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U.S. Environmental Protection Agency
National Center for Environmental Economics
Office of Policy
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Subject: Comment on the U.S. Environmental Protection Agency's Advanced Notice of Proposed Rulemaking on "Increasing Consistency and Transparency in Considering Costs and Benefits in the Rulemaking Process" (83 Fed. Reg. 27,524 (June 13, 2018).

Dear Sir/Madam:

The American Petroleum Institute ("API") provides these comments on the U.S. Environmental Protection Agency's ("EPA's" or "the Agency's") Advanced Notice of Proposed Rulemaking on "Increasing Consistency and Transparency in Considering Costs and Benefits in the Rulemaking Process" ("ANPRM").[1] We believe that this ANPRM is a positive step toward improving the consistency and transparency of the Agency's consideration of the costs and benefits of regulatory action. API represents over 625 oil and natural gas companies, leaders of a technology-driven industry that supplies most of America's energy, supports more than 10.3 million jobs and nearly 8 percent of the U.S. economy, and, since 2000, has invested more than $3 trillion in U.S. capital projects to advance all forms of energy, including alternatives.

[1] 83 Fed. Reg. 27,524 (June 13, 2018).

America is now the world's leading producer and refiner of oil and natural gas, a reality that was unimaginable just a decade ago. We have transitioned from an era of energy scarcity and dependence to one of energy abundance and security. The developments of the past decade have brought cost savings for American consumers, good paying jobs, renewed opportunities for U.S. manufacturing, a stronger economy and greater national security. Record U.S. production and refining is happening alongside greater environmental progress: CO_2 emissions from power generation are down to 30-year lows, thanks in large part to greater use of natural gas. Also, cleaner burning transportation fuels and industry investments in emissions-reducing technologies have enabled reduced emissions of criteria air pollutants. Energy abundance has helped cut energy and material costs for American manufacturers and is helping to attract manufacturing back to the United States.

Technological innovations and industry leadership have propelled the oil and gas industry forward, despite the unprecedented level of federal regulatory actions that have targeted our industry. While we do not wish to return to an era without effective environmental regulations, API believes it is time for EPA to more carefully consider the Agency's regulatory approach. Notwithstanding the drastic improvements to air and water quality over the past several decades, the pace of regulatory activity has only increased. The 2015 Ozone National Ambient Air Quality Standards ("NAAQS"), for instance, required states to achieve attainment with ozone levels that approach naturally-occurring background levels. EPA rules and permit conditions are also increasingly imposing emission and effluent limits so stringent that they are near, if not lower than the limits of detection for many laboratory analyses, not to mention sensors designed for use in the field. EPA has justified this approach through a belief that the Agency is required to promulgate new compliance targets no matter how costly and to address all risk no matter how remote or speculative. Simply put, society is spending more and more for smaller and smaller pollutant reductions and for less and less environmental benefit.

This increasing disproportionality between compliance costs and environmental gains adversely impacts not only the industries subject to these ever-tightening regulations, but also EPA's ability to meet its environmental protection mandates. EPA must operate within the limits of its resources, and it must consider the opportunity costs of its actions. Funding and staffing resources may be unwisely devoted to rules designed to reduce emissions and discharges past the point where risk can reasonably be inferred and without meaningful consideration of costs. This approach may be sapping funds that could be used for critical environmental challenges that may be inadequately addressed, such as improving the national water treatment and wastewater infrastructure system.

As such, API supports EPA's interest in improving the consistency and transparency of its calculation and consideration of regulatory costs and benefits. These economic considerations, which are required in numerous statutes and executive orders, were mandated precisely for the purpose of improving the efficacy of environmental regulation and the allocation of both industry and Agency resources.

An effort to improve the consistency and transparency of these analyses should not, therefore, be viewed as an effort to abandon the Agency's pursuit of improved environmental outcomes – nor

has API ever advocated for such a result. Rather, responsible public policy should rely on a more rational prioritization of resources that is informed by a meaningful weighing of compliance burdens against the risks in full consideration of the uncertainty associated with those risks. This ANPRM is a critical step toward that important goal.

API appreciates the opportunity to provide these detailed comments that follow. We look forward to working with EPA in improving the transparency and consistency of the Agency's consideration of costs and benefits. If you have any questions, please contact Ted Steichen at (202) 682-8568 or steichent@api.org.

