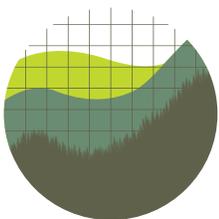




Enhancing Consideration of Time Frames in Cost-Benefit Analysis



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Executive Summary

As the Office of Management and Budget (OMB) contemplates revisions to *Circular A-4*'s guidance on regulatory analysis, one issue merits considerable attention: federal agencies often fail to justify the analytical time frames they use for their cost-benefit analyses. In so doing, agencies risk overlooking key long-term impacts that may justify more stringent regulation.

Regulations typically generate costs and benefits that occur over time. Thus, when agencies analyze the impact of a proposed regulation through cost-benefit analysis, they must select an analytical time frame long enough to encompass this stream of costs and benefits. This intuitive concept is already articulated in *Circular A-4*, which emphasizes that choosing the appropriate temporal scope is critical to good regulatory analysis. And yet, in practice, agencies often choose an endpoint for their regulatory analyses that fails to capture the full stream of a regulation's costs and benefits. Critically, agencies frequently offer limited explanation for this choice, and occasionally offer no explanation at all.

Overlooking long-term impacts can have negative ramifications for regulatory policy. A truncated analytical time frame tends to shortchange a regulation's benefits more than its costs, since benefits are often back-loaded while costs are often front-loaded. Shortening the analytical time frame may therefore cause net-beneficial regulations—or more stringent alternatives that produce greater net benefits—to appear net-costly or less net-beneficial than other alternatives. As a result, the practice of truncating regulatory impacts may cause agencies to select a suboptimal policy alternative, potentially overlooking a more stringent option that is better for society's long-term welfare.

Further, when agencies provide minimal or no explanation for the analytical time frame they choose, they increase their likelihood of choosing an inappropriate time frame. This is because failing to provide a sufficient explanation hinders interested parties from properly evaluating or scrutinizing the choice of time frame, and may also cause the agency itself to neglect important considerations that could compel a longer analytical time frame. In this way, agency failures to explain their choice of time frame compounds the risk of suboptimal policymaking.

This deficiency is prevalent across agencies and would be best addressed through standardized guidance and practice. OMB should therefore update its guidance on selecting analytical time frames as part of any revisions to *Circular A-4*. More detailed guidance would help prevent the overlooking of future costs and benefits, and help ensure that, for any given rulemaking, both the agency and the public understand whether and how the analytical time frame affects the overall policy choice. Following such updates—or even without them—OMB should better ensure that agencies adhere to *Circular A-4*'s guidance and devote more thorough attention to their choice and explanation of the analytical time frame. Absent greater scrutiny from OMB going forward, this problem is likely to persist.

This report examines agencies' routine practice of selecting, without sufficient explanation, analytical time frames that do not capture the full stream of a regulation's costs and benefits. **Section I** describes how truncated analytical time frames can lead to substandard policy choices and discusses why decisionmaking quality suffers when agencies fail to explain their choice of time frame. **Section II** overviews a sample of regulatory impact analyses that contain minimal,

Federal agencies often fail to justify the analytical time frames they use for their cost-benefit analyses. In so doing, agencies risk overlooking key long-term impacts that may justify more stringent regulation.

if any, explanation for the analytical time frame used in the agency's cost-benefit analysis. It then presents as case studies two regulatory impact analyses that truncated longer-term benefits of a more stringent alternative—benefits that, had they been considered, may have supported choosing the more stringent alternative. **Section III** examines two counterexamples in which the agency provides a relatively detailed explanation for the analytical time frame chosen. **Section IV** concludes by offering a series of recommendations, summarized below, OMB can implement in its revisions to *Circular A-4* to improve the current treatment of analytical time frames in cost-benefit analysis.

Summary of Recommendations OMB Should Consider Incorporating into Its Revised *Circular A-4* Guidance:

1. Identify and discuss the analytical time frame in a dedicated section.
2. Explain in detail any limitations affecting the choice of analytical time frame.
3. Address whether the analysis is sensitive to the choice of analytical time frame.
4. Conduct a temporal break-even analysis when significant costs or benefits occur beyond the analytical time frame.
5. Maintain the analytical time frame's length, at minimum, in subsequent rulemakings.

I. Selecting the Appropriate Analytical Time Frame Is a Critical Component of Cost-Benefit Analysis

A. The Analytical Time Frame Affects the Substantive Assessment of Costs and Benefits

Cost-benefit analysis has long been a central feature of agency rulemaking. Since 1981, agencies have been required by a series of executive orders to weigh the estimated costs of their regulations against the anticipated benefits, and to submit their cost-benefit analysis of major rules to OMB for substantive review.¹

OMB's principal guidance on cost-benefit analysis is found in *Circular A-4*. Published in 2003 during the George W. Bush Administration, these long-standing guidelines "defin[e] good regulatory analysis" and are designed to "standardiz[e] the way benefits and costs of Federal regulatory actions are measured."² Though not legally binding,³ this guidance document recommends best practices for agencies to consider.

Circular A-4 suggests that agencies carefully consider the temporal scope of their cost-benefit analyses. Even before delving into topics as fundamental as developing a baseline or selecting alternatives, *Circular A-4* emphasizes that "[t]he time frame for [an agency's] analysis should cover a period long enough to encompass all the important benefits and costs likely to result from the rule."⁴ The guidance also states that the analysis should "clearly identify[] when the benefits and costs are expected to occur."⁵

Individual regulatory agencies have developed their own internal guidance on economic analysis that likewise stresses the importance of choosing an appropriate analytical time frame. For instance, the Environmental Protection Agency's (EPA) *Guidelines for Preparing Economic Analyses* recognize that, among other factors, the "years covered" can have "a profound influence on the outcome of the economic analysis."⁶ The EPA Guidelines also state that the analytical time frame "should be long enough that the net benefits for all future years (beyond the time horizon) are expected to be negligible when discounted to the present."⁷ Similarly, the Department of Health and Human Services' *Guidelines for Regulatory Impact Analysis* instruct the agency to account for "the full time period" over which costs and benefits accrue.⁸

¹ See Exec. Order No. 12,291 §§ 2(b), 3(c)-(d), 46 Fed. Reg. 13,193, 13,193-94 (Feb. 19, 1981); Exec. Order No. 12,866 §§ 1(b)(6), 6(a)(3) (C), 58 Fed. Reg. 51,735, 51,736, 51,741 (Oct. 4, 1993); see also Exec. Order No. 13,563 § 1(b), 76 Fed. Reg. 3821, 3821 (Jan. 21, 2011) ("This order is supplemental to and reaffirms the principles, structures and definitions governing contemporary regulatory review that were established in Executive Order 12666.").

² OFF. OF MGMT. & BUDGET, CIRCULAR A-4, at 1 (2003) [hereinafter CIRCULAR A-4].

³ *Louisiana v. Biden*, No. 22-30087, 2022 WL 866282, at *1 (5th Cir. Mar. 16, 2022) ("Compliance with Circular A-4 is not required by any statute or regulation and is not binding on any agency.").

⁴ CIRCULAR A-4, *supra* note 2, at 15.

