

Chapter 3 - Need for Regulatory Action and Evaluation of Policy Options

The essential components of an economic analysis are (1) a clear statement of the need for regulatory action describing the problem to be addressed by the policy and (2) a detailed evaluation of policy options. The statement of need should include a description of the market, institutional, or behavioral distortions being addressed, an explanation of why the market and other institutions have failed to correct these problems, and a justification for federal action to address them.

The economic analysis should consider and evaluate multiple policy options that address the environmental problem. This is true for analyses of proposed and final rules, even when the Agency has settled on a specific option. When identifying policy options, the analysis should describe any statutory or judicial requirements that must be considered. The options should include those permissible under the relevant statutory authority and may include those that are unavailable but with other advantages. The options may differ in their levels of stringency, compliance dates, and requirements based on entity size and location, or they may represent entirely different regulatory approaches. Detailing possible options is a necessary step in establishing why the selected option is the appropriate choice.

3.1 The Statement of Need

Consistent with Executive Order (EO) 12866 and Office of Management and Budget (OMB) Circular A-4 (2023), each economic analysis should include a statement of need that provides: (1) a clear description of the problem being addressed and the significance of that problem, (2) the failures of private markets or public institutions that warrant agency action, and (3) an assessment of whether Federal regulation is the best way to correct the problem.¹ This statement sets the stage for the

1 EO 12866 states, "Federal agencies should promulgate only such regulations as are required by law, are necessary to interpret the law, or are made necessary by compelling need, such as material failures of private markets to protect or improve the health and safety of the public, the environment, or the well-being of the American people..." (emphasis added). The Office of Management and Budget's guidance for how to comply with EO 12866, Circular A-4 (OMB 2023), provides recommendations to federal agencies on the development of economic analyses supporting regulatory actions. OMB (2023, p. 14) states that "including a summary in regulatory analyses of the needs being addressed may provide useful background and help ensure that the description of the needs informs the scope of the analyses (and vice versa) to the extent relevant, appropriate, and consistent with the best available evidence and best practices for objective analysis."

subsequent benefit-cost analysis (BCA) and allows one to judge whether the policy adequately addresses the problem.

3.1.1 Problem Description

The statement of need should begin with a brief review of the problem or public need to be addressed by the policy. While not always the case, the compelling public need for U.S. Environmental Protection Agency (EPA) regulations is generally to address an environmental problem. In this case, the following considerations are often relevant:

- The primary environmental contaminants causing the problem and their concentrations.
- The media through which exposures or damages take place.
- Private and public sector sources responsible for creating the problem.
- Human exposures involved and the health effects due to those exposures.
- Non-human resources affected and the resulting outcome.
- The expected change in the environmental problem over time, absent additional regulation.
- Available and potential abatement and mitigation techniques and technologies.
- The amount or proportion of the environmental problem likely to be corrected by federal action.
- Any existing state, local and other federal activities that partially or fully address the problem.

3.1.2 Reasons for Regulatory Action

After defining the problem, the statement of need should examine the reasons why the market and other public and private sector institutions have failed to correct it. That is, it should define the reason or social purpose for the regulatory action. This identification is an important component of policy development because the underlying failure itself often suggests the most appropriate remedy for the problem (see Chapter 4). A regulation can be promulgated for a number of social purposes. For pollution problems, the social purpose is commonly to correct a “market failure.” Other potential reasons for regulatory action include addressing behavioral biases; improving the efficiency and effectiveness of government operations; promoting distributional fairness and advancing equity; and protecting civil rights and civil liberties.

3.1.2.1 Market Failure

A market failure occurs when the allocation of goods and services by the free market is not economically efficient. The most common causes of market failure are externalities, overutilization of common property resources, under-provision of public goods, market power, and inadequate or asymmetric information.² While there are other social purposes for government regulation,

² For further discussion of market failure, types of market failures and externalities see Scitovsky (1954), Bator (1958), Buchanan and Stubblebine (1962), Mishan (1969), Baumol and Oates (1988), Cornes and Sandler (1996), Hanley et al. (2019), Perman et al. (2003), and Tietenberg and Lewis (2014). OMB (2023) also describes different categories of market failure as well as other reasons for regulation. Section A-2 of these Guidelines provides further discussion of externalities.

correcting a market failure, particularly addressing an externality, is most likely the driver behind environmental policy.