Sincerely,

/s/

Howard J. Feldman

COMMENTS OF THE AMERICAN PETROLEUM INSTITUTE ON INCREASING CONSISTENCY AND TRANSPARENCY IN CONSIDERING COSTS AND BENEFITS IN THE RULEMAKING PROCESS

ADVANCED NOTICE OF PROPOSED RULEMAKING

83 Fed. Reg. 27,524 (June 13, 2018)

Docket ID No. EPA-HQ-OA-2018-0107

August 13, 2018

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Exhibit 11: Dr. Anne E. Smith (NERA Economic Consulting) written comments and testimony in the SAB's proceedings

I. SUMMARY OF RECOMMENDATIONS

In the sections that follow, API offers a number of recommendations that we believe can improve the consistency and transparency of EPA cost-benefit analyses. These recommendations include identification of elements of cost-benefit analyses that we believe are amenable to greater standardization and improvement, measures to improve EPA's process for evaluating and utilizing costs and benefits, options for improving the Agency's understanding of regulatory burdens on industry sectors, and procedures to ensure that the changes that the Agency may adopt pursuant to this ANPRM are promulgated in a clear, transparent, and legally defensible manner.

Each of these recommendations is supported with examples of problematic elements of some of EPA's past cost-benefit analyses, detailed explanations of alternative approaches that could have improved those prior analyses, and extensive discussion of the statutes, regulations, guidance, and directives under which EPA's analyses should be conducted. Given the detail API provided in these sections, they are necessarily lengthy. As such, we are providing here a comprehensive list of the recommendations API explains in more detail in the sections that follow.

- API recommends that EPA should follow Circular A-4 in the rulemaking efforts as described below and should build these requirements into any and all regulations published as an outcome of this ANPRM. As part of that approach, a key issue to address further is how co-benefits of criteria and hazardous air pollutants are estimated in other rulemakings to prevent distortion of regulatory benefits.

- API recommends that all EPA cost-benefit analyses consider impacts using 3 percent and 7 percent discount rates, and that the real discount rate of 7 percent be used as a base-case for regulatory analysis. In certain narrow instances where EPA must consider important intergenerational costs and benefits, EPA could utilize a lower positive interest rate, but only after both transparently conducting a sensitivity analysis and providing regulatory stakeholders with an opportunity to review and comment on the Agency's proposed use of a lower discount rate. To accomplish this, EPA should request comments at the proposed rule phase for any rule for which EPA believes they may utilize a discount rate other than those specified in Circular A-4.

- In order to conduct a valid and legally-defensible cost-benefit analysis, EPA's analysis should be constructed to weigh domestic costs against domestic benefits.

- When the Agency proposes to regulate based on uncertain or speculative benefits, EPA must exercise utmost diligence in assuring that its cost-benefit analyses and each assumption, data gap, and source of uncertainty is transparently portrayed and fully disclosed. This diligence and transparency in appropriately characterizing uncertainty should be considered both with respect to uncertainty in the risk assessment as well as uncertainty in the benefit economic value determination.

    - Address uncertainties in risk assessments clearly and transparently:

        - Increase transparency in use of weight-of-evidence criteria;
        - Increase transparency in how EPA addresses inter- and intra-individual variability when assessing adverse effects;
        - Require the use of available tests to analyze the potential for model misspecification;
        - Increase transparency regarding the key assumptions affecting dose-response models;
        - Increase transparency regarding the reasons for geographic inconsistencies in epidemiology results and their implications regarding benefit estimates; and,
        - Include within rulemaking dockets an integrated assessment of the major sources of uncertainty identified through sensitivity analysis as having a significant effect on the resulting risk estimates.
    - When faced with uncertain economic outcomes, EPA should also undertake a meaningful effort to quantify uncertainty and should factor uncertainty into its decision-making.
        - EPA should exercise its discretion to refrain from regulating in the face of highly uncertain outcomes or conduct some discounting commensurate with the level of uncertainty of the surmised benefits; and
        - EPA should follow OMB Circular A-4 by taking steps to transparently portray uncertainty by disclosing its sources and, wherever possible, quantifying its extent.
- EPA should focus its cost-benefit analysis on the pollutant it proposes to regulate:
    - API recommends that EPA abandon its prior approach of relying on the co-benefit of $PM_{2.5}$ reductions to justify rules targeting other pollutants.
    - API does not believe, however, that EPA needs to wholly abandon all consideration of the co-benefits of reducing ancillary pollutants. These considerations may be appropriate if conducted in accordance with sound scientific, economic, and statistical principles. API simply requests that when utilizing cost-benefit analysis to justify rulemakings, EPA ensures through regulations that the regulated pollutant drives the cost-benefit analysis.
- Wherever permissible, EPA should more closely follow OMB Circular A-4's directive to avoid worst-case and overly conservative assumptions.

