



Demystifying Regulatory Impact Analyses

Association of Air Pollution Control Agencies
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Overview

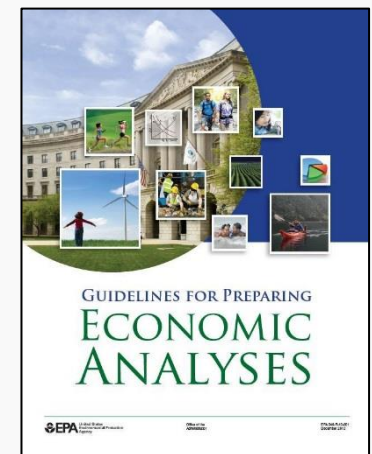


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- Role of Benefit-Cost Analyses in EPA's Air Pollution Regulation
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Why Estimate Benefits and Costs?



- Executive Orders 12866 and 13563 direct EPA to quantify the benefits and costs of economically significant regulations
 - Benefits and costs assessed in Regulatory Impact Analyses (RIAs)
 - To the extent permitted by law, benefits information can inform the regulatory decision and help “justify” the costs
 - Unquantified benefits are important considerations
 - Assessment should be as comprehensive and transparent to the public as feasible
- Guidance for developing EPA’s benefit-cost analyses
 - OMB’s *Circular A-4* (2003)
https://www.whitehouse.gov/omb/circulars_a004_a-4/
 - EPA’s *Guidelines for Preparing Economic Analyses* (2010)
[https://yosemite.epa.gov/ee/epa/erm.nsf/vwAN/EE-0568-50.pdf/\\$file/EE-0568-50.pdf](https://yosemite.epa.gov/ee/epa/erm.nsf/vwAN/EE-0568-50.pdf/$file/EE-0568-50.pdf)
- Benefit-Cost Analysis addresses economic efficiency