As defined by Keohane and Olmstead (2016), "An externality results when the actions of one individual (or firm) have a direct, unintentional, and uncompensated effect on the well-being of other individuals or the profits of other firms."³ Technically, externalities occur when the outputs and inputs chosen by one individual enter the utility or production function of another without passing through markets or contracts. Put another way, externalities occur when the market does not account for the effect of one party's activities on another party's well-being without compensation.

Consider, for example, a factory that produces smoke as a by-product of manufacturing that, in turn, affects individuals living downwind. The factory does not weigh the costs of its actions on the downwind community when making production decisions. Although the factory imposes an externality on the downwind community, the mere existence of an externality is not enough to justify a regulation. Under certain conditions, namely, the ability to bargain, availability of complete information, and presence of low transaction costs, externalities can be internalized by the free market (Coase 1960). Text Box 3.1 describes this Coasian solution in more detail.

It is important to differentiate externalities from other external effects when an individual or firm is affected by the behavior of others. For example, a negative outcome caused by another individual is not an externality if the affected individual rationally and willingly accepts the risk of that outcome through a private transaction between them. This may occur when a worker accepts a job with a greater risk of injury in exchange for a higher wage. However, this assumes complete and perfect markets with full information and that the transaction stipulations reflect and incorporate the expected risk such that no externality is associated with increased risk of injury. Similarly, external effects that function through the price system (e.g., higher prices faced by certain consumers because of rising demand) or zero-sum transfers from one person to another (e.g., through taxes or redistribution of consumer and producer surplus) are not externalities by definition and do not constitute a market failure. For example, if person A outbids person B in an auction, person B may be made worse off than if they had won the auction but were unwilling to pay the higher bid. This is a result of the price system working to ensure scarce resources go to those willing to pay the most for them, avoiding an inefficient allocation of resources.⁴

3 Keohane and Olmstead (2016) go on to say, "Note three keywords in the definition: direct, unintentional, and uncompensated. For example, because your health and happiness depend in part on how clean the air is, automobile drivers have a direct effect on your well-being. Unintentional is included in the definition to rule out acts of spite or malice. (It is the effect rather than the action that is unintentional. I may decide deliberately to use a gasoline-powered lawnmower, without the intent of my action being to pollute the air or disturb the neighbors.) Finally, uncompensated implies that the responsible actor does not compensate the damaged parties (or is not fined) for his actions. This rules out market transactions or bargaining between individuals" [emphasis in original].

4 External effects operating through the price system are referred to as pecuniary externalities.

Text Box 3.1 - Coasian Solution

Government intervention for the control of environmental externalities may not be necessary if parties can work out an agreement between themselves. Coase (1960) outlined conditions under which transaction costs are low enough that a private agreement between affected parties might result in the attainment of a welfare-maximizing level of pollution without government intervention. First, property rights must be fully and clearly defined and transferable. In situations where the resource in question is not “owned” by anyone, there is no ability to negotiate, and the offending party can “free ride,” or continue to pollute, without facing the costs of its behavior, and a Coasian solution is not possible.

When property rights can be defined and have been allocated, a welfare-maximizing solution can be reached regardless of which party is assigned the property rights, although the distribution of the gains from bargaining will differ. Take for example a farm whose pesticide application to its crops pollutes the well water of nearby homeowners. If property rights of the watershed are assigned to the homeowners, and information is available to them about potential damages from the pollution, then the farm may negotiate with the homeowners about its continued use of the pesticide. Potential compensation from the farm to the homeowners agreed upon through such negotiations need not be in the form of cash but could involve investments to reduce the water contamination or land swaps. (e.g., Deryugina et al. 2021), If property rights of the watershed are given to the farm, then the homeowners could negotiate to pay the farm to stop applying the pesticide.

The effectiveness of such agreements is contingent on meeting additional conditions: bargaining must be possible, damages must be known, and transaction costs must be low. These conditions are more likely to be met when there are only a small number of individuals involved. If either party is unwilling to negotiate or faces high transaction costs, then no private agreement will be reached. Asymmetric information or bargaining power can also hinder a socially optimal solution. Going back to the example, consider a case where there are many farms in the watershed using the pesticide on their crops, and it may be difficult to identify the relative contribution of each farm’s effluent on damages experienced by the homeowner. Clearly, homeowners would have more difficulty in negotiating an agreement with many farms than they would in negotiating with a single farm. However, technological advances in data sharing and networking can increase the likelihood of finding a Coasian solution. Advances in internet search and the availability of monitoring devices that can lower transactions costs and reduce information asymmetries, and social networks can make it easier for groups to communicate and arrive at bargained solutions. Deryugina et al. (2021) discusses several Coasian solutions to actual environmental problems.