- EPA should use more probabilistic approaches and account for worst case scenarios through the presentation of uncertainty.

- EPA should also scrutinize the science and data the Agency uses in regulatory analyses to ensure they remain valid, credible, devoid of obvious bias, consistent with EPA's Principles of Scientific Integrity, and realistic.

- API recommends that EPA transparently revisit and reconsider the credibility and validity of its method of extrapolating $PM_{2.5}$-related mortality risks below the Lowest Measured Level ("LML").

- EPA should not use "deterministic" air quality models—particularly when the Agency is aware of approaches that can more accurately predict real-world impacts.

- At a minimum, EPA should provide more information on its Mortality Risk Valuation, as well as the use and measurement of the Value of a Statistical Life ("VSL") in economic analyses.

- API recommends that EPA limit its use of hypothetical populations and take steps to validate the assumptions it builds into these hypothetical populations so that they can be used to provide more realistic assessments of potential impacts. At a minimum, EPA should explain each of the assumptions on which it relied in its use of hypothetical populations to assess risk and the uncertainties associated with said assumptions.

- API supports the updated modeling effort EPA is employing in its present review of the Clean Power Plan and encourages EPA to take further steps to more broadly update its approach to establishing credible baselines from which to measure the costs and benefits of proposed actions.

- API recommends that EPA's cost-benefit analyses consider indirect costs and the broader impacts of proposed regulatory actions, including impacts on jobs, energy security, and viability of the regulated community as well as indirectly impacted industries.

    - API further recommends that EPA work with potentially impacted industries to obtain the best possible understanding of the nature and extent of the costs that will be incurred as a result of a proposed regulatory action.

    - API recommends that EPA's cost-benefit analyses utilize a whole economy approach that focuses more broadly on the economic and employment impacts of proposed actions by taking into account the cascading effects of a regulatory change across interconnected industries and markets nationwide.

- Unless expressly prohibited by statute, EPA should conduct and base regulatory decisions on cost-benefit analyses.

- API recommends that EPA not only expansively interpret its authority to consider costs under the Agency's governing statutes, but actually make regulatory decisions that are consistent with the outcome of EPA's analyses.

- API suggests EPA issue a rule to ensure that Agency decisions are based on sound cost-benefit analyses unless expressly prohibited. Due to the varying ways in which EPA must consider costs under different statutes or portions thereof, API suggests that EPA may need to consider statute-specific rulemakings to ensure that the necessary variations are taken into account.

- API recommends that EPA undertake a cross-cutting review of the cumulative impact of multiple regulations on specific industries.

- While we support EPA's interest in conducting more retrospective reviews of its regulations, API cautions that there are many challenges which EPA must first work through before undertaking any extensive efforts.

  - EPA should ensure that the retrospective reviews are conducted in ways that minimize the costs on industry and still yield meaningful improvements to the Agency's cost and benefit calculations.

  - API recommends that EPA ensure that the impacted industry has the ability and desire to support such an effort.

  - If EPA decides to conduct retrospective costs analyses and/or further evaluate its ability to conduct meaningful comparisons of *ex ante* and *ex post* costs, API recommends that the Agency specifically seek out *ex post* evidence of unanticipated indirect cost and economy-wide impacts that may have been incurred.

- API recommends that EPA improve its approach to cost-benefit analyses through multiple rulemaking processes and, to the extent possible, avoiding reliance on guidance documents.

  - Specifically, API suggests EPA consider a statute-specific approach, as we believe this would strike the right balance between the need for consistency and the challenges associated with variations from statute to statute.

    - API also suggests EPA begin its statute-specific rulemakings with a rule for the Clean Air Act.

  - API also believes EPA should improve how the Agency documents cost-benefit analyses in rulemakings, and specifically address this in any regulatory actions which occur as a result of this ANPRM.