⁵ *Id.* at 31 ("As a first step, you should present the annual time stream of benefits and costs expected to result from the rule, clearly identifying when the benefits and costs are expected to occur. . . . The ending point [for your stream of estimates] should be far enough in the future to encompass all the significant benefits and costs likely to result from the rule.").

⁶ ENV'T PROT. AGENCY, GUIDELINES FOR PREPARING ECONOMIC ANALYSES S-1 (Dec. 2010) [hereinafter EPA GUIDELINES].

⁷ *Id.* at 6-5.

⁸ DEPT. OF HEALTH & HUMAN SERVS., GUIDELINES FOR REGULATORY IMPACT ANALYSIS 6-7 (2016) [hereinafter HHS GUIDELINES].

Temporal scope is a critical consideration in regulatory analysis because it affects the substantive assessment of costs and benefits. The costs and benefits of any given regulation typically occur over time.⁹ When a cost-benefit analysis uses an analytical time frame that ends before all costs and benefits have materialized, the agency is effectively placing no value on costs and benefits beyond that point.¹⁰ This could have a significant impact on the ultimate policy decision if, for instance, costs or benefits that would affect whether a policy is net-beneficial fall beyond the agency’s analytical time frame.¹¹

In practice, truncated analytical time frames tend to disproportionately shortchange the benefits of regulations. Regulatory costs are often expended upfront in order to prevent some future harm or obtain some other future benefit.¹² This is particularly true in the environmental context given the long-range character of air and water pollution.¹³ An insufficiently long period of analysis therefore runs the risk of truncating important benefits (more so than costs) that would justify a regulation, potentially depriving the public of a health- or environmentally-protective policy.¹⁴

In practice, truncated analytical time frames tend to disproportionately shortchange the benefits of regulations.

EPA has previously highlighted this very risk. The agency’s *Guidelines* note that:

In some cases, the benefits of a policy are expected to increase over time. When this occurs, analysts should extend the analysis far enough into the future to ensure that benefits are not substantially underestimated. For example, suppose a proposed policy would greatly reduce greenhouse gas (GHG) emissions. In the baseline scenario, the level of GHG in the atmosphere would steadily increase over time, with a corresponding increase in expected impacts on human health and welfare and ecological outcomes. A [benefit-cost analysis] limited to the first decade after policy initiation would likely distort the relationship of benefits and costs associated with the policy.¹⁵

⁹ See Frank Ackerman & Lisa Heinzerling, *Pricing the Priceless: Cost-Benefit Analysis of Environmental Protection*, 150 U. PA. L. REV. 1553, 1559 (2002) (“Costs and benefits of a policy frequently occur at different times.”).

¹⁰ See Arden Rowell, *Time in Cost-Benefit Analysis*, 4 U.C. IRVINE L. REV. 1215, 1232 (2014) (“When a period of time is omitted from a cost-benefit analysis, it is like valuing all costs and benefits after that period at zero dollars.”).

¹¹ See EPA GUIDELINES, *supra* note 6, at 5-4 (“How one defines the ending point of the baseline is particularly important in situations where the accrual of costs and/or benefits do not coincide due to lagged effects, or where they occur over an extended period of time. For example, the human health benefits of a policy that reduces leachate from landfills may not manifest themselves for many years if groundwater contamination occurs decades after closure of a landfill. In theory, the longer the time frame, the more likely the analysis will capture all of the major benefits and costs of the policy.”).

¹² See Ackerman & Heinzerling, *supra* note 9, at 1559 (“Often, [regulatory] costs are incurred today, or in the near future, to prevent harm in the more remote future.”).

¹³ See Arden Rowell, *Regulating Best-Case Scenarios*, 50 ENV’T L. 1105, 1154 (2020) (“Th[e] temporal separation of costs and benefits—with costs frontloaded and benefits backloaded—is familiar in many policy contexts and is particularly common in environmental regulation.”); RICHARD L. REVESZ & MICHAEL A. LIVERMORE, *RETAKING RATIONALITY: HOW COST-BENEFIT ANALYSIS CAN BETTER PROTECT THE ENVIRONMENT AND OUR HEALTH* 108 (2010) (“The costs of climate change mitigation will be borne up front, while the benefits will not accrue until much later.”); see also 42 U.S.C. § 4332(F) (requiring all agencies to “recognized the . . . long-range character of environmental problems”).

¹⁴ See, e.g., ENV’T PROT. AGENCY, *REGULATORY IMPACT ANALYSIS FOR FINAL REVISED GHG STANDARDS FOR MODEL YEAR 2023 AND LATER LIGHT-DUTY VEHICLES* 10-4 tbl.10-6 (Dec. 2021) [hereinafter *REVISED LDV STANDARDS RIA*] (projecting that while the final rule’s costs will initially outweigh its benefits, the rule’s benefits in later years so greatly exceed its future costs that the present value (using a 3 percent discount rate) of the rule’s total net benefits is between \$88 billion and \$450 billion).

¹⁵ EPA GUIDELINES, *supra* note 6, at 5-4. The *Guidelines* also note, however, the need to “balance the advantages of structuring the analysis to include a longer time span against the disadvantages of the decreasing reliability of the forecasts for the future.” *Id.*

Importantly, this distortion can affect not only the question of *whether* regulation is appropriate (i.e., cost-benefit justified), but also the question of *what level* of regulation is appropriate. Consider, for example, EPA’s revised greenhouse gas (GHG) emission standards for light-duty vehicles model years 2023 through 2026 (Revised LDV Standards). The regulatory impact analysis for that rulemaking projects that, until at least 2035, the final rule will achieve fewer net benefits than the less stringent alternative the agency considered.¹⁶ In total, however, EPA projects that the final rule will generate \$60 billion *more* in net benefits than the less stringent alternative (using a 3 percent discount rate for all impacts).¹⁷ Had the agency limited its analysis to a 12-year period—effectively placing no value on any costs and benefits accruing after 2035—the agency may have erroneously concluded that the less stringent alternative was the better policy. As a conceptual and practical matter, then, the analytical time frame an agency chooses is a critical component of its cost-benefit and regulatory analysis.

B. Explaining the Time Frame Chosen for a Cost-Benefit Analysis Is Critical

It is of similar importance that agencies explain why the analytical time frame they have chosen is appropriate. *Circular A-4* states that “[a] good analysis should be transparent.”¹⁸ It calls on agencies to “clearly set out the basic assumptions, methods, and data underlying the analysis,” and advises that “[a] qualified third party reading the analysis should be able to understand the basic elements of your analysis and the way in which you developed your estimates.”¹⁹ Likewise,

An agency’s failure to provide a meaningful explanation for its choice of analytical time frame increases the likelihood that key regulatory impacts justifying a stronger policy will be erroneously overlooked.