When left unaddressed, externalities prevent the market from achieving economic efficiency and reduce economic welfare. This can occur in the presence of high transaction costs that make it difficult for private parties to internalize the cost of damages through bargaining, legal action, or other means such that both parties are no worse off. High transaction costs may result when activities that pose environmental risks are difficult to link to the resulting damages because they occur over long periods or occur in a different location than where the pollution originates.⁵ If these

⁵ The concept of an externality is closely tied to the concept of a public good, which is a good that either can be used simultaneously by many (i.e., nonrival) or that is difficult to prevent others from using (i.e., nonexcludable). The environment is a classic example of a public good.

high transaction costs are overcome and the parties can internalize the cost of the damage, then scarce resources will again be efficiently allocated by the market. If the cost of damages cannot be internalized, then government intervention may be necessary to fully address the externality.⁶

But even the presence of an unaddressed externality is not enough to justify a regulation; what is required is a compelling need for government intervention at any level of government (federal, state or local). That is, there must be some form of evidence that government intervention can improve economic welfare.⁷ Government regulation may not be warranted if the benefits of regulation do not justify the costs. Circumstances where this may occur include when a regulation designed to reduce a negative externality (e.g., direct emission controls) exacerbates pre-existing distortions. In this case, government intervention could make things worse.

There should also be some evidence that the externality will persist. If the market will correct itself through innovation and technological change or the externality will cease to exist through private transactions, then government intervention may not be necessary. A BCA can determine whether government intervention to remove the externality can improve economic efficiency even if the externality only exists for a short time absent additional regulation (i.e., it is resolved in the baseline after the short time). Furthermore, even if an externality warrants government intervention, it may not warrant direct, prescriptive regulation. Some externalities may be addressed more efficiently through other means such as providing information, requiring firms to carry insurance, defining legal liability, or assigning property rights. The nature of the externality may determine the best approach for government action (see Chapter 4).

3.1.2.2 Other Social Purposes for Regulatory Action

While correcting a market failure, particularly an externality, is the most common justification for environmental regulation, there are other underlying institutional or behavioral distortions that may justify regulatory action or government intervention. These include addressing behavioral biases; improving the efficiency and effectiveness of government operations, promoting distributional fairness and advancing equity; and protecting civil rights and civil liberties. Additionally, regulation may be justified for multiple interconnected reasons, such as addressing a market failure and promoting distributional fairness.

If the social purpose of a regulation is not to address a market failure (e.g., to improve Agency processes or solely to define a statutory term), then the statement of need still should include a description of the problem being addressed and an explanation of why government action is necessary to address this problem. If the purpose of a regulation is to protect sensitive subpopulations or address other distributional impacts rather than, or in addition to, addressing a market failure, that should be stated in the statement of need.

One possible social purpose is addressing behavioral biases. The behavioral economics literature has documented situations in which individuals appear to act in ways that are inconsistent with

6 As shown in Section A-5, there is an optimal level at which an externality should be addressed by a regulation. At this optimal level, further reduction in the externality is inefficient. Therefore, in the simple case where there is only one externality and it is controlled by an existing regulation, the existing regulation is not sufficiently stringent if the additional benefits from reducing the externality further will exceed the additional cost, and therefore additional regulation would be net-beneficial. Similarly, an existing regulation may be too stringent such that additional regulation would lead to negative net benefits.

7 Lusk (2013) provides a useful nine-point checklist for externalities that require prescriptive regulation.

rational choice, sometime referred to as "behavioral failures" or "behavioral anomalies" (Shogren and Taylor 2008). In such situations, it is possible that government intervention could lead to a more efficient allocation of resources than the free market outcome. However, because the mission of EPA is to protect human health and the environment, behavioral failure absent an environmental externality is not a typical justification for regulation at EPA. If insights from behavioral economics are used as a justification for regulation, analysts should provide robust empirical evidence supporting the existence of behavioral anomalies in the affected market and rules out other explanations consistent with rational behavior, such as hidden costs. Chapter 4 includes more discussion of behavioral economics and its implication for policy design.