    - Specifically, API believes that improved documentation in two areas would significantly improve the consistency and transparency of EPA's cost-benefit analysis:

- Presentation of the results of Agency cost-benefit analyses in a simple manner that can be easily understood by the general public; and,

- Presentation of a full accounting of each RIA including detailed explanations for each decision and assumption so that interested stakeholders have a complete understanding of EPA's methodology.

- To the greatest extent possible, changes to the way EPA conducts cost-benefit analyses should be done through notice-and-comment rulemaking.

II. GREATER TRANSPARENCY AND CONSISTENCY IN EPA'S CONSIDERATION OF COSTS AND BENEFITS IS NEEDED

EPA is required to consider costs and benefits in rulemaking under multiple statutes, under numerous different provisions within those statutes, and under various executive orders. These requirements differ in specificity (*e.g.*, explicit or implicit, proscriptive or open-ended, detailed or general), and they have been interpreted by EPA and courts in an even more divergent manner. Regardless of the statute or executive order requiring the consideration of cost and benefits, however, the goal of the requirement is always the same – to improve environmental regulation and the manner in which EPA issues regulations. These analytical requirements are, in fact, admonitions for EPA to engage in fully informed rulemaking and to strike a balance between costs and benefits.

Requirements to conduct cost-benefit analyses are not merely analytical hurdles that EPA must surpass in order to allow a pre-selected regulatory outcome to survive a legal challenge. Cost-benefit analyses are intended to be used by EPA to determine whether, and to what extent, to regulate.

EPA should therefore allow its cost-benefit analyses to drive the outcome of its rulemaking decisions to the greatest extent permitted under its governing statutes. Meaningful reliance on cost-benefit analyses in regulatory decision-making not only improves the consistency and transparency of those analyses, it improves the overall quality of Agency rulemaking. By promulgating rules (or refraining from promulgating rules) after careful consideration of costs and benefits, EPA and states could devote regulatory resources more efficiently.

Regulators and the regulated community would be better able to identify risks and prioritize responses. Rules, regulatory approaches, and enforcement decisions would be more squarely based on scientific data and sound economic principles.

Increased transparency and consistency could also increase trust within, and participation by, the regulated community. When the Agency's efforts to analyze costs and benefits cease to appear to some stakeholders as pre-determined conclusion-driven inquiries, the regulated community will see more value in participating in rulemaking processes and may choose to engage more

thoroughly in the process including offering more valuable data that would further improve rulemaking decisions. There is a strong positive feedback loop for stakeholders who see that their input is being taken into account.

Congress clearly understood that development and use of cost-benefit analyses would significantly improve Agency decision-making and environmental outcomes. That is why Congress required EPA to consider costs and benefits in so many contexts. Improving the consistency and transparency of these analyses, therefore reflects an intent to faithfully adhere to existing congressional mandates and achieve the environmental and regulatory improvements Congress foresaw when it crafted those mandates.

III. INCREASE CONSISTENCY AND TRANSPARENCY BY STANDARDIZING ELEMENTS OF THE COST-BENEFIT ANALYSIS

Given the number of different contexts and statutory provisions under which the Agency conducts cost-benefit analyses, API recognizes that EPA likely cannot adopt a single one-size-fits-all approach. We do not believe, however, that EPA's need for flexibility in analyzing costs and benefits in specific contexts necessitates that the Agency refrain from adopting any uniform practices or standardized methods. Regardless of the requirement under which the cost-benefit analysis is conducted or EPA's ability to make regulatory decisions based on a consideration of costs, all cost-benefit analyses share many common elements. API believes EPA should adopt regulations which standardize these common elements to the extent allowed under the various legal authorities given to EPA.

With respect to these common elements, all cost-benefit analyses require decisions about the universe of costs and benefits to be considered and all cost-benefit analyses require EPA to calculate the present value of costs that may be paid alongside the benefits that may be realized in the future. All cost-benefit analyses also require the selection of a baseline from which to measure potential changes to costs and benefits, and all cost-benefit analyses must account for the uncertainty inherent in projecting future outcomes. Each of these considerations is amenable to a more standardized approach that can increase the consistency and transparency of the manner in which EPA conducts cost-benefit analyses.