EPA’s *Guidelines* emphasize that “[t]he choice [of analytical time frame] should be explained and well-documented.”²⁰ It then goes on to state that “[i]n no case should the time horizon be arbitrary, and the analysis should highlight the extent to which the sign of net benefits or the relative rankings of policy alternatives are sensitive to the choice of time horizon.”²¹

Explaining the choice of analytical time frame—i.e., explaining why the analysis ends when it does; what, if any, costs and benefits materialize after that point; and whether the policy decision is sensitive to the choice of time frame—helps to ensure the propriety of that choice. Giving reasons for methodological choices and assumptions has a “decision-disciplining function”²² that helps to “filter out tendencies toward ‘bias, self-interest, insufficient reflection, or simply excess haste.’”²³ An agency that explains its choice of time frame must think through the pros and cons of its decision more carefully than it otherwise would.²⁴ Conversely,

¹⁶ Compare REVISED LDV STANDARDS RIA, *supra* note 14, at 10-4 tbl.10-6, with *id.* at 10-8 tbl.10-12.

¹⁷ *Id.*

¹⁸ CIRCULAR A-4, *supra* note 2, at 17.

¹⁹ *Id.*

²⁰ EPA GUIDELINES, *supra* note 6, at 6-6; *see also id.* at 11-9 (“Presentations of economic analyses should strive for clarity and transparency. An analysis whose conclusions can withstand close scrutiny is more likely to provide policy makers with the information they need to develop robust environmental policies.”).

²¹ *Id.* at 6-6.

²² Frederick Schauer, *Giving Reasons*, 47 STAN. L. REV. 633, 657–58 (1995).

²³ Jodi L. Short, *The Political Turn in American Administrative Law: Power, Rationality, and Reasons*, 61 DUKE L.J. 1811, 1822 (2012) (citing Schauer, *supra* note 22, at 657).

²⁴ Martin Shapiro, *The Giving Reasons Requirement*, 1992 U. CHI. LEGAL F. 179, 180 (1992) (“Giving reasons requirements are a form of internal improvement for administrators. A decisionmaker required to give reasons will be more likely to weigh pros and cons carefully before reaching a decision than will a decisionmaker able to proceed by simple fiat.”); *see also* Schauer, *supra* note 22, at 657–58 (“A reason-giving mandate will also drive out illegitimate reasons when they are the only plausible explanation for particular outcomes.”).

the failure to provide a meaningful explanation increases the likelihood that key regulatory impacts justifying a stronger policy will be erroneously overlooked.

Explaining the analytical time frame also fosters good decisionmaking because it invites dialogue, scrutiny, and additional information from stakeholders that the agency may take into account.²⁵ Stakeholders, however, cannot properly evaluate an agency's choice of analytical time frame if the agency does not disclose whether any costs and benefits occur beyond the time frame chosen and, assuming such costs and benefits do occur, explain why they are not included in the analysis. Because the choice of analytical time frame can affect the ultimate policy decision, as discussed above, it follows that the absence of an explanation impedes stakeholders' ability to scrutinize the agency's policy choice.

²⁵ See John F. Manning, *Nonlegislative Rules*, 72 GEO. WASH. L. REV. 893, 904 (2004) (“[N]otice-and-comment rulemaking improves the quality of agency decisionmaking by mobilizing the whole spectrum of interested parties to direct arguments, information, and criticism to the agency.”); Matthew Diller, *The Revolution in Welfare Administration: Rules, Discretion, and Entrepreneurial Government*, 75 N.Y.U. L. REV. 1121, 1189 (2000) (“The requirement that agencies explain their decisions and respond to comments is intended to improve the quality of decisions and to ensure that rules are based on appropriate considerations.”).

II. Agencies Routinely Use Truncated Analytical Time Frames While Offering Little to No Explanation for Their Choice

Notwithstanding the discussion above, agencies routinely choose analytical time frames that truncate regulatory costs and benefits while offering little, if any, explanation for their choice.

In preparing this report, the Institute for Policy Integrity (Policy Integrity) examined cost-benefit analyses from six different agencies²⁶ dating back to 2010. The survey found numerous analyses that either truncated costs or benefits²⁷ or presented the analysis in a way that prevented comprehension of whether any costs or benefits had been truncated. Of these, a great number gave no explanation for the analytical time frame used.²⁸ Many others offered limited explanations

²⁶ The six agencies are Department of Energy, Department of Health and Human Services, Department of the Interior, Department of Labor, Department of Transportation, and the Environmental Protection Agency.

²⁷ Either by analyzing only a single snapshot year or by ending the analysis at a point where, based on the trajectory of costs or benefits up to that point, the rule would be expected to generate costs or benefits in subsequent years.

²⁸ See generally REVISED LDV STANDARDS RIA, *supra* note 14 (providing no explanation at xvi, 10-1 to 10-4, or elsewhere for ending the cost-benefit analysis in 2050); BUREAU OF LAND MGMT., DEP'T OF THE INTERIOR, REGULATORY IMPACT ANALYSIS FOR THE FINAL RULE TO RESCIND OR REVISE CERTAIN REQUIREMENTS OF THE 2016 WASTE PREVENTION RULE (Aug. 2018) (providing no explanation at 33, 43, 52, or elsewhere for using a 10-year period of analysis); DEP'T OF ENERGY, TECHNICAL SUPPORT DOCUMENT: ENERGY EFFICIENCY PROGRAM FOR CONSUMER PRODUCTS AND COMMERCIAL AND INDUSTRIAL EQUIPMENT: UNINTERRUPTIBLE POWER SUPPLIES (Dec. 2016) (analyzing national energy savings, consumer savings, and emissions impacts over a 30-year period but providing no explanation for this choice at 1-1, 2-8, 13-3, 17-2, or anywhere else); DEP'T OF THE INTERIOR, REGULATORY IMPACT ANALYSIS OF THE FINAL STREAM PROTECTION RULE (Nov. 2016) (providing no explanation at 3-1 to 3-21 or elsewhere for ending the cost-benefit analysis in 2040); FOOD & DRUG ADMIN., DEP'T OF HEALTH & HUMAN SERVS., REGULATORY IMPACT ANALYSIS FOR USE OF SYMBOLS IN LABELING FINAL RULE (July 2016) (providing no explanation at 5-6, 14, 17, or elsewhere for using a 20-year analytical time frame); ENV'T PROT. AGENCY, REGULATORY IMPACT ANALYSIS FOR THE FINAL REVISIONS TO THE EMISSION GUIDELINES FOR EXISTING SOURCES AND THE FINAL NEW SOURCE PERFORMANCE STANDARDS IN THE MUNICIPAL SOLID WASTE LANDFILLS SECTOR (July 2016) (providing no explanation at ES-2, 1-2, or elsewhere for ending analysis of the final emission guidelines in 2040); DEP'T OF ENERGY, TECHNICAL SUPPORT DOCUMENT: ENERGY EFFICIENCY PROGRAM FOR CONSUMER PRODUCTS AND COMMERCIAL AND INDUSTRIAL EQUIPMENT: COMMERCIAL PACKAGED BOILERS (Mar. 2016) (analyzing national energy savings, consumer savings, and emissions impacts over a 30-year period but providing no explanation for this choice at 1-1, 10-3 to 10-5, 10D-9, 13-3, or anywhere else); DEP'T OF ENERGY, TECHNICAL SUPPORT DOCUMENT: ENERGY EFFICIENCY PROGRAM FOR CONSUMER PRODUCTS AND COMMERCIAL AND INDUSTRIAL EQUIPMENT: BATTERY CHARGERS (July 2015) (analyzing national energy savings, consumer savings, and emissions impacts over a 30-year period but providing no explanation for this choice at 1-1, 10-8, 13-5, 17-2, or anywhere else); FOOD & DRUG ADMIN., DEP'T OF HEALTH & HUMAN SERVS., REGULATORY IMPACT ANALYSIS FOR FOOD LABELING: CALORIE LABELING OF ARTICLES OF FOOD IN VENDING MACHINES (Nov. 2014) (providing no explanation at 4, 7-8, 39, or elsewhere for using a 20-year analytical time frame); ENV'T PROT. AGENCY, REGULATORY IMPACT ANALYSIS FOR PETROLEUM REFINERIES NEW SOURCE PERFORMANCE STANDARDS JA (Apr. 2012) (estimating costs and benefits for the year 2017 but providing no explanation at 1-4, 1-5, or elsewhere why a single year analysis is appropriate or why, assuming it is appropriate, 2017 is the correct year for analysis); ENV'T PROT. AGENCY & NAT'L HIGHWAY TRAFFIC SAFETY ADMIN., DRAFT REGULATORY IMPACT ANALYSIS FOR PROPOSED RULEMAKING TO ESTABLISH GREENHOUSE GAS EMISSIONS STANDARDS AND FUEL EFFICIENCY STANDARDS FOR MEDIUM- AND HEAVY-DUTY ENGINES AND VEHICLES (Oct. 2010) [hereinafter MDV/HDV STANDARDS DRAFT RIA] (providing no explanation at ES-1, 9-33, or elsewhere for ending the cost-benefit analysis in 2050); see also PIPELINE & HAZARDOUS MATERIALS SAFETY ADMIN., DEP'T OF TRANSP., AMENDMENTS TO PARTS 192 AND 195 TO REQUIRE VALVE INSTALLATION AND MINIMUM RUPTURE DETECTION STANDARDS FINAL RULE 43 (Mar. 2022) (specifying an analytical time frame only for "incremental procedural costs" and providing no explanation, at 43 or elsewhere, for this or any other analytical time frame used); FISH & WILDLIFE SERV., DEP'T OF THE INTERIOR, REGULATORY IMPACT ANALYSIS FOR PROPOSED RULEMAKING FOR REGULATIONS GOVERNING TAKE OF MIGRATORY BIRDS 3 (Apr. 2021) (using a 10-year period to estimate the value of fines paid by industry but providing no explanation for this time frame); FED. R.R. ADMIN., DEP'T OF TRANSP., REGULATORY IMPACT ANALYSIS FOR PROPOSED AMENDMENTS TO BRAKE SYSTEM SAFETY STANDARDS GOVERNING