3.1.3 Need for Federal Action

The final component of the statement of need for the regulatory action is an evaluation and explanation of why a federal remedy is preferable to actions by private and other public-sector entities, such as the judicial system or state and local governments.⁸ Federal involvement is often required for environmental problems that cross jurisdictional boundaries (e.g., when pollution in one state affects the population of another). In some cases, federal involvement is mandated by statute or directed by an EO as described in Chapter 2. A federal regulation could be justified by comparing its expected performance to realistic alternatives that rely on other institutional arrangements. This component of the statement of need for regulatory action, justifying federal regulation, should verify that the policy action is necessary, within the jurisdiction of the relevant statutory authorities, and yields results that will be preferable to no action. Finally, the statement of need should identify those aspects of the regulation necessitated by statutory requirements and those that are discretionary.

3.2 General Guidance on Policy Options to Evaluate

3.2.1 Need to Assess Multiple Options

Each analysis should evaluate multiple policy options. Following the statement of need, the economic analysis should identify and describe in detail all policy options or potential regulatory alternatives that were considered. This includes clearly explaining which options were selected for emphasis and further analysis and why other important options were not. Since the BCA informs the public, stakeholders and Congress and other decision makers of the effects of the policy assessing a robust set of policy options is important.

The identification of policy options should describe any statutory or judicial requirements that must be considered when designing the regulation, how those requirements may influence the

8 As discussed in Chapter 2, EO 13132, "Federalism," describes principles of federalism and identifies requirements for federal preemption of state or local law. Also, there is a robust economics literature on the pros and cons of regulating environmental quality at different jurisdictional levels that may be informative when determining whether federal regulation is appropriate as a substitute or complement to state or local regulation (e.g., Oates 2002). See also Circular A-4 (OMB 2023) on "Showing Whether Federal Regulation Is the Best Way to Solve the Problem."

options considered and how the proposed or finalized option satisfies them.⁹ For example, the description should identify any economic considerations (e.g., costs incurred by regulated entities) and discretionary provisions in the statute that may be used to shape the form and stringency of the regulation. The analysis may also identify options that are more efficient or cost-effective even if the regulatory approaches may be prohibited by statutory or judicial requirements (see also OMB 2023). For example, the Supreme Court has held that the Clean Air Act requires that National Ambient Air Quality Standards be set based on health or welfare considerations only; the Act bars EPA from considering the costs of implementing them when setting the standards.

At a minimum, the economic analysis should fully assess and present three options for consideration: the proposed or finalized option; a more stringent option; and a less stringent one.^{10,11} The incremental benefits and costs for each option, as well as other important criteria (e.g., distributional consequences), should be compared across the options. Measuring the incremental benefits and costs of successively more stringent regulatory options provides a clear indication of the most economically efficient option, provided important benefits and costs can be quantified and monetized. If options cannot be characterized by regulatory stringency (e.g., they differ by the provisions included), the economic analysis should still analyze at least three options, including one that achieves greater benefits and one that costs less than the proposed or finalized option (see also OMB 2023).

Assessing at least three options applies in any circumstance. It is not adequate to evaluate only the selected option, even for a final rule that establishes the option to be promulgated. Similarly, in cases where the design of the regulation is dictated by statute, presenting multiple options is still necessary when the regulation is proposed or finalized -- even though the Agency may have no discretion in its design. Assessing multiple options helps inform the public about the anticipated benefits and costs of the Agency's final action compared to options not pursued, it is imperative that the analysis assesses multiple options.

The analysis should also consider whether there are alternatives to federal regulation that may address the market failure or other regulatory objective (e.g., distributional concern) more efficiently. Alternatives may include using existing product liability rules to encourage firms to internalize the costs of the environmental damages, introducing market-oriented approaches such as fees, penalties, subsidies, marketable permits, and offsets, or the potential for state or local regulation. Even if options are not available due to statutory restrictions, the economic analysis should discuss the limitations of the statutory requirements and, if possible, estimate the

9 Often, consideration of different regulatory options is required or encouraged by statute (e.g., different stringencies of emissions standards). Any qualitative or quantitative analysis that supports these considerations should be summarized in the BCA, even if estimates of the benefits and costs of those options were not produced.

