

Overview and Key Updates for The Second Prospective Section 812 Benefit-Cost Analysis of the Clean Air Act

Council Review Meeting
15 March 2007

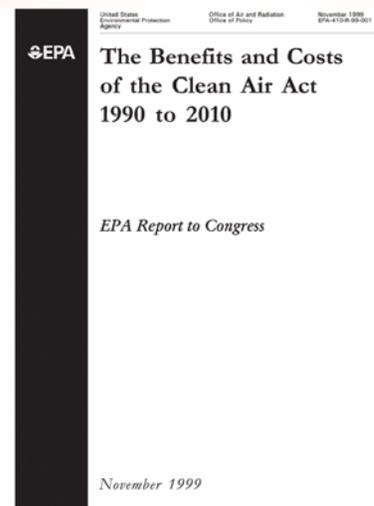


Jim DeMocker
Office of Air and Radiation

Presentation

- ⇒ The 2nd Prospective
 - ↳ Refresher / Introduction
 - ↳ Progress to Date
 - ↳ The Road Ahead

- ⇒ Updates by Component
 - ↳ Status
 - ↳ Key Issues
 - ↳ Team Presentations

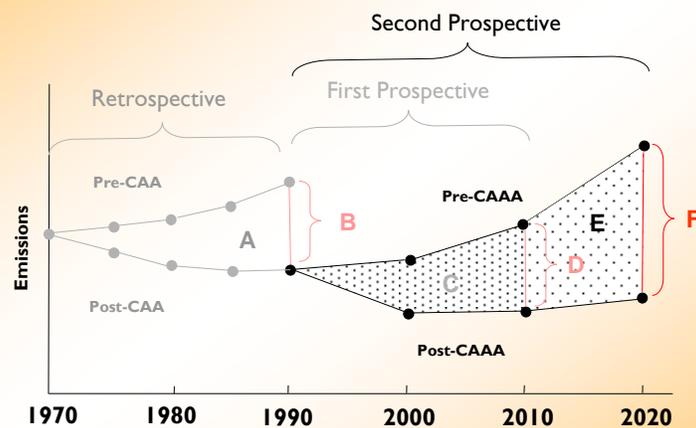


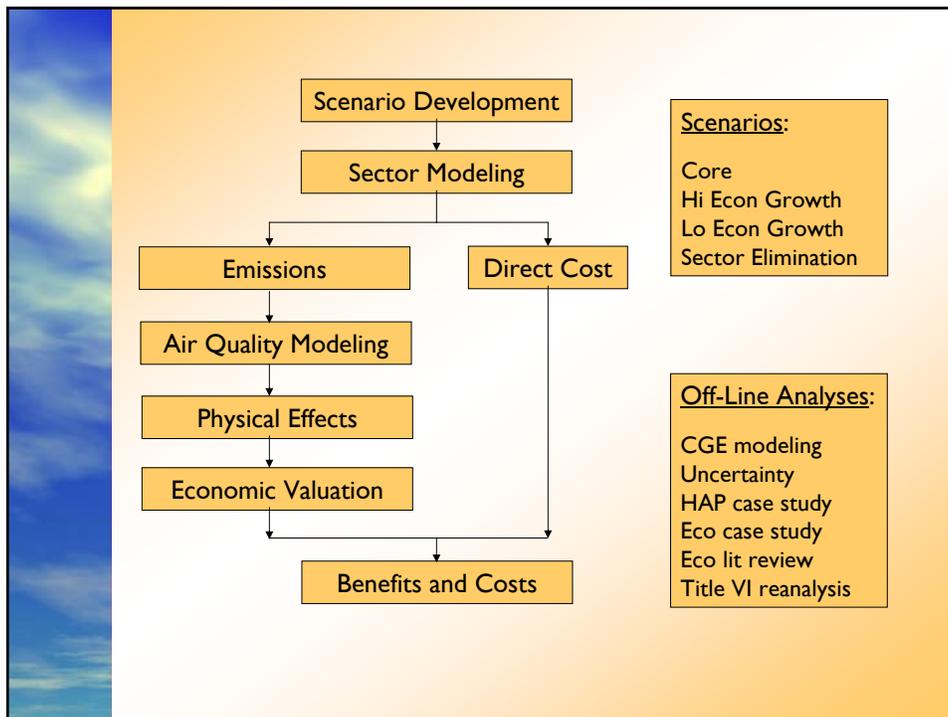
1990 Clean Air Act, Section 812

- ⇒ EPA "... shall conduct a comprehensive analysis of the impact of this Act on the public health, economy, and environment of the United States."
- ⇒ Retrospective + biennial Prospectives
- ⇒ Review by outside experts
 - ↳ Advisory Council on Clean Air Compliance Analysis



812 Scenarios -- Schematic





- ## Progress to Date
- ⇒ **Timing is Everything**
 - ↪ New NAAQS and attainment-related programs
 - CAIR, CAMR, CAVR, CAND
 - ↪ Air Quality Model Improvements
 - ⇒ **Working Ahead and Refining Methods**
 - ↪ Learning effects
 - ↪ Uncertainty plan refinements
 - ↪ Ecological literature review and case study plan
 - ↪ Prototype learning laboratory on CGE
 - ↪ HAP case study
 - ↪ AirControlNET and emissions inventory improvements
 - ↪ Dynamic population model → cessation lag sensitivity analysis
 - ⇒ **Major Data and Methods Progress by OAQPS**