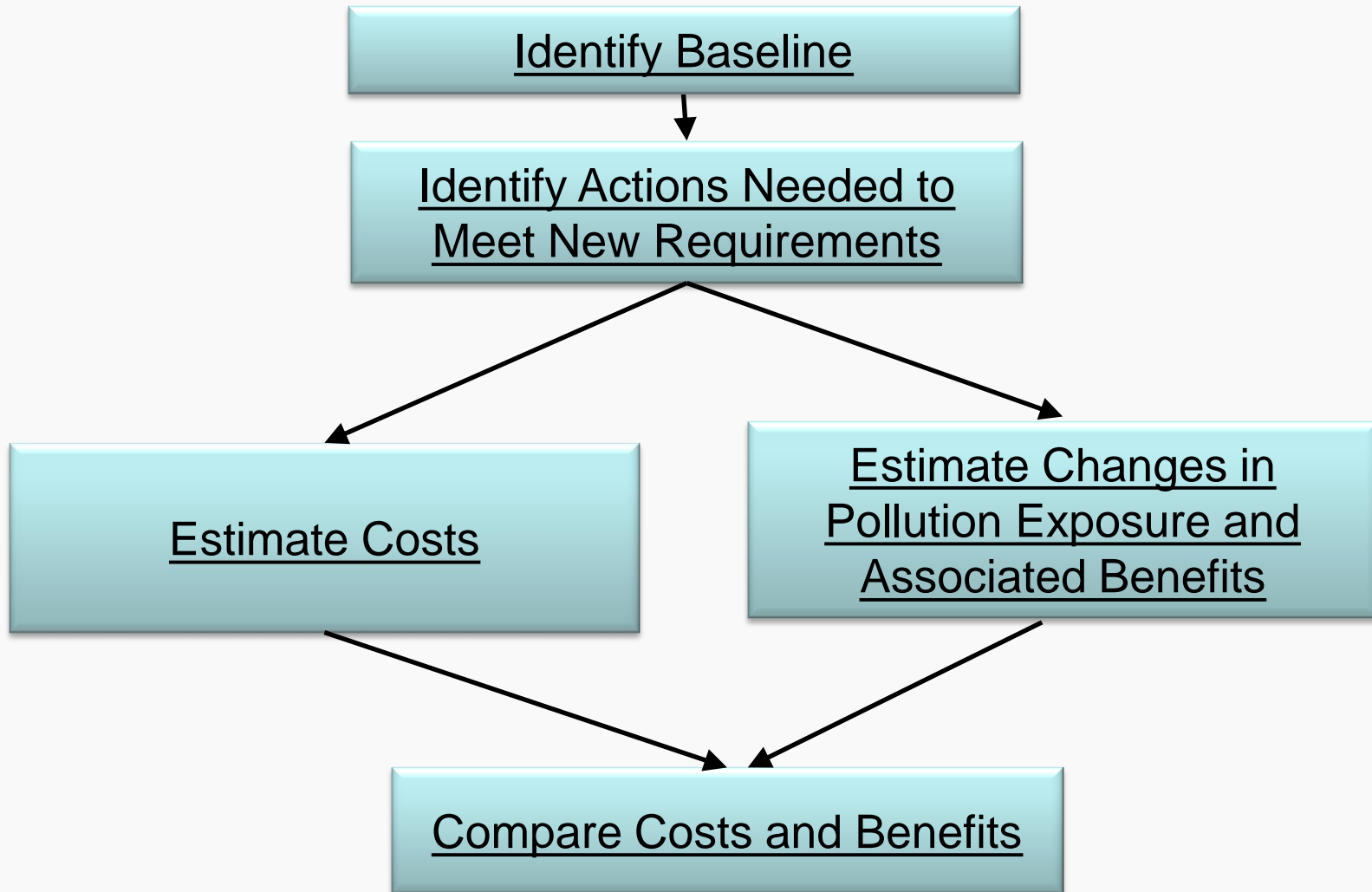


Role of Benefit-Cost Analyses in EPA's Air Pollution Regulations



- Clean Air Act does not allow consideration of economic information for some decisions, including:
 - Setting the level for primary National Ambient Air Quality Standards (NAAQS) (health-based)
 - Setting a “MACT floor” for National Emission Standards for Hazardous Air Pollutants (NESHAP) (technology-based)
- Clean Air Act allows consideration of economic information for some decisions, including:
 - New Source Performance Standards (NSPS)
 - Standards of Performance for Existing Sources (Emission Guidelines)
 - Regulating “beyond the MACT floor” for NESHAP
 - Secondary NAAQS (protects public welfare)
- Even for actions where economic information is not considered in the standard setting, economic analysis provides information to the public on the benefits and cost to society of the action, as well as, impacts to particular groups of interest (e.g., environmental justice communities)

Steps in Conducting a Cost-Benefit Analysis for an Air Pollution Regulation



Identifying a Baseline and Actions Needed to Meet New Requirements



- **Baseline**
 - In order to identify the costs and benefits associated with a specific regulation, it is necessary to first develop a picture of the world in absence of that regulation.
 - The baseline should include all finalized (“on the books”) state and federal rules.
 - Costs and benefits are only counted for emission reductions that occur as a result of the regulation being analyzed.
- **Actions Needed to Meet New Requirements**
 - Identify alternative regulatory alternatives and emission control options.
 - Consider statutory requirements, policy priorities, institutional feasibility, enforceability, ethics (e.g., environmental justice), sustainability, and economic efficiency (if allowed by statute).

Cost Analysis



- Engineering Costs
 - Measures the direct costs to the regulated firms, including pollution control equipment, record keeping and reporting requirements and labor for equipment installation, operation and maintenance, and monitoring.
 - Cost effectiveness – annual costs of regulation divided by emission reductions
- EPA, OAQPS, Air Economics Group provides cost guidance through the EPA Air Pollution Control Cost Manual.
 - The Control Cost Manual covers the design of and costs to build and operate many types of add-on controls (e.g., incinerators, baghouses, Selective Catalytic Reduction).
 - The Control Cost Manual is commonly relied upon by OAQPS, other offices in EPA, and among State regulators and industry for answering control cost questions. Available at https://www3.epa.gov/ttn/ecas/cost_manual.html

CoST – COnTrol Strategy Tool



- CoST is a software tool for control strategy and cost analysis and was developed primarily for use in RIAs for National Ambient Air Quality Standards (NAAQS).
- Supports preparation and analysis of future year emissions control strategies for point (primarily non-EGU – industrial), area, and mobile sources.
- CoST provides estimates of the emissions reductions and costs associated with:
 - the target pollutant (e.g., NO_x or VOC for ozone NAAQS analyses)
 - co-impacts of the selected measures on other criteria pollutants
- Control measures and documentation are publicly available and are available at <http://www.epa.gov/ttn/ecas/cost.htm>.

