



Air Strategy Assessment Program

ASAP

**Presentation for CMAS Conference
September 29, 2005**

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Overview

- What is ASAP?
 - Purpose
 - Uses
- Current Version Details
- Example Application
- Future Directions

What is ASAP?

Air Strategy Assessment Program

- PC-based screening tool
- Supports specification, evaluation, and comparison air pollution control strategies:
 - AirControlNET
 - Control costs
 - Multi-pollutant emissions reductions
 - Response Surface Metamodel
 - Air quality impacts (O₃ and PM_{2.5})
 - BenMAP
 - Health benefits

Terminology

More specialized

The ASAP logo consists of the letters 'ASAP' in a bold, white, sans-serif font, centered on a dark green trapezoidal background that tapers towards the top.

ASAP: A decision support tool based on Phoenix tailored for specific problem and decision-maker needs.

The Phoenix logo features the word 'Phoenix' in a white, stylized, italicized font, set against a light blue trapezoidal background that tapers towards the top.

Phoenix: A framework for Integrated air quality assessment and policy analysis built on MIMS

The MIMS logo displays the letters 'MIMS' in a white, bold, sans-serif font, centered on a dark blue trapezoidal background that tapers towards the top.

MIMS: A generic framework for integrated modeling

What are the anticipated future uses?

- EPA Regulatory Impact Assessment
 - Estimating the costs and benefits of regulations
e.g., PM NAAQS Review
- Screening Tool for Control Strategy Assessment
 - Evaluating the relative efficacy of controls on different source categories
 - Identifying and comparing cost-effective control strategies
- Local and Regional Air Quality Planning
 - Evaluating the relative effectiveness of local versus national controls

Why use ASAP?

- Instantaneous “what if” analysis based upon state-of-the-art modeling
- Limited computing resources needed
 - ASAP runs on a typical desktop computer
- Quick turn-around time
 - Specifying and evaluating a control strategy takes only minutes
- User-friendly graphical user interface
 - Hides complexity of the component models
 - Handles model linkages and automates execution
 - Automatically generates summary tables and figures

What are the limitations of using ASAP?

- ASAP is a screening tool
 - ASAP results are intended to identify cost-effective control strategies
 - ASAP results may inform local and regional planning but needs to be verified with regulatory modeling tools
 - The ASAP modeling components have been configured by EPA to facilitate linkage and carry out specific common analyses