 - ↪ Updated NEI, enhanced BenMAP, RSMs for PM and ozone
 - ⇒ **Sector Modeling Complete: Direct Cost and Emissions**

The Road Ahead

- ⇒ Final Direct Cost Report
- ⇒ Final Emissions Report

- ⇒ Air Quality Modeling
- ⇒ Benefits Analysis
 - ↻ Health Effects
 - ↻ Welfare Effects
 - ↻ Valuation

- ⇒ Uncertainty Analysis
- ⇒ CGE Analysis
- ⇒ Ecological Case Study: Adirondacks
- ⇒ HAP Case Study
- ⇒ Title VI Reanalysis

- ⇒ Consolidated 812 Report



Direct Cost

- ⇒ Principal Focus for Current Review
 - ↻ Charge questions
- ⇒ Presentation by Jason Price of IEc & Jim Wilson of Pechan
 - ↻ Description of key methodologies and draft results
- ⇒ A Work In Progress
 - ↻ Nonroad used RIA engine sales, not 812 emissions analysis (consistency)
 - ↻ Affirm same price deflator series used throughout (consistency)
 - ↻ Discount rate retrofit for some MACT rules – used 10% too long
 - ↻ Fixing Exhibit 7-2 on marginal cost / average cost by NAA
- ⇒ Final Direct Cost Report Spring / Summer 2007

Emissions

- ⇒ Principal Focus of August 7 2006 AQMS Review
- ⇒ Refinements Made and Gaps Filled
- ⇒ Presentation by Jim Neumann of IEC & Jim Wilson of Pechan
 - ↳ First look at new, expanded results
 - ↳ Description of key data sources and methods
- ⇒ (Still) A Work In Progress
 - ↳ Updating certain 8-hour ozone NAAQS targets, esp NO_x
 - Especially Chicago
 - ↳ Additional refinements to be described by Jim Neumann
- ⇒ Final Emissions Report Spring 2007