10 An exception may occur if the proposed or finalized option is at or near the limit of technical feasibility, in which case the analysis might not need to examine a more stringent option. However, it is possible that even if abatement of an environmental contaminant using on-site controls is technically infeasible, the value of the good or activity whose production creates the contaminant may be less than the harm the contaminant causes. In such circumstances, a more stringent option that shifts production away from the good or activity should be evaluated.

11 While developing a regulation, the decision maker may choose the more stringent or less stringent option after weighing the results of the analysis. Doing so demonstrates the usefulness of the analysis. In this circumstance, the analysis should include an additional option to satisfy this guidance if time allows. If there is insufficient time to evaluate an additional option, the other two options should still be presented, and the analysis should explain why the central option was not selected.

opportunity cost of not being allowed to pursue these options. There is no prohibition against analyzing these options.¹²

When a rule includes several distinct regulatory provisions, the benefits and costs of each provision should be analyzed both separately and jointly (i.e., as a package of provisions).¹³ Doing so may yield insights such as identifying unnecessary or otherwise undesirable regulatory requirements. For example, evaluating provisions independently may identify those provisions for which their costs exceed their benefits, even when the benefits of a regulation in its entirety exceed its costs. Jointly analyzing multiple provisions becomes more complicated when the existence of one provision affects the benefits or costs arising from another. Even so, it is still possible to evaluate a specific provision by estimating the net benefits of a regulatory option with and without that provision.

Ultimately, the number of options to evaluate and their design is a matter of judgment, but the analysis should strive for a balance between thoroughness and analytic capacity. Realistically, analyzing all possible combinations of provisions is impractical if their number is large and interactions between provisions are common. Generally, some options can be eliminated through a preliminary and less rigorous analysis, leaving a more manageable number to be evaluated in the formal BCA. For a proposed rule, it may be useful to provide an economic analysis that illuminates important tradeoffs associated with key specific aspects of the rule on which the Agency is soliciting comment.

3.2.2 Policy Design Options

The analysis should carefully describe the policy design being evaluated and, when the costs or benefits vary substantially with alternative policy designs, assess alternative design options.¹⁴ The policy design includes the core regulatory approach as well as key features of its implementation and structure. Prescriptive regulation (e.g., technology, design, or performance standards) is common in Federal environmental regulations. Performance standards, which specify the allowable limit but not the way regulated entities must achieve that limit, are generally less costly than standards that dictate technologies or techniques. Economic analyses may include assessments of policy designs that currently are not statutorily allowed to highlight potential tradeoffs between the required approach and other more desirable approaches (for example, more flexible market-based approaches such as emissions taxes and allowance trading systems that may be prohibited).

12 OMB Circular A-4 (2023) states, "Your analysis of the effects of the regulation should not presuppose that there is a need for the regulation, and your analysis of the potential need for the regulation should not presuppose the effectiveness of your regulation." (p.14) and "If legal or other constraints prevent the selection of a regulatory action that best satisfies the philosophy and principles of Executive Orders 12866, you may consider identifying these constraints and estimating their opportunity cost (and effects more generally). Such information may, for example, be useful to Congress under the Regulatory Right-to-Know Act or in considering statutory reforms." (pp.22-23)

13 When the benefits or costs of a regulation or one of its provisions are highly uncertain, an option may include a voluntary program or pilot project or additional data collection prior to regulation. See Chapter 4 for further discussion of these options.

14 Chapter 4 provides a detailed description of different regulatory approaches, including a detailed discussion of considerations for selecting among different regulatory approaches.

Aspects of the market failure may help identify which types of regulatory approaches to consider. A key principle in the design of environmental regulations is that the regulatory structure and incentives should align with the environmental objective. For example, if the effect of emissions on human health depends on the proximity to the emission, then generally the optimal regulation should more stringently control emissions from emitters that are closer to population centers. Another example is that regulations should impose requirements on emissions rather than the inputs associated with the emissions provided emissions monitoring costs are not too high relative to the costs of monitoring input use.