that did not provide meaningful insight into why a particular analytical endpoint was appropriate.²⁹

The following subsections explore two of these analyses in detail and illustrate how analytical time frames that truncate costs and benefits without sufficient explanation increase the risk of suboptimal policymaking.

A. Greenhouse Gas Emission Standards for Model Years 2023–26

In December 2021, EPA finalized the Revised LDV Standards for model years 2023–26.³⁰ In addition to the final rule, EPA evaluated a less stringent alternative that it referred to as “the Proposal,” and a more stringent alternative that it referred to as “Alternative 2 minus 10.”³¹ EPA estimated the costs and benefits of the final rule and both alternatives for “each calendar year [from 2023] through 2050.”³² However, the agency did not explain why it chose this 28-year analytical time frame.

OPERATIONS USING AN ELECTRONIC AIR BRAKE SLIP SYSTEM 10 (Dec. 2020) (providing no explanation for using 10-year analytical time frame); FED. AVIATION ADMIN., DEP’T OF TRANSP., OPERATION OF SMALL UNMANNED AIRCRAFT SYSTEMS OVER PEOPLE FINAL RULE 43 (Sept. 2020) (using a 10-year period of analysis to “capture the recurring effects of the rule” but providing no explanation why 10 years, as opposed to a longer period, is appropriate for this purpose); Examinations of Working Places in Metal and Nonmetal Mines, 82 Fed. Reg. 7680, 7692 (Jan. 23, 2017) (providing no explanation for using a 10-year period of analysis); ENV’T PROT. AGENCY, REGULATORY IMPACT ANALYSIS FOR THE FINAL MERCURY AND AIR TOXICS STANDARDS 1-12 (Dec. 2011) (providing no explanation for why costs and benefits were estimated for only a single snapshot year).

²⁹ NAT’L HIGHWAY TRAFFIC SAFETY ADMIN., DEP’T OF TRANSP., PRELIMINARY REGULATORY IMPACT ANALYSIS: PROPOSED RULEMAKING FOR MODEL YEARS 2024-2026 LIGHT-DUTY VEHICLE CORPORATE AVERAGE FUEL ECONOMY STANDARDS 13 & n.22 (Aug. 2021) (stating without elaboration that “[t]he extension [of the study period] through calendar year 2050 reflects a balance between completeness and uncertainty, as well as the need to capture the interactions of the new and used vehicle markets as the vehicles produced in MYs 2024-2026 are used, age, and retire”); ENV’T PROT. AGENCY, ECONOMIC ANALYSIS FOR REGULATION OF HEXACHLOROBUTADIENE (HCB) UNDER TSCA SECTION 6(h), at 4-1 (Dec. 2020) (observing that the analytical time frame must balance the need to capture all significant future net benefits against the uncertainty around when events might render the rule obsolete, but providing no explanation as to why the 25-year period chosen strikes the appropriate balance); ENV’T PROT. AGENCY, TECHNICAL SUPPORT DOCUMENT FOR THE FINAL RULE: USE OF LEAD FREE PIPES, FITTINGS, FIXTURES, SOLDER, AND FLUX FOR DRINKING WATER 4-8 (June 2020) (stating only that “one-time and yearly costs were projected over a 25-year time period to coincide with and allow comparison with other drinking water regulations,” and providing no discussion regarding the extent to which the chosen time frame captures the rule’s impacts); ENV’T PROT. AGENCY, REGULATORY IMPACT ANALYSIS FOR THE REPEAL OF THE CLEAN POWER PLAN, AND THE EMISSION GUIDELINES FOR GREENHOUSE GAS EMISSIONS FROM EXISTING ELECTRIC UTILITY GENERATING UNITS, at ES-3, 1-7 to 1-8 (June 2019) (ending cost-benefit analysis in 2037 for the circular reason that “this is the last year that may be represented with the analysis conducted for the [final snapshot] year of 2035” while also stating that the snapshot years were chosen because “each [are] representative of the surrounding years” and enable analysis of the 2023-2037 time frame); BUREAU OF LAND MGMT., DEP’T OF THE INTERIOR, REGULATORY IMPACT ANALYSIS FOR PROPOSED WASTE PREVENTION RULE 41 (Jan. 2016) [hereinafter PROPOSED WASTE PREVENTION RULE RIA] (stating only that “[b]eyond the initial 10-year period [of analysis] we expect the rule to have less of an impact”); FISH & WILDLIFE SERV., DEP’T OF THE INTERIOR, ECONOMIC ANALYSIS OF CRITICAL HABITAT DESIGNATION FOR THE GUNNISON SAGE-GROUSE, at ES-1 (Nov. 2014) (stating only that “[t]he 20-year analysis period reflects the maximum amount of time under which future activities and economic impacts associated with the Proposed Rule can be reliably projected, given available data and information”); FISH & WILDLIFE SERV., DEP’T OF THE INTERIOR, ECONOMIC ANALYSIS OF CRITICAL HABITAT DESIGNATION FOR THE NORTHERN SPOTTED OWL 2-15 (Nov. 2012) (justifying the choice of analytical time frame by reference to general OMB guidance and other general considerations as opposed to particular characteristics of the regulation); ENV’T PROT. AGENCY, ECONOMIC ANALYSIS FOR THE FINAL REVISED TOTAL COLIFORM RULE 7-5 (Sept. 2012) (stating that “one-time and yearly costs were projected over a 25-year time period to allow comparison with other drinking water regulations using the same analysis period,” but providing no discussion regarding the extent to which the chosen time frame captures the rule’s impacts).