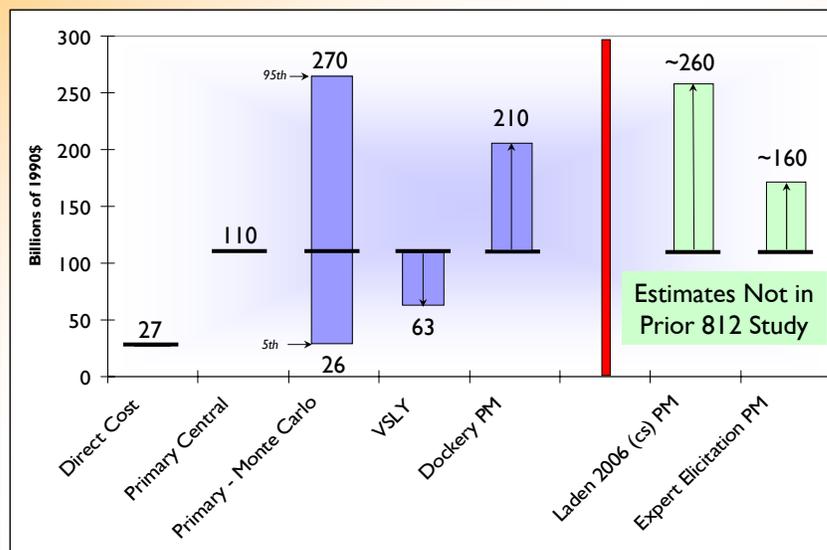
Air Quality Modeling

- ⇒ AQMS Review August 7 2006
- ⇒ Costliest Study Component: CMAQ ~20k and RSM ~4k per
- ⇒ FY07 Budget Recently Clarified
- ⇒ Tentative Final Decisions on AQM by Scenario
 - ↳ Core Scenarios
 - 7 CMAQ runs → 1990 base plus 2000, 2010, 2020
 - 7 RSM runs to facilitate comparisons
 - ↳ High and Low Economic Growth
 - 2 CMAQ runs → 2020 only
 - 2 RSM runs
 - ↳ Sector Elimination
 - 15 RSM runs → 2000, 2010, 2020 each for 5 sectors

Health Effects I

- ⇒ Several Major Health Effect Estimation Issues Looming
- ⇒ Thresholds in PM Mortality and Morbidity Functions
 - ↳ Inconsistency in prevailing advice
 - ↳ Council HES + NAS + Elicited Experts → no threshold
 - ↳ EPA interpretation of CASAC letter → 10 micrograms
- ⇒ Use of Expert Elicitation (EE) Results for PM Mortality
 - ↳ Whether and how to aggregate disparate expert views
 - ↳ Weight given EE method vs empirically-based function(s)
- ⇒ Use of Laden (2006) Reanalysis of Six Cities Study

Specific Issue: Uncertainty Analysis First Prospective 2010 Costs & Benefits



Health Effects II

⇒ Ozone Mortality

- ↪ Per HES advice, EPA sponsored 3 meta-analyses of ozone mortality literature → published in Epidemiology in 2005
- ↪ HES asked for follow-up information and opportunity to review
- ↪ CASAC view → ozone mortality is a legitimate endpoint
- ↪ Led to discussions with OMB on analytical treatment, outside review
- ↪ NAS panel to review use of ozone mortality in benefits analyses
 - Forming now with 18 month timeframe (after 812 finished)
- ↪ Interim approach in flux, but current policy is—
 - Refer to zero effect as a possible “alternative estimate” or part of range
 - Use means from 3 meta-analyses plus NMMAPS, perhaps for Primary
- ↪ June 2007 Ozone NAAQS proposal RIA will use interim approach
- ↪ 812 analysis will confront issue soon after ozone NAAQS RIA
- ↪ Anticipate need for HES review of interim approach used for 812

NAS Ozone Mortality

John C. Bailar III, Chair

- ⇒ Richard T. Burnett
- ⇒ Lauraine G. Chestnut
- ⇒ W. Michael Foster
- ⇒ A. Myrick Freeman III
- ⇒ Montserrat Fuentes
- ⇒ Daniel S. Greenbaum
- ⇒ Alan J. Krupnick
- ⇒ Nino Kuenzli
- ⇒ Kent E. Pinkerton
- ⇒ Armistead G. Russell
- ⇒ Helen Suh
- ⇒ Evelyn O. Talbott
- ⇒ Bailus Walker, Jr.