Evaluating regulatory features other than stringency and regulatory approach may also help identify better policy designs. Options that vary these regulatory features, both alone and in combination, should be considered (see also OMB 2023). These features include the entities that are subject to the regulation.¹⁵ By varying policy design features in the options considered, the analysis may identify approaches that increase net benefits or reduce the impact on certain groups. These features include but are not limited to:

- **Compliance dates:** Providing more time before a regulation takes effect may reduce costs by allowing the regulated entities additional planning time, which can be weighed against a possible reduction in benefits.
- **Enforcement methods:** Alternatives include regular on-site inspections, random monitoring, periodic reporting and noncompliance penalties, which may have different costs and efficacy.
- **Requirements for different-sized firms or facilities:** In some cases, small firms or facilities may face proportionately higher compliance costs, especially if there are large, fixed compliance costs.¹⁶ When a market-based approach cannot be used, varying the regulatory stringency or pollution requirement by firm size may increase economic efficiency.
- **Requirements for different geographic regions:** Differentiating requirements by region may be desirable if there is significant regional variation in pollution reduction benefits or the costs of compliance.
- **Requirement for facilities of different vintages:** New facilities may face lower costs of compliance than older facilities because of the relative ease with which abatement methods can be integrated into their production processes. Also, pollution control investments may be in use longer at new facilities, and therefore may yield greater benefits over time.

15 The coverage of a regulation may include different market sectors or different entities within a sector. Generally, the statutes that EPA implements identify the groups of similar emitting sources that would be subject to a particular regulation, although there is often some flexibility in defining the types of entities included in each group, the requirements for different subgroups and some regulatory choices may influence subsequent requirements for multiple sectors.

16 Chapter 2 describes analysis for examining potential adverse economic impacts on small entities and procedures to solicit and consider flexible regulatory options that minimize adverse economic impacts on small entities under the Regulatory Flexibility Act of 1980 (RFA), as amended by The Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA) (5 U.S.C. 601-612). These are required for rules with a “significant economic impact on a substantial number of small entities.” Chapter 9 outlines the analytic tasks associated with complying with the RFA.

However, stricter requirements for new facilities than old ones may lead to inefficient investment patterns (e.g., firms delaying investments to avoid stricter regulation).¹⁷

It is important to account for and present both the total benefits and costs of each option and the incremental benefits and costs among the options. As discussed in depth in Chapter 5, it is important to account for all of the benefits and costs for all policy options because any options where benefits exceed costs is an improvement in economic efficiency according to the potential Pareto principle.^{18,19} By this standard, selecting any option with positive net benefits would improve societal welfare. However, the *most* economically efficient option is the one that produces the largest increase in net benefits. While the option with the highest net benefits is obvious from the presentation of total benefits and costs, presenting the incremental benefits and costs of each option compared to the next less-stringent alternative helps to indicate if there is an even more economically efficient option other than those being considered. In general, economic efficiency is maximized (i.e., net benefits are highest) when incremental benefits are equal to incremental costs.²⁰

Determining which option is the most economically efficient may be more challenging when there are consequences that society would be willing to pay for (or avoid) but that cannot be quantified or monetized. As discussed In Chapter 5 and elsewhere in these Guidelines, effects should be quantified, even if they cannot be monetized, and discussed qualitatively if not. Differences between consequences that are not quantified or monetized should also be compared among policy options. In particular, different policy options may have different distributional impacts, even without significantly changing the benefits and costs of the regulation, and this difference may not be obvious when only evaluating the total costs and benefits. It may be important to consider which regulatory alternatives may generate important differences in distributional effects.

Furthermore, carefully detailing the sources of the benefits and costs of a rule, rather than looking only at its total net benefits, may help identify other policy options. For example, a regulation that is designed to reduce releases of one contaminant may result in an increase or decrease in releases of other contaminants. Again, the benefits and costs from all the changes in contaminant levels should be accounted for in a BCA. However, when an action produces benefits from reductions in contaminants other than those related to the statutory objective of the regulation, and the benefits associated with these reductions in other contaminants are a large share of total benefits, or when net-benefits would be negative without them, then the analysis should identify other policy options that include directly regulating those contaminants.²¹

17 Chapter 8 provides additional discussion of the advantages and disadvantages of vintage-differentiated regulations. Chapter 4 describes regulatory designs that can address some of the disadvantages.

18 The potential Pareto principle, or the compensation principle, states that economic welfare is improved by an action if the benefits of the action outweigh the costs (provided both benefits and costs can be measured accurately) because the gainers (those who benefit) could, theoretically, compensate the losers (those who bear the costs) and still be better off. Section A.3 of these Guidelines provides a further description of the potential Pareto principle.