ASAP Functionality and Components

Basic Functionality

Specify Control Strategy



Evaluate Costs and Emissions Reductions



Estimate Air Quality Impacts

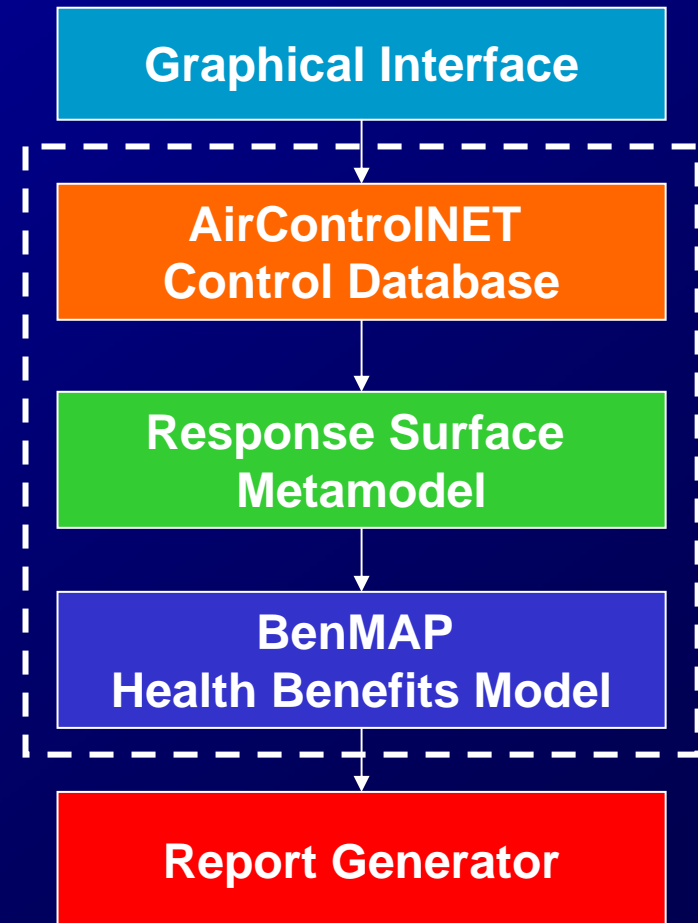


Calculate Health Benefits



Generate Reports

Components



ASAP Data Relationships

Incorporates 3 Sets of Relationships into a Single Tool



Incorporates the Metamodel Relationships between
Emission Reductions & Air Quality

Uses Other Previously Established Relationships

ASAP Status

- Current work
 - Complete demo version of ASAP for conducting O3 assessments for Eastern US and Chicago/Milwaukee nonattainment areas (available late 2005)
- Near-Future Work
 - Develop PM components of ASAP for national assessments as part of PM NAAQS Review proposal RIA (Dec 2005)
 - Develop multi-pollutant version for Final PM NAAQS Review RIA (Fall 2006)
- Future Work and Applications (2006 & beyond)
 - Provide template for others to develop targeted regional and/or local assessment capabilities
 - Incorporate optimization and uncertainty analysis capabilities

Current Project: Ozone Demonstration Version

- Focus: Development of cost-effective ozone control strategies
 - Nonattainment areas
(Chicago, Northeast Corridor)
- Demo tool consists of:
 - AirControlNET Version 4.0 Cost Data
 - CAMx-based O3 Response Surface Metamodel
 - Eastern US for 2015 w/ CAIR baseline
 - NOx and VOC reductions for specific sectors
 - Differentiates Northeast Corridor and Chicago
 - BenMAP Version 2.2 with new O3 health end-points

Example Analyses

Policy Exercise 1:

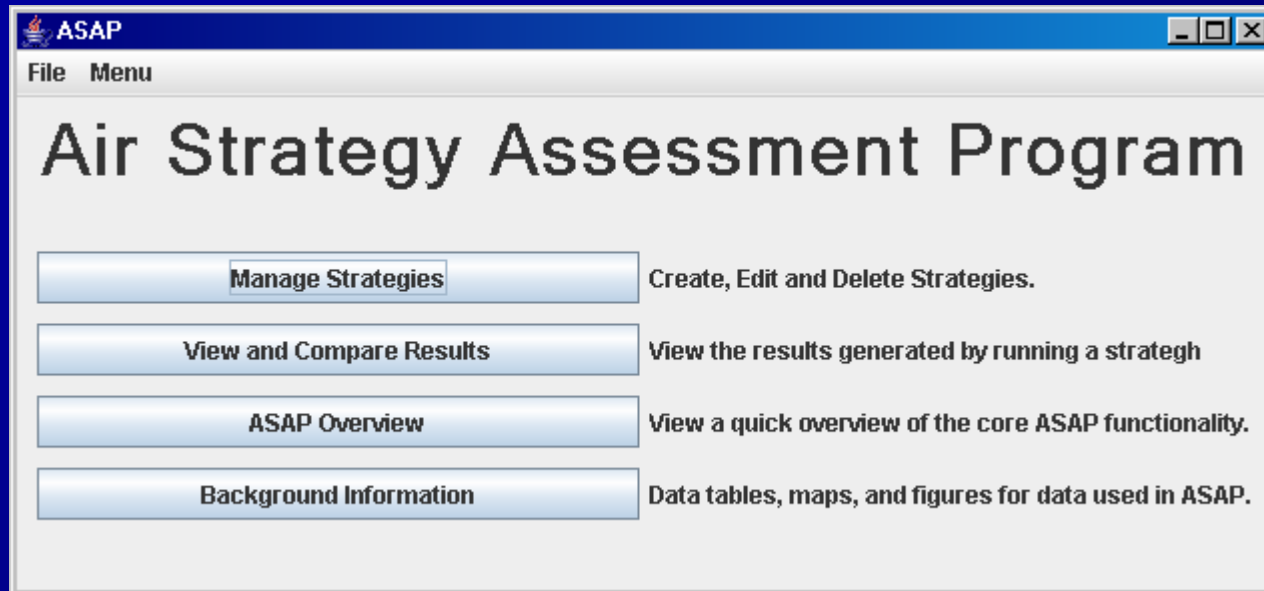
- What are the impacts (cost, air quality, health benefits) of a 10% reduction in on-road & non-road NO_x & VOC emissions?

