Glossary of Terms

This glossary briefly defines key terms used throughout the white papers and memos. Economic terms that are common to the discipline are not included (e.g., equivalent variation, economic welfare, opportunity cost, willingness-to-pay, etc.) Included terms are defined based on the way in which they are typically used by the EPA (for instance, as defined by the Clean Air Act, by the Office of Management and Budget, or in EPA's *Guidelines for Preparing Economic Analyses*).

Area source: Sources that emit less than 10 tons per year of a single air toxic, or less than 25 tons per year of a combination of air toxics. Though emissions from individual area sources are often relatively small, collectively their emissions can be of concern, particularly where large numbers of sources are located in heavily populated areas.

Benefits: Favorable effects society gains due to a policy or action. Economists define benefits by focusing on changes in individual well-being (i.e., welfare or utility). Willingness to pay (WTP) is the preferred measure of these changes as it theoretically provides a full accounting of individual preferences across trade-offs between income and the favorable effects.

Benefit-cost analysis: Evaluates the favorable effects of policy actions and the associated opportunity costs of those actions. It answers the question of whether the benefits are sufficient for the gainers to potentially compensate the losers, leaving everyone at least as well off as before the policy. The calculation of net benefits helps ascertain the economic efficiency of a regulation.

BenMAP: The Environmental Benefits Mapping and Analysis Program (BenMAP) is a software package containing a library of concentration–response relationships, population data, baseline incidence rates, and valuation functions. It quantifies and values the PM2.5 and ozone health impacts from air quality scenarios.

Compliance costs: Costs firms incur to reduce or prevent pollution in order to comply with the regulation; the two main components are capital costs and operating costs. Capital costs are often one-time costs related to the installation or retrofit of structures or equipment to reduce emissions; operating costs are reoccurring annual expenditures associated with the operation and maintenance of the equipment.

Computable general equilibrium model: Take into account microeconomic behavior of consumers and firms to simulate the workings of a market economy and can include representations of the distortions caused by taxes and regulations. They are used to calculate a set of price and quantity variables that will return the simulated economy to equilibrium after the imposition of a regulation.

Criteria air pollutants: The Clean Air Act requires EPA to set National Ambient Air Quality Standards for six common air pollutants (ground-level ozone, particulate matter, carbon dioxide, nitrogen oxides, sulfur dioxide, and lead). EPA calls these pollutants "criteria" air pollutants because it regulates them by developing human health-based and/or environmentally-based criteria (science-based guidelines) for setting permissible levels.

Damage-function approach: Method for estimating benefits, where changes in individual endpoints (specific effects that can be associated with changes in air quality) are estimated and dollar values reflective of households' willingness to pay (WTP) are assigned to those changes. Total benefits are then calculated as the sum of the benefit estimates for all non-overlapping endpoints.

Direct costs: Costs that fall directly on regulated entities as a result of the regulation (often synonymous with compliance costs).

Economic impact analysis: Examines the distribution of monetized effects of a policy – both costs and benefits - such as changes in industry profitability or government revenues, as well as non-monetized effects, such as changes in employment or numbers of plant closures.

Economically significant regulation: A proposed or final regulation with an annual cost or benefit of $100 million or more.

Economy-wide modeling: A comprehensive economic framework that attempts to simulate effects of a policy shock throughout the entire economy.

Feedback effects: When changes in other sectors feedback to the regulated sector and cause additional behavioral effects (e.g., requirements to install a scrubber could drive up the price of scrubbers which then, in turn, increases compliance costs in the regulated sector).

General equilibrium model: Built around the assumption that for some discrete period of time, an economy can be characterized by a set of equilibrium conditions in which supply equals demand in all markets. When the imposition of a regulation alters conditions in one market, a general equilibrium model will determine a new set of prices for all markets that will return the economy to equilibrium.

Hard linkage: Implies the complete integration of a CGE and detailed sector model within one consistent framework.

Hazardous air pollutants: Pollutants that cause or may cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental and ecological effects. EPA is required to control 187 hazardous air pollutants. Examples include benzene, perchlorethlyene, and methylene chloride. Hazardous air pollutants are also known as toxic air pollutants or air toxics.

Health impact function: A mapping of ambient pollution concentrations in the atmosphere to health outcomes, sometimes referred to as health endpoints.

Health state dependence: The case where a consumer's health affects their marginal utility of non-medical consumption, where negative (positive) state dependence is the specific case in which the marginal utility of non-medical consumption decreases (increases).

Indirect costs: Costs incurred in related markets or experienced by consumers or government not under the direct scope of the regulation; often transmitted through changes in prices of the goods or services produced in the regulated sector.

Interaction effects: How changes in prices or quantities in one sector interact with other sectors to cause effects in other markets.

Major source: Sources that emit 10 tons per year of any listed toxic air pollutant or 25 tons per year of a mixture of air toxics. These sources may release air toxics from equipment leaks, when materials are transferred from one location to another, or during discharge through emission stacks or vents.

Mobile sources: Pollution sources that move. Air pollution in the United States comes from many types of engines, industries, and commercial operations. These sources include vehicles, engines, and motorized equipment that produce exhaust and evaporative emissions.

Optimization: Consumers are assumed to maximize utility and firms maximize profits or minimize costs subject to resource constraints, preferences, and production possibilities. Pareto efficiency or Pareto optimality is when resources are distributed in such a way that it is impossible to make any one individual better off without making at least one individual worse off.

Partial equilibrium model: A quantitative method or model that assesses the impact of an economic or policy shock affecting one or more interconnected markets, assuming the rest of the economy remains fixed (ceteris-paribus condition). Typically captures supply and demand responses in the regulated sector; may be extended to consider a small number of related sectors (e.g., that supply intermediate goods to the regulated sector, or markets for substitute or complimentary products).

Point source: Point source emissions are generated from stack emissions. The major point source emissions categories are power plants, industrial boilers, petroleum refineries, industrial surface coatings and chemical manufacturing industries.

PopSim: A dynamic population simulation model that forecasts the U.S. population by age group and gender.

Reduced-form model: Used to characterize data under a priori assumptions. The reduced form of a system of equations is the result of solving the system for the endogenous variables as a function of the exogenous variables, if any.

Social cost: The total burden that a regulation will impose on the economy. It is defined as the sum of all opportunity costs incurred as a result of a regulation, where an opportunity cost is the value lost to society of all the goods and services that will not be produced and consumed in the presence of regulation as resources are reallocated towards pollution abatement.

Soft linkage: Typically refers to the passing of information between existing top-down and bottom-up models that have been independently developed where the models stay completely separate. Information flows between models may be one-way or two-way, but is never completely integrated.

Structural model: A model that explicitly specifies underlying preferences, production, and resource allocation in ways that are consistent with economic theory.

Stationary source: A non-mobile pollution source. Examples include power plants, factories, and manufacturing processes.

Transitional costs: Short term costs incurred only during the time period when the economy is still adjusting to a new equilibrium

Value of statistical life (VSL): A summary measure for the dollar value of small changes in mortality risk experienced by a large number of people. For example, if 10,000 individuals are each willing to pay $500 for a reduction in risk of 1/10,000, then the value of saving one statistical life equals $500 times 10,000.