Importantly, adopting common procedures in these discrete areas would not create a rigid formula through which EPA must shoehorn all cost-benefit analyses. Instead, some standardization of these elements balances EPA's need for a flexible approach to cost-benefit analysis while harmonizing common elements. The resulting analyses are then more amenable to comparison across different rules, more immune to biases and efforts to tailor analyses to support specific outcomes, and more transparent for stakeholders that wish to participate in rulemaking processes and/or require some ability to anticipate regulatory actions.

The recommendations below likely do not represent all the common elements of cost-benefit analyses that can be made more consistent and transparent. These are just some examples of

elements of recent cost-benefit analyses that API members have observed being applied in an inconsistent and opaque fashion and consider critical for EPA to address.

a. Standardize Use and Consideration of Discount Rate

In order to account for the fact that people place a higher value on current consumption than on future consumption, EPA and other agencies use a discount rate in their cost-benefit analyses that adjusts estimated benefits and costs depending on the time that they will be incurred[2] The need to utilize a discount rate to estimate present value through an adjustment to future costs and benefits is fundamental to economic analysis and therefore not widely considered discretionary or the subject of reasonable debate. The precise value of the discount rate is to some degree discretionary and it can have an enormous, potential outcome-determinative impact on the valuation of benefits and costs. For instance, in the cost-benefit analysis EPA performed for the Clean Power Plan in 2015, the estimated global climate benefits in the rate-based scenario for 2030 ranged from $6.4 billion to $61 billion depending on which discount rate was applied. This nearly ten-fold variation was based entirely on the use of different discount rates.[3] Clearly, this input can wholly transform the outcome of a cost-benefit analysis and entirely change the justification for and against a rule.

The Office of Management and Budget ("OMB") has long recognized the need for agencies to maintain a consistent and transparent approach to these present value calculations. OMB developed in 1996, and has twice updated, Circular A-4, which provides OMB's guidance to Federal agencies on the development of regulatory analysis. It was designed to assist analysts in regulatory agencies like EPA "by defining good regulatory analysis . . . and standardizing the way benefits and costs of Federal regulatory actions are measured and reported."[4] API believes that EPA should follow Circular A-4 in every rulemaking effort and should build these requirements into any and all regulation published as an outcome of this ANPRM.

As relevant to this subsection, OMB Circular A-4 provides agencies clear guidance on discount rates:

> *As a default position, OMB Circular A-94 states that <u>a real discount rate of 7 percent should be used as a base-case for regulatory analysis</u>. The 7 percent rate is an estimate of the average before-tax rate of return to private capital in the U.S. economy. It is a broad measure that reflects the returns to real estate and small business capital as well as corporate capital. It approximates the opportunity cost of capital, and it is the appropriate discount rate <u>whenever the main effect of a regulation is to displace or alter the use of capital in the private sector</u>. OMB revised Circular A-94 in 1992 after extensive internal review and public comment. In a recent analysis, OMB found that the average rate of return to capital remains near the 7 percent rate estimated in 1992. Circular A-94 also recommends using other discount rates to show the sensitivity of the estimates to the discount rate*

[2] OMB, Circular A-4, at 32.
[3] 2015 RIA at ES-22.
[4] https://obamawhitehouse.archives.gov/omb/circulars_a004_a-4/.

assumption . . . For regulatory analysis, you should provide estimates using real discount rates of 3 and 7 percent.[5]

Circular A-4 also allows "a further sensitivity analysis using a lower but positive discount rate" when a rule "will have important intergenerational benefits or costs," but requires that the 7% rate be used for the base-case analysis.[6] However, in some cases, the use of a higher discount rate may be warranted to supplement the analysis. Rates of three or seven percent may not consider the associated rate of return to capital investments typically employed by the industry. Accordingly, API agrees with OMB Circular A-4 that states "…since the rates of return on capital are higher in some sectors of the economy than others, the government needs to be sensitive to possible impacts of regulatory policy on capital allocation."[7]

In the Clean Power Plan's 2015 cost-benefit analysis, EPA failed to follow OMB guidance in a number of respects. First, instead of using the 3 percent and 7 percent discount rates as directed by OMB, EPA used a 2.5 percent discount rate, 3 percent discount rate, 5 percent discount rate, and a 3 percent discount rate of the 95th percentile of the estimated benefit.[8] Second, when EPA calculated the overall net global climate benefit to justify the Clean Power Plan (*i.e.*, total benefits less costs), the Agency improperly relied on only one of its multiple discount rates, the 3 percent discount rate.[9] Under Circular A-4, EPA should have "calculat[ed] net benefits using discount rates of 3 and 7 percent."[10]

These departures from the guidance OMB provided in Circular A-4 profoundly changed EPA's cost-benefit analysis. Moreover, the process by which EPA decided to make these changes was neither transparent nor meaningfully informed by stakeholder engagement or the administrative record. Indeed, the cost-benefit analysis that accompanied the 2015 Clean Power Plan provides a particularly unfortunate example of how an inconsistent analytical approach can undermine the utility an important decision-making tool.