Economic Impact and Employment Analysis



- Economic impact analysis addresses the impacts on the regulated (directly affected) industry and markets, and on indirectly affected industries and markets, resulting from increased production costs caused by a regulation.
- This analysis also typically includes:
 - Estimation of Social Costs
 - Changes in social welfare that may result from regulation or policy
 - Changes in price and quantity of affected products (for regulated sector as well as sectors that use products from the regulated sector)
 - Impacts on international trade, small businesses and municipalities, other government entities, environment justice communities, and energy effects
- Economic impact analysis will typically also include an employment analysis.
 - This analysis can be qualitative or quantitative depending upon the information available.
- EPA uses a variety of methods, models and tools to estimate economic impacts. Those methods, models and tools are discussed in EPA reports or are available at: www.epa.gov/ttn/ecas

Small Business, Unfunded Mandates, Environmental Justice and Statement of Energy Effects



- Regulatory Flexibility Act (RFA)/Small Business Regulatory Enforcement Fairness Act (SBREFA) – Requires initial screening analysis using:
 - Annual cost-to-sales ratios (annual cost of regulation divided by annual sales revenue for small entities affected by the policy)
 - Initial screening analysis can provide some indication of potential economic impacts to affected firms; not a substitute for a full Economic Impact Analysis (EIA).
 - Applied often for small entity impact analysis; if impacts of a proposed rule are significant and substantial enough; then EPA must convene a SBREFA Panel.
 - Analysis follows EPA’s SBREFA guidelines for approach and interpretation of results.
- Unfunded Mandates Reform Act (UMRA) – applicable for actions that result in expenditures to state, local or tribal governments or the private sector of \$100 million or more annually.
- EO 12898 – Federal Actions to Address Environmental Justice in Minority and Low-Income Populations (1994): Identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of programs on minority, low income, and Tribal and Indigenous populations.
- Statement of Energy Effects (EO 13211) – estimate impacts on energy prices, output, transmission, and distribution.

Overview of Benefits



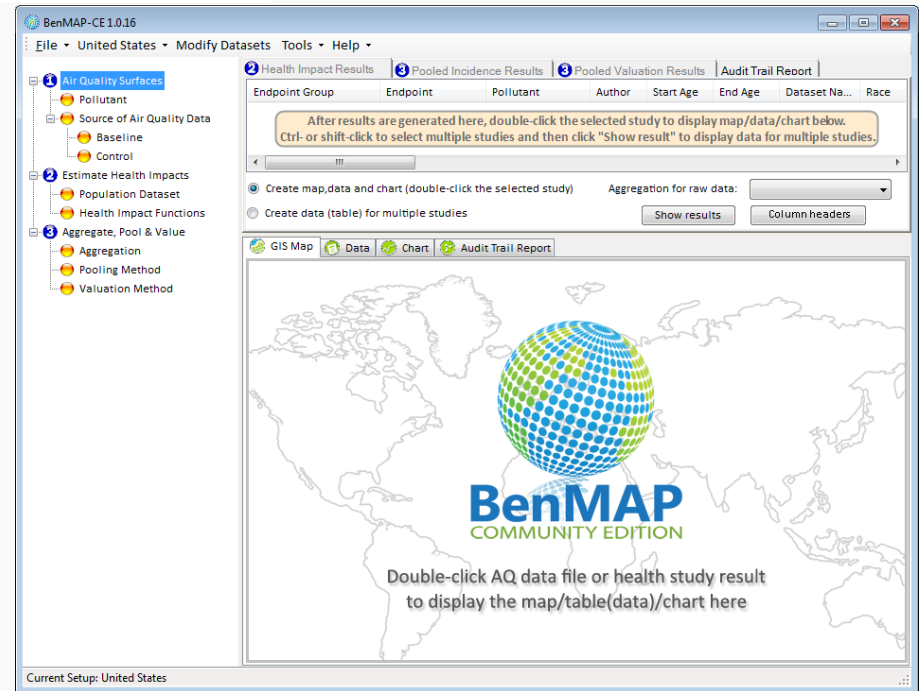
- Goal: Describe and monetize all the positive consequences of an action.
 - To inform the public about the incremental impacts of the action
 - To compare to the costs (in dollars)
 - To justify the costs (to extent permitted by law)
- Total benefits > total monetized benefits
 - Many important benefits remain unquantified.
 - EPA has not yet developed systematic approaches to monetizing benefits for many pollutants.
- Total benefits = Direct benefits + co-benefits + unquantified benefits – disbenefits.