Policy Exercise 2:

- How can we achieve a 10 ppb reduction in ozone for the Baltimore nonattainment area? What are the costs and benefits?

We will run through Policy Exercise 1

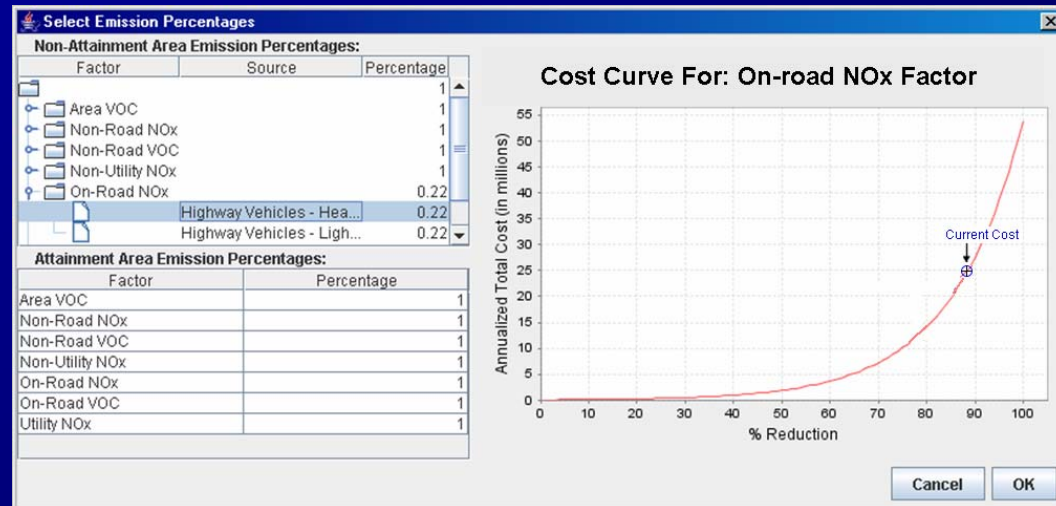
ASAP: Main Screen GUI



Example Application

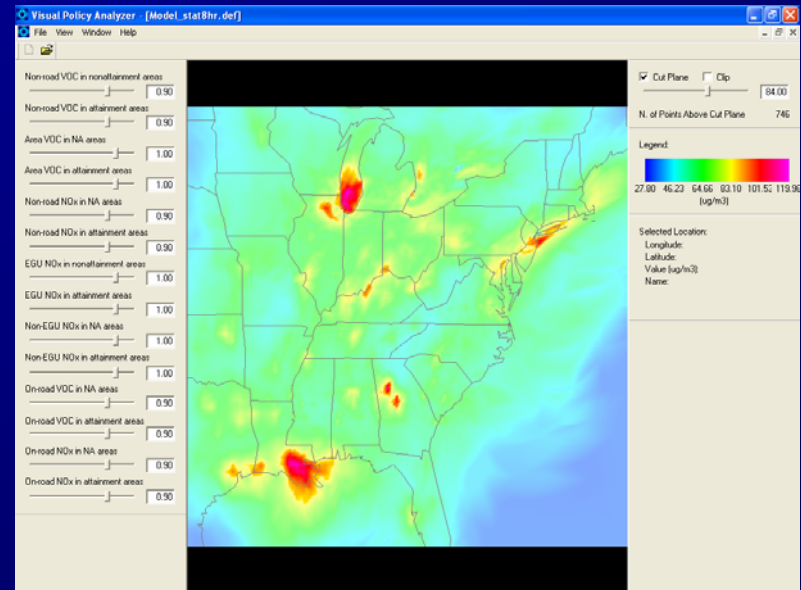
Cost Curves Analysis

- Cost analysis impacts of 10% reduction in onroad & nonroad NOx & VOC emissions
 - GUI screenshot of the Cost Curve of on-road NOx factor