- Evaluate EPA approaches for—
 - ozone mortality risk estimates
 - benefit calculations
- Assess specific methods for—
 - short-term exposure risk
 - life expectancy changes
 - life expectancy valuation
 - uncertainties
 - policy implications
- Report ~ 18 months

<http://www8.nationalacademies.org/cp/projectview.aspx?key=48768>

Health Effects III

- ⇒ Use of New Kaufman Study (NEJM, 2007)
 - ↪ Heart disease & stroke risk in postmenopausal women
 - ↪ Potential relevance for men and other age groups
- ⇒ Use of New Woodruff et al (2006) Infant Mortality Study
 - ↪ Includes cause specific estimates of risk; e.g. resp. failure
- ⇒ Studies to Use for Nonfatal Heart Attacks
 - ↪ Zanobetti and Schwartz (2005) adds to the literature
 - ↪ ...but uses PM10 and focused on adults over 65
- ⇒ Changes in Baseline Mortality Incidence Rates
 - ↪ New database consistent with census population projections

Valuation I

- ⇒ Key Issue = Valuation of Premature Mortality
 - ↪ EPA Guidelines → \$6.1M (1999\$) ...from 812
 - ↪ Prevailing Council advice → Viscusi-Aldy (\$7.6M in 2000\$)
... but consider new
 - ↪ Current OAR practice → \$1M to \$10M range, central estimate at \$5.5M (2000\$; 1990 income levels)
 - ↪ EEAC completing its review
 - ↪ Kochi et al now published → \$5.4M (2000\$; 1990 income levels)

Valuation II

- ⇒ Nonfatal Heart Attack Valuation
 - ↪ OAQPS is updating COI estimates
 - using California Health and Work Survey
 - building lost wages and productivity model using 2-stage choice model
- ⇒ Hospitalization Costs
 - ↪ OAQPS updating medical cost data using analysis of MEPS
 - ↪ Also apply above to nonfatal heart attack valuation
- ⇒ Asthma Valuation
 - ↪ Now using WTP based estimate from Rowe and Chestnut (1986)
 - ↪ OAQPS developing new probabilistic model of asthma symptoms
- ⇒ Update Methodology for Valuing School Absences?
 - ↪ Current approach assumes only mothers stay home with children
 - ↪ Leads to lower value due to lower average wages for women
- ⇒ Neal Fann Demonstration of BenMAP

Uncertainty Analysis

- ⇒ A Central Concern of the Project Team
 - ↪ Working to respond to NAS and Council recommendations
- ⇒ Second Principal Focus for Current Review
 - ↪ Charge question defined
- ⇒ Presentation by Henry Roman of IEC
 - ↪ Overall uncertainty plan update
- ⇒ Initiating Uncertainty Work Soon... Barring Showstoppers
- ⇒ OAQPS Working with SAB on New Uncertainty Panel

Off-Line Analyses

⇒ CGE

- ⇒ Decided on post-processor role
- ⇒ New candidate model: EMPAX
- ⇒ Presentation by Art Rios, OAQPS

⇒ Ecological Assessment

- ⇒ Expanded literature review completed
- ⇒ Adirondack case study plan ready to initiate

⇒ HAP Case Study

- ⇒ Significant progress
- ⇒ Presentation by Henry Roman of IEc

⇒ Title VI Reanalysis

- ⇒ Upcoming

<http://www.epa.gov/oar/sect812/>



Jim DeMocker
Office of Air and Radiation

Supplemental Slides

Council Letter – Second Prospective Blueprint

⇒ Key Recommendations:

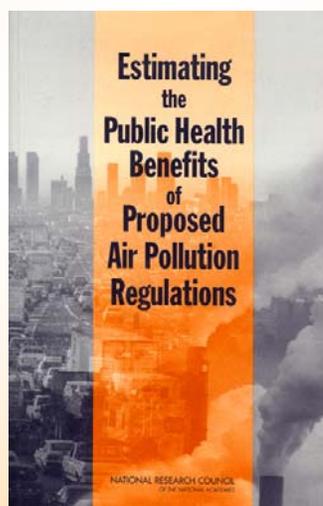
- ↳ Learning Laboratories
- ↳ Expand Uncertainty Analysis, per NAS (2002)
- ↳ Disaggregation by Major Emitting Sector
- ↳ Central Discount Rate, plus Range
- ↳ Consistent Assumptions
- ↳ CGE Modeling for Spillovers
- ↳ Revise Mortality Risk Valuation Estimates
- ↳ Consider QALYs, but outside BCA
- ↳ Ecological Effects Assessment
- ↳ Air Toxics Benefits Assessment