19 Executive Order 12866 and OMB (2023) also consistently affirm that all benefits and costs should be assessed in BCA of regulatory actions.

20 The proposed or finalized option should also be reasonably robust to alternative potential baseline conditions. See Section 5.6 on uncertainty.

21 The statutory objective of the regulation is the specific objective of the statutory provision under which the regulation is promulgated.

In addition, an analysis of a policy option in which the other contaminant(s) are regulated directly, either separately or simultaneously with the regulation being analyzed, may be warranted.²² If there are interactions in the control of contaminants, the most economically-efficient approach to their control requires simultaneously determining the appropriate policy design for each (e.g., Tietenberg, 1973). If there are important interactions in the control of multiple contaminants, options that jointly consider the appropriate design for each should be identified and may be analyzed, even if such considerations are not currently permissible. Correspondingly, there may be costs from increases in other environmental contaminants that are not associated with the statutory objective of the regulation.²³ If the effects of these increases due to the regulation are large, analysis of options to mitigate them may be warranted.

22 Chapter 5 provides further discussion and guidance on how to treat in an economic analysis those benefits from environmental contaminants other than those related to the statutory objective.

23 Such costs attributable to increases in other pollutants (and other environmental contaminants) should be accounted for even if future regulation might reduce them.

Chapter 3 References

- Bator, F.M., 1958. The anatomy of market failure. *The Quarterly Journal of Economics*, 72(3): 351-379.
- Baumol, W.J. and W.E. Oates. 1988. *The Theory of Environmental Policy*. Cambridge: Cambridge University Press.
- Buchanan, J. M. and W.C. Stubblebine. 1962. Externality. *Economica* 29(116): 371-384.
- Coase, R. 1960. The Problem of Social Cost. *The Journal of Law and Economics*, 3: 1-44.
- Cornes, R. and T. Sandler. 1996. *The Theory of Externalities, Public Goods, and Club Goods*. Cambridge: Cambridge University Press.
- Deryugina, T., F. Moore, and R.S. Tol. 2021. Environmental Applications of the Coase Theorem. *Environmental Science & Policy*, 120: 81-88.
- Executive Order 12866: Regulatory Planning and Review, October 4, 1993. Available at: <https://www.archives.gov/files/federal-register/executive-orders/pdf/12866.pdf> (accessed December 22, 2020).
- Executive Order 13132: Federalism, August 10, 1999. Available at: <https://www.govinfo.gov/content/pkg/FR-1999-08-10/pdf/99-20729.pdf> (accessed December 22, 2020).
- Hanley, N., J. Shogren, and B. White. 2019. *Introduction to Environmental Economics*. Oxford: Oxford University Press.
- Keohane, N.O. and S.M. Olmstead, 2016. Markets and the Environment. Island Press.
- Lusk, J.L. 2013. Lunch with Pigou: Externalities and the “Hidden” Cost of Food. *Agricultural and Resource Economics Review*, 42(3): 419-435.
- Mishan, E.J. 1969. The Relationship Between Joint Products, Collective Goods, and External Effects. *Journal of Political Economy*, 77(3): 329-348.
- Oates, W. E. 2002. A Reconsideration of Environmental Federalism. *Recent Advances in Environmental Economics*, ed. J. List and A. De Zeeuw. Cheltenham, UK: Edward Elgar Publishing. 1-32.
- OMB. 2023. Circular A-4, Regulatory Analysis, November 9, 2023. Available at: <https://www.whitehouse.gov/wp-content/uploads/2023/11/CircularA-4.pdf> (accessed June 13, 2024).
- Perman, R., M. Common, J. McGilvray, J., and Y. Ma. 2003. *Natural Resource and Environmental Economics*. 3rd Ed. Essex: Pearson Education Limited.
- Scitovsky, T. 1954. Two Concepts of External Economies. *Journal of Political Economy*, 62(2): 143-151.
- Shogren, J. and L. Taylor. 2008. On Behavioral-Environmental Economics. *Review of Environmental Economics and Policy*, 2(1): 26-44.
- Tietenberg, T. 1973. Specific Taxes and the Control of Pollution: A General Equilibrium Analysis. *The Quarterly Journal of Economics*, 86: 503-522.
- Tietenberg, T. and L. Lewis. 2018. *Environmental and Natural Resource Economics*. 11th Ed. New York: Routledge.