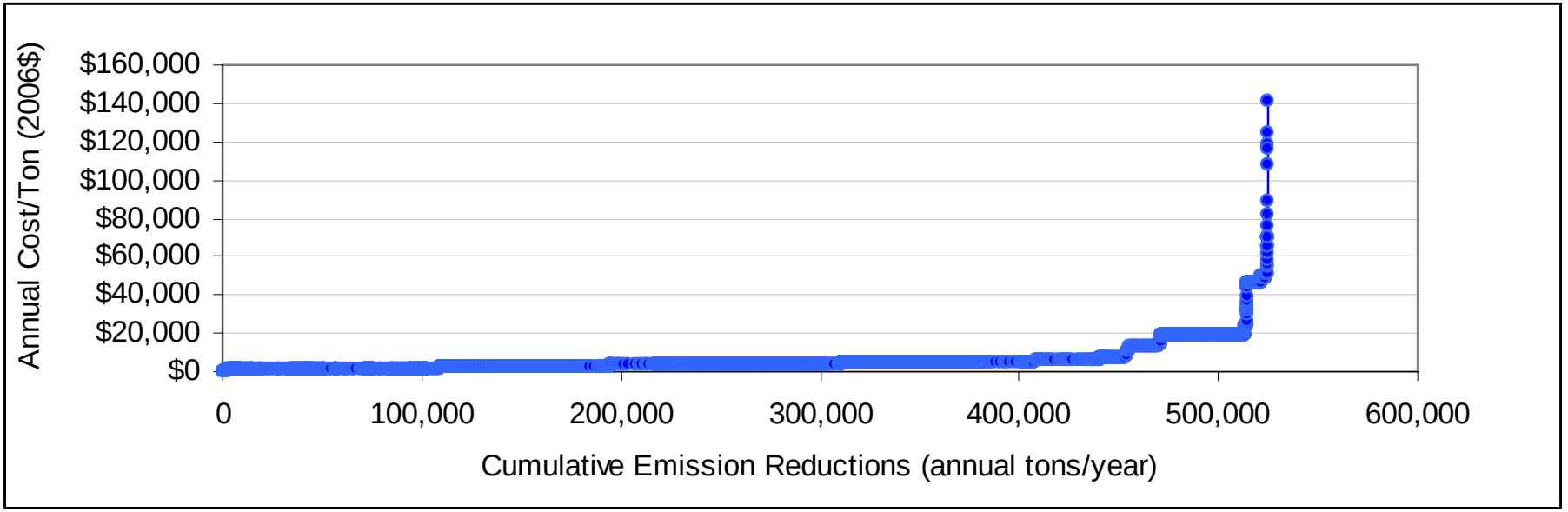
- Maximum Emission Reductions
  - Used in Ozone NAAQS RIA for application of point & area source controls (in conjunction with cost curve analysis)
- Least Cost
  - Used in PM2.5 NAAQS RIA for application of point & area source controls
- Least Cost Curve
  - Useful for
    - Determining Percentages of control possible
    - Establishing stopping points when controls become ineffective
- Annotate Inventory
  - Useful to creating control strategies where controls need to be applied in addition to control technologies already on sources
- Apply Measures in Series
  - Used for mobile source control strategies