³⁰ Revised 2023 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions Standards, 86 Fed. Reg. 74,434 (Dec. 30, 2021) [hereinafter 2023 Revised LDV Standards]. These standards are briefly discussed above. See Section I.A, *supra*.

³¹ 2023 Revised LDV Standards, 86 Fed. Reg. at 74,487.

³² See REVISED LDV STANDARDS RIA, *supra* note 14, at xvi, xx–xxi; see also *id.* at 3-13 (noting that “[t]he rulemaking’s analytical timeframe” is 2023–50); *id.* at 3-24 (stating that 2023–50 is the time frame of analysis for the final rule).

That EPA used 2050 as its analytical endpoint is quite notable. The agency used the same endpoint more than a decade prior when, in November 2010, it proposed GHG standards for medium- and heavy-duty engines and vehicles and analyzed costs and benefits from 2012 through 2050.³³ Thus, EPA used for its Revised LDV Standards an analytical time frame 11 years shorter without providing an explanation.

When an agency perennially employs the same endpoint for its analytical time frames (e.g., 2050) instead of extending the endpoint in step with the passage of time, analytical time frames grow increasingly shorter with each passing year.

As this example illustrates, when an agency perennially employs the same endpoint for its analytical time frames (e.g., 2050) instead of extending the endpoint in step with the passage of time, analytical time frames grow increasingly shorter with each passing year. The result is that, all else being equal, net-beneficial years that would previously have been captured by the agency’s cost-benefit analysis are now no longer within the analysis’s temporal scope.

Critically, it is possible that EPA’s unexplained decision to use 2050 as its endpoint played a decisive role in the policy design ultimately chosen, pointing the agency to a less stringent alternative than it might have chosen had it analyzed regulatory impacts farther into the future. EPA

concluded from its cost-benefit analysis that the “[n]et benefits for the Final Revised Standards exceed those of . . . [the more stringent] Alternative 2 minus 10 when using a 3 percent discount rate.”³⁴ The RIA estimates that, from 2023 through 2050, the final rule will generate \$190 billion in net benefits whereas Alternative 2 minus 10 is estimated to generate \$180 billion in net benefits.³⁵

But the RIA also shows how the respective policies are projected to perform in certain snapshot years, namely 2023, 2026, 2030, 2035, 2040, and 2050.³⁶ Looking at these snapshot years, it is apparent that while Alternative 2 minus 10 is relatively less net-beneficial at the outset, this alternative is equally—and, in some years, more—net-beneficial than the final rule in later years.³⁷ The net benefits trajectory for both alternatives strongly suggests that both policies will yield significant net benefits in 2051 and beyond, notwithstanding EPA’s unexplained decision to effectively value those benefits at zero.³⁸ Moreover, it is not clear from their respective trajectories that, had EPA extended its analytical time frame to 2060 or 2070, the final rule would have remained superior to Alternative 2 minus 10 in terms of total net benefits yielded.³⁹ Thus, by ending its cost-benefit analysis at 2050, EPA’s analysis may have pointed to a less stringent alternative than it would have with a longer time frame.

³³ See Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles, 75 Fed. Reg. 74,152 (Nov. 30, 2010); MDV/HDV STANDARDS DRAFT RIA, *supra* note 28, at ES-1 to ES-2 & tbl.1 (estimating rule-related benefits, costs, and net benefits for a 39-year period from 2012 through 2050).

³⁴ REVISED LDV STANDARDS RIA, *supra* note 14, at xxii.

³⁵ Compare *id.* at 10-4 tbl.10-6 (valuing climate benefits based on a 3 percent discount rate and discounting future net benefits to present value using a 3 percent discount rate), with *id.* at 10-12 tbl.10-18 (same).

³⁶ See *id.* at 10-4 tbl.10-6, 10-12 tbl.10-18.

³⁷ Compare *id.* at 10-4 tbl.10-6 (valuing climate benefits based on a 3 percent discount rate), with *id.* at 10-12 tbl.10-18 (same). For instance, in 2030, 2035, 2040, and 2050, EPA projects that the final rule will yield net benefits of -\$1.4 billion, \$13 billion, \$26 billion, and \$36 billion, respectively, while projecting that Alternative 2 minus 10 will yield net benefits of -\$0.77 billion, \$14 billion, \$26 billion, and \$36 billion, respectively. *Id.*

³⁸ See *id.*

³⁹ See *id.*

B. Methane Waste Prevention Proposed Rule⁴⁰

In February 2016, the Bureau of Land Management (BLM) proposed the Waste Prevention Rule to “reduce waste of natural gas from venting, flaring, and leaks during oil and natural gas production activities” on Federal and Indian lands.⁴¹ Among other measures, the proposal sought to reduce natural gas waste by requiring operators to limit gas flaring from development oil wells, control vapor emissions from oil storage tanks, use low- or no-bleed pneumatic controllers, and perform periodic leak detection and repair (LDAR).⁴²

BLM chose a 10-year analytical time frame for its cost-benefit analysis of the proposal, measuring costs and benefits from 2017 to 2026.⁴³ But the agency failed to offer a meaningful explanation for this choice, asserting only that “[b]eyond the initial 10-year period, we expect the rule to have less of an impact.”⁴⁴ Nowhere did BLM provide a basis for that expectation or otherwise explain why it chose a 10-year period of analysis.⁴⁵

BLM’s conclusory assertion that the rule would have “less of an impact” after 10 years was belied by the fact that, with respect to almost every proposed requirement, net benefits were on an increasing trajectory throughout the duration of the analysis.⁴⁶ And yet, despite this clear uptrend and the significant net benefits yielded in 2026, BLM chose to end its analysis in 2026 and thus effectively counted net benefits in 2027 and beyond to be zero.