Thankfully, the analytical approach EPA is now proposing to use in evaluating the Clean Power Plan stands in stark contrast to the approach on which EPA relied in 2015. In observance of Circular A-4's guidance that agencies considering regulations with "important intergenerational benefits or costs … might consider a further sensitivity analysis using a lower but positive discount rate,"[11] EPA included calculations of the claimed forgone domestic climate benefits using a 2.5 percent discount rate.[12] The Agency, however, correctly observed that "there remain additional

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[5] OMB Circular A-4 at 33-34 (emphasis added).
[6] *Id.* at 36 ("If your rule will have important intergenerational benefits or costs you might consider a further sensitivity analysis using a lower but positive discount rate in addition to calculating net benefits using discount rates of 3 and 7 percent."). A 3% rate is prescribed "when regulation primarily and directly affects private consumption (e.g., through higher consumer prices for goods and services)."
[7] https://www.whitehouse.gov/sites/whitehouse.gov/files/omb/circulars/A4/a-4.pdf at pg. 33.
[8] 2015 RIA at ES-22; OMB, Circular A-4, at 33.
[9] 2015 RIA at ES-22.
[10] OMB, Circular A-4, at 36. In its net benefit calculations in the Clean Power Plan, EPA did use a 3 percent and 7 percent discount rate for the health co-benefits. OMB, Circular A-4, at 33.
[11] *Id.* at 36.
[12] 2017 RIA at 166-167 (citing Circular A-4 and discussion of "intergenerational benefits or costs").

sources of uncertainty that have not been fully characterized and explored due to remaining data limitations" in considering alleged intergenerational effects.[13] Citing a 2017 report from the National Academies, EPA found that "additional research and analysis is still needed to develop a methodology for implementing a declining discount rate [for claimed intergenerational benefits] and to understand the implications of applying these theoretical lessons in practice."[14]

As such, the Agency's approach here appropriately follows the guidance OMB provided in Circular A-4 by calculating the effect of a lower discount rate would have. Only after considering the needed research and inherent uncertainties (and transparently describing and taking comment on those needs and uncertainties), did EPA opt to utilize standard discount rates in its actual net benefit calculations.

API believes utilizing Circular A-4 to the maximum extent feasible is an important step to restoring the transparency and consistency needed in cost-benefit analyses and recommends that EPA formally adopt this approach more broadly. Specifically, API recommends that all EPA cost-benefit analyses include and consider impacts using 3 percent and 7 percent discount rates, and that the real discount rate of 7 percent should be used as a base-case for regulatory analysis. In certain narrow instances where EPA must consider important intergenerational costs and benefits, EPA could utilize a lower positive interest rate, but only after transparently conducting a sensitivity analysis and only after providing regulatory stakeholders an opportunity to review and comment on the Agency's proposed use of a lower discount rate. In order to accomplish this, EPA should request comments at the proposed rule phase for any rule in which EPA believes they may utilize a discount rate other than those specified in Circular A-4.

b. Focus on Only Domestic Costs and Benefits

In order to conduct a valid and legally-defensible cost-benefit analysis, EPA should ensure that it weighs costs and benefits of the same scale and of the same type. In particular, EPA's analyses should be constructed to weigh domestic costs against domestic benefits. By doing so, EPA can better ensure that projected domestic impacts alone justify the costs to be imposed on domestic industries. When EPA has failed to do so and weighed domestic costs against global benefits, EPA has effectively put its thumb on the scale in favor of regulatory action. Such an analysis is not only inconsistent with basic economic principles and competitively disadvantages American businesses, it is impermissible under the Clean Air Act ("CAA").[15]