BenMAP

COMMUNITY EDITION

- The “environmental Benefits Mapping and Analysis Program--Community Edition”
- The principal tool EPA uses to quantify the benefits criteria air quality improvements
- An open-source PC-based and graphic user interface-driven software program
- Program estimates the incidence and economic value of adverse health outcomes
- Training available
 - Short tutorial on BenMAP website
- Receive email updates:
<http://www.epa.gov/airquality/benmap/regis.html>



Download program at
<https://www.epa.gov/air/benmap>

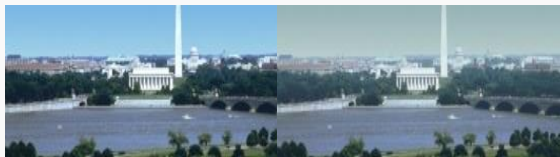
Typical Categories of Benefits for Air Rules



Health Benefits – based on epidemiology studies showing relationship between pollution exposure and health effects (generally quantified using BenMAP-CE)



Climate Benefits – based on damages estimated by climate models per ton of CO₂ (quantified using “social cost of carbon” (SCC))



Visibility Benefits – based on value of reducing light extinction from air pollution



Ecosystem Benefits – based on changes in recreation or economic value of ecosystem products

Climate Benefits



- Social cost of carbon (SCC) estimates are monetary values of impacts associated with marginal changes in CO₂ emissions in a given year.
- These estimates are used to value the avoided damages, or benefits, of rulemakings that achieve reductions in CO₂ emissions. The values increase over time.
- The SCC was developed by an interagency working group with estimates most recently updated in May 2013 using three global integrated assessment climate models.
- The SCC methodology has been recently expanded to estimate the benefits of rulemakings that achieve reductions in methane emissions (oil and gas and municipal solid waste landfills regulations).

Example: MSW Landfills EG and NSPS Proposal - Emission Guidelines



Table ES-1 Summary of the Monetized Benefits, Costs, and Net Benefits for the Proposed Emission Guidelines for Existing MSW Landfills in 2025 (2012\$)

	3% Discount Rate	7% Discount Rate
Total Monetized Benefits ¹	\$670 million	
Total Costs ²	\$35 million	\$47 million
Net Benefits	\$640 million	\$620 million
Non-monetized Benefits ³	Health effects of PM _{2.5} and ozone exposure from 2,770 Mg NMOC/yr reduced Health effects of HAP exposure from 2,770 Mg NMOC/yr reduced Visibility impairment Vegetation effects	

¹ Monetized benefits include the climate-related benefits associated with the reduction of 436,100 Mg/yr methane (\$660 million, valued using the social cost of methane) and the net reduction of 238,000 Mg/yr of CO₂ (\$12 million, valued using the social cost of carbon). The social cost of methane and social cost of carbon estimates are calculated with four different values of a one ton reduction (model average at 2.5 percent discount rate, 3 percent, and 5 percent; 95th percentile at 3 percent). For the purposes of this table, we show the benefits associated with the model average at 3% discount rate; however we emphasize the importance and value of considering the full range of values, which is \$310 million - \$1.8 billion for the proposed option. We provide climate benefit estimates based on additional discount rates in Section 4.2.

² The engineering compliance costs are annualized and include estimated revenue from electricity sales for landfills that are expected to generate revenue by using landfill gas for energy.

³ While we expect that these avoided emissions will result in improvements in air quality and reductions in health effects associated with HAP, ozone, and particulate matter (PM), we have determined that quantification of those benefits cannot be accomplished for this rule in a defensible way. This is not to imply that these benefits do not exist; rather, it is a reflection of the difficulties in modeling the direct and indirect impacts of the reductions in emissions for this industrial sector with the data currently available.