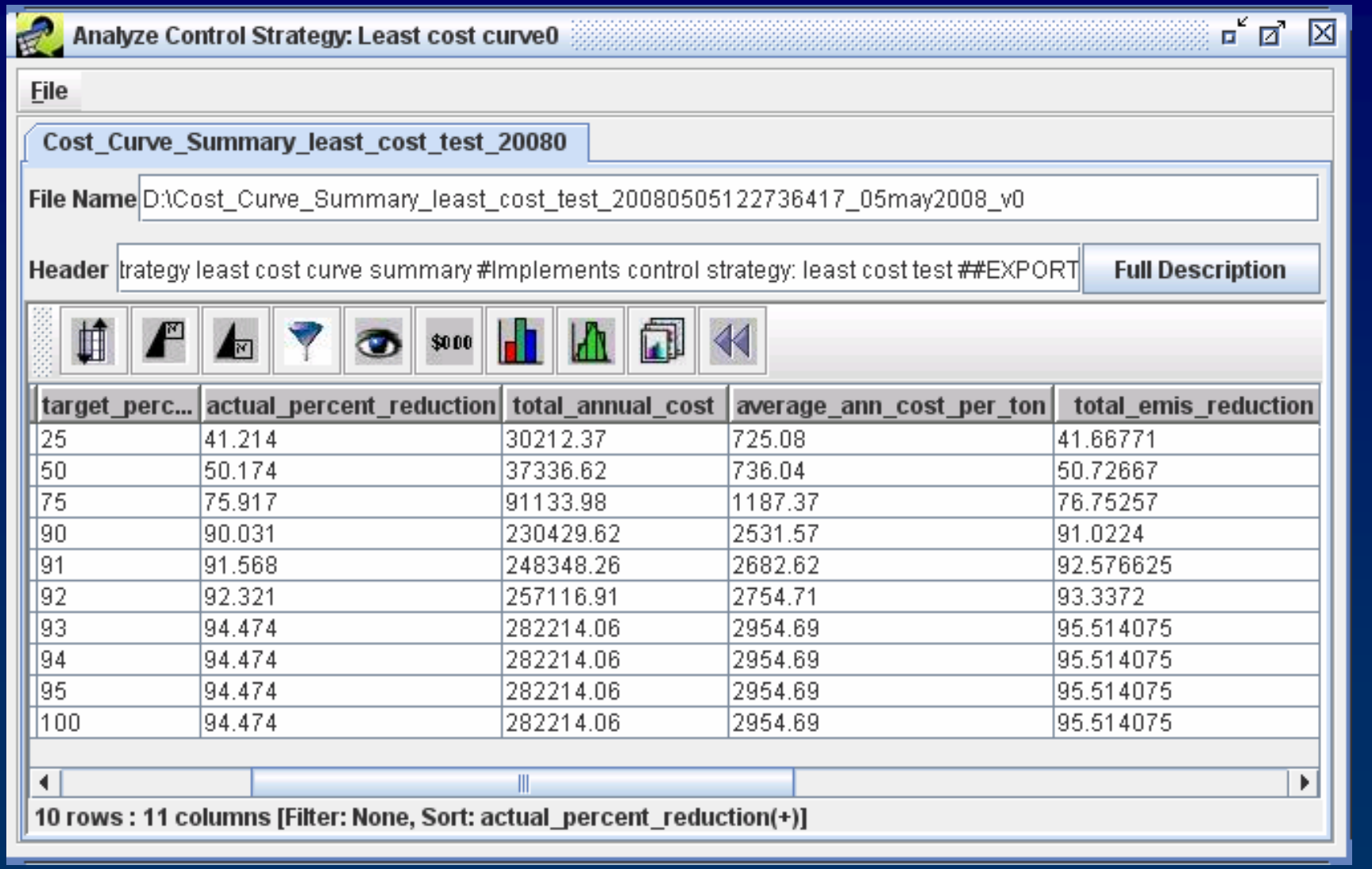
New Least Cost Analyses

- Least cost analysis type finds ‘least cost’ way to reduce emissions of a pollutant within a region (algorithm is similar to that in AirControlNET)
- Inventories from multiple sectors (point, area, agricultural) can be processed together in a single least cost run
- Least cost curve strategy performs a series of least cost runs each n percentage points (e.g., 5%, 10%, 15%, …) and summarizes the results of each run.