This decision may have had a significant impact on the policy proposed. Consider, for example, the LDAR requirements evaluated by the agency. BLM proposed a semi-annual LDAR program that it estimated would result in net benefits of \$19–21 million for the first three years, \$35 million per year for the next five years, and \$48 million per year for the final two years that BLM analyzed.⁴⁷ Of the six alternative LDAR programs BLM considered, several yielded net benefits

⁴⁰ The Methane Waste Prevention Rule was finalized on November 18, 2016. Waste Prevention, Production Subject to Royalties, and Resource Conservation, 81 Fed. Reg. 83,008 (Nov. 18, 2016). For purposes of this report, we discuss the proposal to illustrate how, at the proposal stage, an agency’s failure to explain its choice of analytical time frame hinders the public’s ability to comment and may, as a result, ultimately impact the policy finalized. *See also infra* note 53.

⁴¹ Waste Prevention, Production Subject to Royalties, and Resource Conservation, 81 Fed. Reg. 6616, 6616 (Feb. 8, 2016).

⁴² *Id.* at 6619–23.

⁴³ PROPOSED WASTE PREVENTION RULE RIA, *supra* note 29, at 41.

⁴⁴ *Id.*

⁴⁵ *See id.*

⁴⁶ For example, BLM estimated that the proposed flaring limits would result in net benefits of \$13 million in the first year of the analysis (2017), \$19–20 million per year for the next two years (2018–19); \$27–29 million per year over the next five years (2020–24); and \$29–30 million per year for the final two years of the analysis (2025–26). *Id.* at 62 tbl.10, 64 tbl.11a (using 3 percent discount rate). Similarly, BLM estimated that the proposed pneumatic controller requirements would result in net benefits of \$54–55 million for the first three years, \$64 million per year for the next five years, and \$73 million per year for the final two years. *Id.* at 78, 79 tbl.16 (using 3 percent discount rate). The net benefits of other proposed requirements took on similar trajectories. *See, e.g., id.* at 87, 89 tbl.20 (estimating that, at a 3 percent discount rate, the proposed liquids unloading requirements would result in net benefits of \$35–37 million per year for the first three years, \$45–47 million per year for the next five years, and \$54–55 million per year for the final two years); *id.* at 94, 96 tbl.26, 98 tbl.27a (estimating that, at a 3 percent discount rate, the storage tank control requirements would result in net benefits of \$2 million per year for the first three years, \$3–4 million per year for the next five years, and \$5 million per year in the final two years).

⁴⁷ *Id.* at 113 tbl.33, 114 tbl.34a (using 3 percent discount rate). These figures assumed that EPA would not finalize its proposal to amend the New Source Performance Standards for oil and gas sources by setting standards for methane and volatile organic compounds. *See id.* at 108–09. This proposal, which was issued roughly five months prior to BLM’s proposed Waste Prevention Rule but was not yet finalized, see Oil and Natural Gas Sector: Emission Standards for New and Modified Sources, 80 Fed. Reg. 56,593 (Sept. 18, 2015), would have affected the number of sources impacted by BLM’s rule. *See* PROPOSED WASTE PREVENTION RULE RIA, *supra* note 29, at 4–5. BLM also calculated net benefits of the proposed LDAR requirements assuming that EPA would finalize its proposal. *Id.* at 109. But in comparing the proposed requirements to various alternatives considered, BLM “use[d] a baseline without a final [EPA regulation].” *Id.* The agency noted, however, that if EPA ultimately finalized its regulation (which it in fact did, *see* Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources, 81 Fed. Reg. 35,824 (June 3, 2016)), “both the costs and benefits of these alternatives would be slightly lower.” PROPOSED WASTE PREVENTION RULE RIA, *supra* note 29, at 109.

superior to that of the proposed program.⁴⁸ For instance, one of the alternatives—a quarterly LDAR program for gas wells in conjunction with an annual LDAR program for oil wells (Alternative 1)—was estimated to result in net benefits of \$24–27 million per year for the first three years, \$44 million per year for each of the next five years, and \$60 million per year for the final two years.⁴⁹ Although BLM recognized that the proposed requirements yielded what it called “slightly less net benefits,”⁵⁰ BLM chose this approach “because it more closely resemble[d]” EPA’s pending proposal to amend the New Source Performance Standards for the oil and natural gas source category.⁵¹

But this calculus might have been different had BLM extended its analysis beyond ten years. BLM projected that the margin between Alternative 1’s projected net benefits and that of the proposed LDAR requirements was \$5 million in the first year, \$6 million per year for the following two years, \$9 million per year in each of the next five years, and \$12 million per year for the final two years.⁵² Nothing in this trajectory suggests that the estimated margin would begin to level off in 2027, let alone shrink. But even assuming, for argument’s sake that, beginning in 2027, this margin decreased to \$10 million per year for the next three years before falling by half to \$5 million per year for the following three, Alternative 1 would still yield an additional \$45 million in net benefits over the six years immediately succeeding BLM’s analysis. This would represent a 50 percent increase over and above the \$86 million in additional net benefits already generated by Alternative 1. It is possible that additional net benefits of this magnitude would have been sufficient to transform Alternative 1’s net benefits advantage from “slight[.]” to significant, perhaps leading BLM to choose Alternative 1 over the semi-annual LDAR requirements it ultimately proposed. But because BLM ended its analysis after ten years, it is impossible to know.⁵³

Unknowns of this sort are precisely why BLM’s limited explanation for its choice of analytical time frame is deficient. By failing to offer any basis for its “expect[ation]” that the proposal would have “less of an impact” after ten years,⁵⁴ BLM provided no assurance that this choice was the product of sufficient reflection and diminished stakeholders’ ability to meaningfully evaluate and scrutinize that choice—both increasing the likelihood of a suboptimal policy choice.

⁴⁸ PROPOSED WASTE PREVENTION RULE RIA, *supra* note 29, at 111–12.

⁴⁹ *Id.* at 113 tbl.33, 120 tbl.34g (using 3 percent discount rate); *see also, e.g., id.* at 113 tbl.33, 117 tbl.34d (estimating that, using 3 percent discount rate, a semi-annual LDAR program with a one-time LDAR inspection for marginal oil wells would result in net benefits of \$24 million the first year, \$34–35 million per year for the next two years, \$47 million per year in each of the following five years, and \$58 million per year for the final two years).

⁵⁰ *Id.* at 112. This characterization was dubious given that Alternative 1 yielded approximately 26 percent more in net benefits over the 10-year period of analysis—roughly \$86 million in total—than the proposed LDAR requirements. *Compare id.* at 114 tbl.34a (projecting \$331 million in total net benefits using 3 percent discount rate) *with id.* at 120 tbl.34g (projecting \$417 million in total net benefits using 3 percent discount rate).

⁵¹ *Id.* at 112.

⁵² *Compare id.* at 114 tbl.34a (using 3 percent discount rate), *with id.* at 120 tbl.34g (using 3 percent discount rate).