Example: MSW Landfills EG and NSPS Proposal - Supplemental NSPS



Table ES-2 Summary of the Monetized Benefits, Costs, and Net Benefits for the Supplemental Proposed New Source Performance Standards for MSW Landfills in 2025 (2012\$)

	3% Discount Rate	7% Discount Rate
Monetized Methane-related Benefits ¹		\$78 million
Monetized CO ₂ disbenefits ¹		\$0.03 million
Total Costs ²	\$7.1 million	\$8.5 million
Net Benefits	\$71 million	\$70 million
Non-monetized Benefits ³	Health effects of PM _{2.5} and ozone exposure from 300 Mg NMOC/yr reduced	
	Health effects of HAP exposure from 300 Mg NMOC/yr reduced	
	Visibility impairment	
	Vegetation effects	

¹ Monetized benefits include the climate-related benefits associated with the reduction of 51,400 Mg/yr methane, valued using the social cost of methane, and the net increase of 670 Mg/yr of CO₂, valued using the social cost of carbon. The social cost of methane and social cost of carbon estimates are calculated with four different values of a one ton reduction (model average at 2.5 percent discount rate, 3 percent, and 5 percent; 95th percentile at 3 percent). For the purposes of this table, we show the benefits associated with the model average at 3% discount rate; however we emphasize the importance and value of considering the full range of values, which is \$36 million - \$210 million for the proposed option. We provide climate benefit estimates based on additional discount rates in Section 4.2.

² The engineering compliance costs are annualized and include estimated revenue from electricity sales for landfills that are expected to generate revenue by using landfill gas for energy.

³ While we expect that these avoided emissions will result in improvements in air quality and reductions in health effects associated with HAP, ozone, and particulate matter (PM), we have determined that quantification of those benefits cannot be accomplished for this rule in a defensible way. This is not to imply that these benefits do not exist; rather, it is a reflection of the difficulties in modeling the direct and indirect impacts of the reductions in emissions for this industrial sector with the data currently available.

Conclusions



- Cost, benefit, economic impact, employment, and additional economic analyses can provide valuable information to regulatory decision-makers and the public and are necessary under a variety of statutory and executive order requirements.

For more information:

- EPA Guidelines for Preparing Economic Analysis
 - Available at:
<http://yosemite.epa.gov/ee/epa/eed.nsf/pages/guidelines.html>
- ECAS website on TTN <http://www.epa.gov/ttnecas1/>
 - RIA/EIA Reports
 - OAQPS Economics Resource Manual
 - EPA Air Pollution Control Cost Manual
 - Control Strategy Tool (CoST)
- BenMAP website <https://www.epa.gov/air/benmap>

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Appendix



- The Regulatory Flexibility Act of 1980, as amended by the Small Business Regulatory Enforcement Fairness Act of 1996 (RFA/SBREFA)
 - For rules with a significant economic impact on a substantial number of small entities, must consider flexible regulatory options that minimize adverse economic impacts on small entities.
- The Unfunded Mandates Reform Act (UMRA) of 1995
 - For rules with Federal Mandates, EPA must consult with state, local and tribal governments and select the least costly, most cost-effective, or least burdensome alternative, or explain why another was chosen.
- The Paperwork Reduction Act of 1995
 - Includes requirements for Information Collection Requests
- Regulatory Right-to-Know Act of 2001
 - Benefits and costs of Federal rules (a) in the aggregate, (b) by Agency program and (c) by major rule

Appendix



- **Executive Order (EO) 12866** – Regulatory and Planning Review (1993), as amended by **EO 13563** – Improving Regulation and Regulatory Review (2011). For regulatory actions >100 million annually, assess all cost and benefits of regulatory alternatives including quantifiable and qualitative measures and choose alternative that maximizes net benefits, considering distributional and equity effects.
- **EO 12898** – Federal Actions to Address Environmental Justice in Minority and Low-Income Populations (1994): Identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of programs on minority, low income and Tribal and Indigenous populations.
- **EO 13045** Protection of Children from Environmental Health and Safety Risks (1997): Evaluate the health or safety effects of planned regulations on children.
- **EO 13132**- Federalism (1999): Consult with state and local governments on rules that may affect them.
- **EO 13175** – Consultation and Coordination with Indian Tribal Governments (2000): Have ‘an accountable process to ensure meaningful and timely input by tribal officials in the development of regulatory policies that have tribal implications.’
- **EO 13211** – Actions Concerning Regulations That Significantly Affect Energy Supply Distributions, or Use (2001): Prepare a Statement of Energy Effects