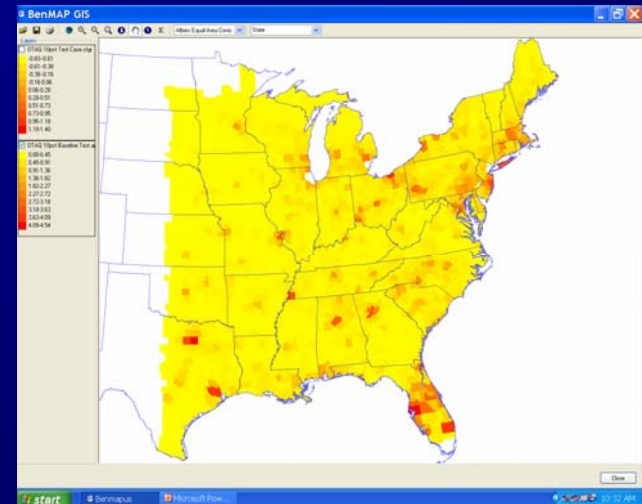
Example Application: Metamodel Analysis

- Metamodel analysis of impacts of 10% reduction in onroad & nonroad NO_x & VOC emissions
 - GUI screenshot of Response Surface Metamodel Visual Policy Analyzer



Example Application: Benefits Analysis

- BenMAP analysis of health benefits of 10 % mobile NO_x and VOC reduction nationwide
 - Plot shows change in O₃ mortality



Example Application: Results

- Emissions Reductions
 - NO_x = 1,400 tons per day
 - VOC = 940 tons per day
- Air Quality Changes
 - 0.1 to 3.1 percent reduction in 8hr O₃ in Eastern US nonattainment counties
 - Average reduction of 1.3 ppb
- Costs
 - Chicago: \$709 million total cost
 - Northeast: \$2.136 billion total cost
 - Note: these costs are a high estimate of mobile costs.
- Benefits
 - Premature mortality (benefit = \$3.3 billion)
 - Total avoided incidences of premature death = 600
 - School absences (benefit = \$70 million)
 - Total reduction in absences = 931,000
 - Minor restricted activity days (benefit = \$27 million)
 - Total avoided MRAD = 540,000

Summary

- ASAP as an integrated framework allows us to leverage best science for timely screening across multiple policy alternatives.
- By linking these data, tools, and models ASAP facilitates multi-pollutant assessments & identifies truly cost-effective and beneficial control strategies to address complex air quality problems.

AirControlNET: Summary

- A relational database tool for conducting control strategy and costing analysis
 - Combines detailed control measure database on EPA emissions inventories to compute source- and pollutant-specific emission reductions and associated costs
 - Provides costs and emissions reductions for user-selected control strategies
 - Pollutants include: NO_x, SO₂, VOC, PM₁₀, PM_{2.5}, NH₃, CO, Hg
- Used to support OAR economic analyses since the late 1990's (e.g., ERCAM-NO_x and ERCAM-VOC in '97 PM/O₃ NAAQS)
- Re-design underway to allow for additional functionality including:
 - Complete integration into ASAP
 - Improvement of mobile and nonroad module
 - Addition of innovative and emerging technology programs

O3 Response Surface Metamodel: Summary

- A new tool that allows for real-time prediction of air quality changes from emissions changes rather than using a more computationally expensive atmospheric chemistry model.
- A statistical “reduced-form” model of a complex air quality model, e.g., CAMx for this pilot study.
- This new tool was developed for ozone in the Eastern US in collaboration with OTAQ for use in the ASAP demo and technical analysis for upcoming OTAQ rules.
- Ongoing work to develop PM and multi-pollutant version based on CMAQ for future use.

BenMAP: Summary

- EPA/OAR next generation environmental benefits analysis program
- GIS based system for
 - creating population level exposure surfaces
 - estimating changes in incidence of a wide variety of health outcomes associated with changes in ambient air pollution
 - valuing changes in incidence of health outcomes
- Used to support EPA/OAR benefits assessments of major rules since 2002