⁵³ It is also impossible to know the extent to which this choice affected the final rule. BLM finalized, with some modification, the LDAR requirements it proposed. The agency estimated in the final rule that these requirements would produce \$380–386 million in net benefits (net present value using a 3 percent discount rate) over the 10-year period analyzed. BUREAU OF LAND MGMT., DEP’T OF THE INTERIOR, REGULATORY IMPACT ANALYSIS FOR FINAL WASTE PREVENTION RULE 91 (Nov. 2016); *see also id.* at 154–55 (Appendix A-6). By contrast, the net benefits achieved by Alternative 1, as estimated in the proposal, were only slightly fewer. *See* PROPOSED WASTE PREVENTION RULE RIA, *supra* note 29, at 120 tbl.34g (presenting a stream of net benefits that, when discounted to present value using a 3 percent rate, totals \$357 million). It is possible that this approximately 6 percent difference would have disappeared or even reversed using a longer period of analysis. It is also possible that—had BLM had the benefit of receiving “many detailed comments” on Alternative 1, as it did on the proposed LDAR requirements, *see* Waste Prevention, Production Subject to Royalties, and Resource Conservation, 81 Fed. Reg. 83,008, 83,028 (Nov. 18, 2016)—the agency could have modified and/or improved upon Alternative 1 to yield greater net benefits during the 10-year period analyzed. Ultimately, however, Alternative 1 was not among the alternative considered in the final rule, and BLM did not mention Alternative 1 in the preamble to the final rule or its Response to Comments document. *See id.* at 83,026–34; BUREAU OF LAND MGMT., RESPONSES TO PUBLIC COMMENTS ON FINAL RULE, WASTE PREVENTION, PRODUCTION SUBJECT TO ROYALTIES, AND RESOURCE CONSERVATION, 191–251 (Nov. 2016).

⁵⁴ PROPOSED WASTE PREVENTION RULE RIA, *supra* note 29, at 41.

III. Occasionally, However, Agencies Choose Analytical Time Frames in Accordance with *Circular A-4's* Guidance

While agencies often fail to sufficiently analyze more stringent alternatives by truncating the analytical time frame, there are counterexamples in which agencies have used longer time frames and/or provided more detailed explanations for their analytical choices. For instance, some of the analyses examined by Policy Integrity provided relatively informative explanations for their choice of analytical time frame.⁵⁵ These examples can serve as models to help inform future progress in this area.

In 2015, for example, EPA finalized the Coal Ash Rule, regulating the disposal of coal combustion residuals (CCR) as solid waste under the Resource Conservation and Recovery Act.⁵⁶ This rule established various minimum national criteria for CCR landfills, CCR surface impoundments, and lateral CCR unit expansions, including location restrictions, operating requirements, groundwater monitoring, and closure and post-closure care requirements.⁵⁷

EPA used a 100-year analytical time frame for its cost-benefit analysis.⁵⁸ In a dedicated subsection of the RIA entitled “Period of Analysis,” EPA explained that it chose a 100-year analytical time frame because “[t]he onset and duration of many of the human health and environmental benefits of the [Coal Ash Rule] may extend at least 100 years or more into

⁵⁵ BUREAU OF SAFETY & ENV'T ENF'T, BUREAU OF OCEAN ENERGY MGMT., DEP'T OF THE INTERIOR, INITIAL REGULATORY IMPACT ANALYSIS FOR OIL AND GAS AND SULFUR OPERATIONS ON THE OUTER CONTINENTAL SHELF—REQUIREMENTS FOR EXPLORATORY DRILLING ON THE ARCTIC OUTER CONTINENTAL SHELF 29 (Dec. 2020) (explaining that an analytical “period of 10 years is too short to show the effects of the revised rule” and that “analysis of the activity period does not extend beyond 20 years of activities because a longer period introduces greater uncertainty associated with predicting exploration activity and the advancement of technical capabilities applicable to Arctic drilling”); ENV'T PROT. AGENCY, ECONOMIC ANALYSIS OF THE FORMALDEHYDE STANDARDS FOR COMPOSITE WOOD PRODUCTS ACT FINAL RULE 5-1 (July 2016) [hereinafter COMPOSITE WOOD STANDARDS ECONOMIC ANALYSIS] (explaining that the 30-year analytical time frame was designed to “capture the important effects of the policy” while minimizing uncertainties around future development of new manufacturing technologies that could change formaldehyde emission rates and/or reduction costs as well as changing demographics, medical treatments for adverse health effects, and consumer preferences); FOOD & DRUG ADMIN., DEP'T OF HEALTH & HUMAN SERVS., REGULATORY IMPACT ANALYSIS FOR FINAL RULES ON: FOOD LABELING: REVISION OF THE NUTRITION AND SUPPLEMENT FACTS LABELS AND FOOD LABELING: SERVING SIZES OF FOODS THAT CAN REASONABLY BE CONSUMED AT ONE EATING OCCASION 9 n.2 (May 2016) (explaining that “[a] time frame of more than 20 years begins to be rather speculative” because likely changes in food, drug, and supplement technologies and medical treatments will impact the potential benefits of the rules); OFF. OF AIR & RADIATION, ENV'T PROT. AGENCY, REGULATORY IMPACT ANALYSIS OF THE FINAL OIL AND NATURAL GAS SECTOR: EMISSION STANDARDS FOR NEW, RECONSTRUCTED, AND MODIFIED SOURCES 3-9 TO 3-10 (May 2016) (explaining information limitations and other factors preventing analysis beyond 2025); DEP'T OF LAB., ECONOMIC ANALYSIS FOR OCCUPATIONAL EXPOSURE TO BERYLLIUM FINAL RULE AT V-2 (2016) (explaining that the 60-year analytical time frame used “reflects the typical time needed to recognize the full benefits of a rule with cancer-avoiding benefits (in this case, a 45-year working life, plus a 10-year latency period for cancer, plus 5 years of ongoing health effects after retirement) and reach steady-state values”); OCCUPATIONAL SAFETY & HEALTH ADMIN., DEP'T OF LAB., ECONOMIC ANALYSIS FOR OCCUPATIONAL EXPOSURE TO RESPIRABLE CRYSTALLINE SILICA FINAL RULE, AT V-1 TO V-2 (Mar. 2016) (same); OFF. OF RES. CONSERVATION & RECOVERY, ENV'T PROT. AGENCY, REGULATORY IMPACT ANALYSIS FOR EPA'S 2015 RCRA FINAL RULE REGULATING COAL COMBUSTION RESIDUAL (CCR) LANDFILLS AND SURFACE IMPOUNDMENTS AT COAL-FIRED ELECTRIC UTILITY POWER PLANTS 2-29 (Dec. 2014) [hereinafter COAL ASH RULE RIA] (explaining that disposal unit lifespans, groundwater migration, and illness latency necessitate use of a 100-year period of analysis).

⁵⁶ Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities, 80 Fed. Reg. 21,302 (Apr. 17, 2015).

⁵⁷ *Id.* at 21,304–05.