Cost Curve for Maximum Emissions Reductions Strategy

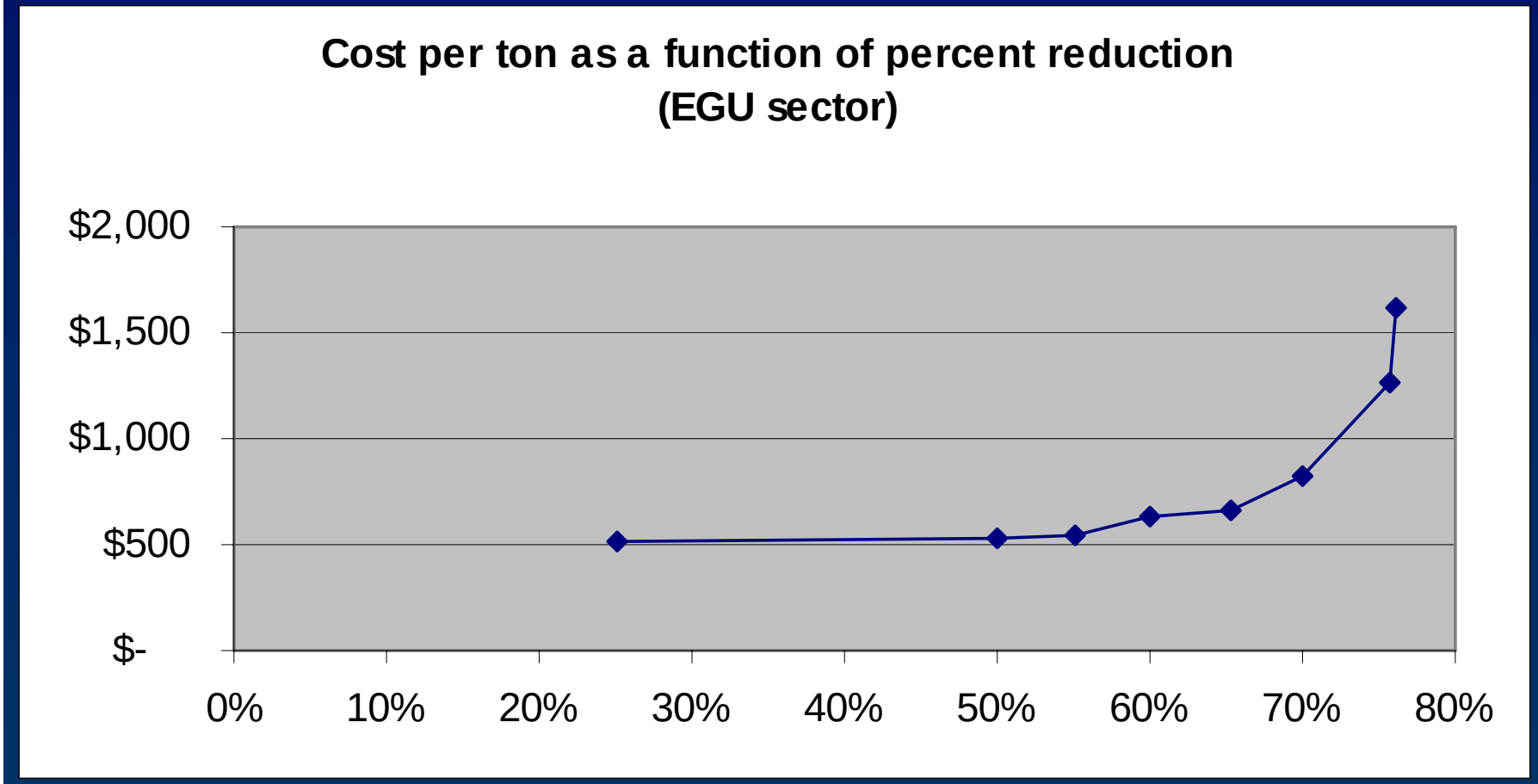
Figure 5.1: Marginal Cost Curve for Modeled Control Strategy Geographic Areas (NOX nonEGU Point and Area Source Controls Prior to Cut Points)





- Cost curve summary shows results for all runs

Cost/Ton for Least Cost Curve Strategy



Priorities for Remainder of FY08

- Annotate EI - associates available measures with inventories based on control efficiency in the inventory
- Control Programs - will allow users to apply projection and control factors to project emission inventories to future years

Wishes for the Future

- Examining ways to perform least cost optimization for multiple target pollutants (e.g., NOx + SOx + CO2)
- Facilitate uncertainty and sensitivity analyses in control strategies
- Accessibility for external partners

Contact Information

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Discussion

- Possible Questions:
  - Do you do these types of analyses?
  - If so, what tools and data sources do you use?
  - What functionality do analysts and policymakers need for multipollutant cost analyses?
  - Are there available sources of multipollutant control measure data (especially for GHG's)?