Council on Learning Labs

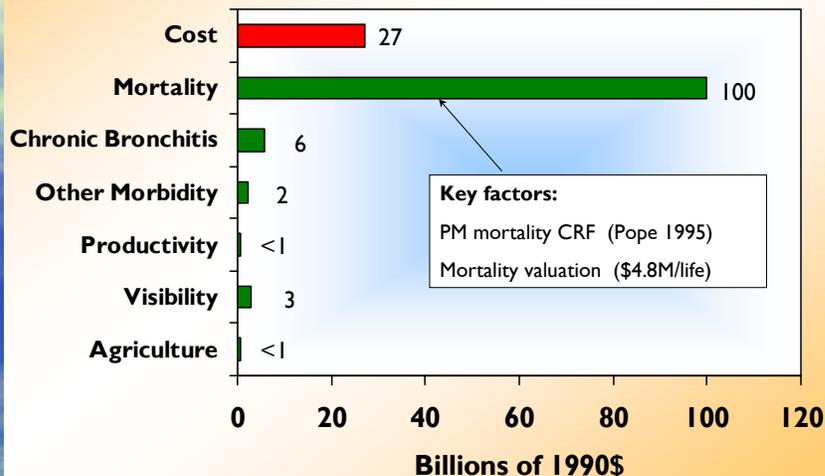
- ⇒ “...management of changes and improvements in methods should be institutionalized by an ongoing process of formal evaluation of proposed enhancements.”
- ⇒ “... develop a public and expert process to carefully review new data and methods for the 812 studies...”
- ⇒ “...distinguish three separate classes of Agency activities...”
 - ↳ **Formal Review and Discussion** ... engage research community with workshops and working papers to develop candidates for new methods
 - ↳ **Satellite or Experimental Evaluations** ... new methods are tested, documented, and published as exploratory work for review and criticism
 - ↳ **Policy Evaluations** ... use only vetted methods for primary analyses
- ⇒ “...changes in methodology require full disclosure and discussion of the implications of new methods...”

NAS Recommendations

- ⇒ 34 recommendations:
 - ↳ Scenario definition
 - ↳ Exposure estimation
 - ↳ Health effects estimation
 - ↳ Uncertainty analysis
- ⇒ Mostly, expand uncertainty analysis
 - ↳ Multi-factor sensitivity analysis
 - ↳ Cost uncertainty
 - ↳ Emissions uncertainty
 - ↳ Alt threshold models
 - ↳ Alt cessation lag models
 - ↳ Mortality CRF sensitivity analysis
 - ↳ More probabilistic treatments
 - ↳ Move probabilistic to primary
 - ↳ Expert opinion where data limited



2010 Monetized Benefits – First Prospective Titles I through V Only



- ⇒ A. John Bailer
- ⇒ John M. Balbus
- ⇒ Joshua T. Cohen
- ⇒ Roger M. Cooke
- ⇒ Adam M. Finkel
- ⇒ Gary Ginsberg
- ⇒ Bruce K. Hope
- ⇒ Jonathan I. Levy
- ⇒ Thomas E. McKone
- ⇒ Gregory M. Paoli
- ⇒ Dorothy E. Patton
- ⇒ Charles Poole
- ⇒ Joseph V. Rodricks
- ⇒ Terry F. Yosie
- ⇒ Lauren Zeise
- ⇒ Bailus Walker, Jr.

NAS Risk Analysis Panel

Thomas A. Burke, Chair

- Suggested improvements over—
 - next 2-5 years
 - next 10-20 years
- Increased probabilistic analysis
- Alternatives to default assumptions
- Quantification of uncertainty
- Sensitive populations, inc life stages
- Value of information approach for priorities, research planning
- Report ~ August 2008

<http://www8.nationalacademies.org/cp/projectview.aspx?key=48693>