⁵⁸ COAL ASH RULE RIA, *supra* note 55, at 2-29 (“[T]his RIA applies a 100-year future period of analysis extending from 2015 to 2114.”).

the future.”⁵⁹ Supporting this conclusion, EPA noted that its regulatory impact analysis used an 80-year average historical lifespan for CCR landfills and that some of the longest operating CCR impoundments at the time had been operating for 70–84 years.⁶⁰ The agency also explained that significant time can pass before CCR leachate reaches groundwater drinking wells and that, according to the agency’s CCR risk assessment, the arrival leachate concentration of arsenic peaks at 75 years.⁶¹ Following such exposure, EPA noted that the latency period for the onset of cancer is approximately 20 years, on average.⁶²

Similarly, in 2016, EPA finalized formaldehyde emission standards for composite wood products to “reduce exposures to formaldehyde and avoid adverse health effects.”⁶³ EPA analyzed costs and benefits over a 30-year time frame.⁶⁴ In a subsection entitled “Discounting and Time Frame for the Analysis,” the agency addressed several factors bearing on the length of the analysis.⁶⁵ In particular, EPA explained that, over time, it would be increasingly likely that new manufacturing technologies would be developed that could change formaldehyde emission rates and/or reduction costs.⁶⁶ EPA further explained that “uncertainties about changing demographics, medical treatments for adverse health effects, and consumer preferences for composite wood products”—all of which would affect the rule’s costs and benefits—would likewise increase with time.⁶⁷ The 30-year time frame was therefore selected to “capture[s] the important effects of the policy” while minimizing the various uncertainties that arise as the analysis extends further into the future.⁶⁸

Explanations of this depth and clarity help ensure that the agency has rationally and adequately considered its choice of analytical time frame and, in the case of a proposed RIA, allow stakeholders to meaningfully engage with the agency on the propriety of that choice. All agencies should seek to emulate this approach in their cost-benefit analyses.

⁵⁹ *Id.*

⁶⁰ *Id.*

⁶¹ *Id.*

⁶² *Id.*

⁶³ Formaldehyde Emission Standards for Composite Wood Products, 81 Fed. Reg. 89,674, 89,676 (Dec. 12, 2016).

⁶⁴ COMPOSITE WOOD STANDARDS ECONOMIC ANALYSIS, *supra* note 55, at 5-1.

⁶⁵ *Id.*

⁶⁶ *Id.*

⁶⁷ *Id.*

⁶⁸ *Id.*

IV. Recommendations for Improvement

An agency's choice of analytical time frame is a critical component of any cost-benefit analysis. This decision can affect the substantive assessment of costs and benefits and may lead to insufficiently stringent regulation—or no regulation where there should be—since truncated analytical time frames tend to disproportionately shortchange benefits rather than costs. When an agency fails to explain why it chose a given analytical time frame, its methodological choices are obscured, and the agency increases its likelihood of choosing a suboptimal policy. And yet despite these risks, federal agencies often devote scarce attention to the analytical time frames in their cost-benefit analyses.

OMB should address the concerns highlighted in this report as part of its ongoing review of *Circular A-4*.⁶⁹ In particular, OMB should consider incorporating the five recommendations outlined below into any updated guidance it issues. These recommendations are designed to ensure that both agencies and the public understand whether and how an agency's choice of analytical time frame affects its substantive assessment of costs and benefits. OMB might also consider revising the guidance to include concrete examples of sufficiently detailed time frame explanations. Ultimately, the updated guidance should push agencies to devote more thorough attention to their choice and explanation of the analytical time frame, and OMB should better ensure, as part of its oversight of regulatory review, that agencies properly conduct this analysis.

1. Identify and Discuss the Analytical Time Frame in a Dedicated Section

Regulatory impact analyses should contain a dedicated section in which the agency explains its choice of analytical time frame. Within this section, the agency should explicitly identify how far into the future a rule and its alternatives are expected to continue to generate significant costs and benefits and explain in some detail the basis for that expectation.

2. Explain in Detail Any Limitations Affecting the Choice of Analytical Time Frame

If there are significant long-term costs or benefits the agency is unable to analyze due to data limitations or uncertainty, the agency should describe those limitations in detail. With respect to data limitations, it should be noted that agencies have previously extrapolated the social cost of greenhouse gases beyond 2050,⁷⁰ which is currently the final year for which the Interagency Working Group on the Social Cost of Greenhouse Gases provides estimates.⁷¹ Agencies should therefore value greenhouse gas reduction benefits as far into the future as necessary to capture all significant benefits of the policy under consideration.

⁶⁹ Memorandum on Modernizing Regulatory Review § 2(b)(i), 86 Fed. Reg. 7223, 7223 (Jan. 26, 2021) (calling for OMB to “identify ways to modernize and improve the regulatory review process, including through revisions to OMB's Circular A-4”).

⁷⁰ See, e.g., REVISED LDV STANDARDS RIA, *supra* note 14, at 3-34 to 3-35 tbls.3-8 to 3-10 (presenting interim global SC-GHG estimates through 2070); *id.* at 3-34 note o (“The [IWG] provides SC-GHG estimates through emissions year 2050. Estimates were extended for the period 2051 to 2070 using the IWG methods, assumptions, and parameters identical to the 2020-2050 estimates.”).

⁷¹ See INTERAGENCY WORKING GROUP ON SOCIAL COST OF GREENHOUSE GASES, TECHNICAL SUPPORT DOCUMENT: SOCIAL COST OF CARBON, METHANE, AND NITROUS OXIDE INTERIM ESTIMATES UNDER EXECUTIVE ORDER 13990, at 5-6 tbls.ES-1 to ES-3 (Feb. 2021).

3. Address Whether the Analysis Is Sensitive to the Choice of Analytical Time Frame

Regulatory analyses should explicitly discuss the extent to which the sign of net benefits or the relative rankings of policy alternatives are sensitive to the choice of analytical time frame.⁷² This may entail some description or characterization of what costs and/or benefits, if any, occur beyond the time horizon. This might also entail conducting a sensitivity analysis of the policy and alternatives using shorter and longer time frames.

4. Conduct a Temporal Break-Even Analysis When Significant Costs or Benefits Occur Beyond the Analytical Time Frame

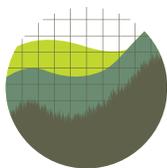
When a regulation has significant costs or benefits that go beyond the analytical time frame but cannot be reasonably quantified, the agency should consider conducting a temporal break-even analysis that identifies the number of additional years, if any, the policy under consideration would need to produce net benefits to become cost-benefit justified in current dollars (or to improve its relative ranking among alternatives).⁷³ For instance, consider a regulation whose total costs exceed total benefits by \$10 million as of the final year of the agency's cost-benefit analysis, but which generates additional benefits beyond the analytical time frame. In such a case, the agency should identify how many additional years the policy would need to generate net benefits at the current trajectory to become cost-benefit justified, and then assess whether the policy is likely to generate such net benefits given the additional unquantified benefits.

5. Maintain the Analytical Time Frame's Length, at Minimum, in Subsequent Rulemakings

For rulemakings concerning the same or similar subjects, agencies should aspire to maintain the length of analysis in subsequent rulemaking. For instance, if a regulation issued ten years ago analyzed costs and benefits out to 2050, a new regulation of the same kind should analyze costs and benefits out to at least 2060, barring a compelling reason otherwise.

⁷² See EPA GUIDELINES, *supra* note 6, at 6-6.

⁷³ Rowell, *supra* note 10, at 1238 (proposing that agencies “include an end point to their [analytical] time scope that extends at least to the ‘temporal break-even point’”); see also HHS GUIDELINES, *supra* note 8, at 6-7 (“In some cases, there may be a significant time lag between when costs are incurred and when benefits accrue or vice-versa. In such cases, the analysis should cover the full time period between when the impacts first occur and when benefits and costs are expected to achieve equilibrium.”).



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