In CAA Section 101(b)(1), Congress expressly stated that the statute's purpose is to "protect and enhance the quality of the *Nation's* air resources so as to promote the public health and welfare and the productive capacity of *its population*."[16] By focusing on "the Nation" and "its population," Congress clearly demonstrated that it enacted the CAA to affect domestic air quality. Prior to promulgating the Clean Power Plan, EPA had in fact agreed with this interpretation—and did so

[13] *Id.* at 167.
[14] *Id.*
[15] Given the transboundary nature of air pollution, this issues arises under the CAA most often.
[16] CAA § 101(b)(1) (emphasis added).

in a climate change-related rulemaking when EPA issued the Endangerment Finding on which it based the Clean Power Plan.[17]

In addition to the clear inferences that can be drawn from Congress' statements of statutory intent, the text of specific provisions of the statute confirms that Congress intended to limit the reach of the Act to domestic effects, unless it expressly provided otherwise. In only two discrete instances, Congress explicitly addressed the foreign effects of domestic air emissions in the CAA.

First, in Title I of the Act, Congress authorized EPA to consider the foreign effects of domestic air emissions within the delineated framework of Section 115. There, Congress defined the process for EPA to evaluate and address reports of domestic air pollution possibly affecting public health or welfare in a foreign country.[18] Critically, this only applies when the Administrator finds there is "reciprocity" such that "the United States essentially [has] the same rights with respect to the prevention or control of air pollution occurring in that country as" Section 115 gives to the foreign country.[19]

Second, in Title VI of the CAA, Congress addressed the global impacts of domestic stratospheric ozone emissions by, among other actions, listing ozone-depleting chemicals of concern, establishing reporting requirements for manufacturers and other entities, and phasing out the production of certain chemicals.[20] Congress expressly enacted Title VI in 1990 in order to implement the Montreal Protocol on Substances that Deplete the Ozone Layer, an international treaty signed by the United States, which addresses stratospheric ozone.[21]

These two discrete provisions (Section 115 and Title VI) represent the full extent of EPA's authority to consider the international benefits of domestic regulation. Critically, these provisions demonstrate that, when Congress chose to allow the Agency to consider foreign impacts of domestic regulation, it said so expressly. These two provisions also reflect the very narrow purpose for which Congress allowed EPA to consider foreign impacts of domestic regulation. Both provisions deal with international agreements under which the United States and one or more foreign nations make reciprocal commitments to impose regulations within their borders that confer benefits outside their borders and/or to the other party.

In these circumstances, the United States is the beneficiary of EPA's action and also the foreign nation's reciprocal regulatory action. As such, while foreign impacts are considered, their consideration is solely intended to inform regulatory decisions seeking to maximize domestic benefits of reciprocal regulatory actions. The executive branch has ample authority to act for the benefit of foreign nations, but the CAA is generally not one of the statutes that confers that

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[17] See Final Rule, Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the CAA, 74 Fed. Reg. 66496, 66514 (Dec. 15, 2009) ("[T]he primary focus of the vulnerability, risk, and impact assessment is the United States").
[18] CAA § 115(a)-(b).
[19] CAA § 115(c).
[20] EPA, 1990 CAA Amendment Summary: Title VI (Jan. 4, 2017), https://www.epa.gov/clean-air-act-overview/1990-clean-air-act-amendment-summary-title-vi.
[21] 42 U.S.C. § 7671m(b) ("This subchapter as added by the CAA Amendments of 1990 shall be construed, interpreted, and applied as a supplement to the terms and conditions of the Montreal Protocol.")

authority. With the exception of these two discrete provisions, the CAA prohibits EPA from weighing international benefits against domestic costs.[22]

In support of limiting the use of international benefits for justifying regulation, OMB directs agencies developing regulatory analyses to focus on the "benefits and costs that accrue to citizens and residents of the United States"[23] and directs agencies which "choose to evaluate a regulation that is likely to have effects beyond the borders of the United States" to report those impacts "separately."[24] OMB's guidance further states that an agency's cost-benefit analysis "should focus on benefits and costs that accrue to *citizens and residents of the United States*."[25]

Agencies should not adopt rules which impose massive costs on the United States, but for which the claimed benefits primarily accrue overseas—certainly not without a clear and explicit directive from Congress. EPA's inclusion of global benefits in the RIA for the Final Clean Power Plan grossly inflated the claimed benefits of the rule. This is now apparent because EPA's RIA for the proposed repeal of the Clean Power Plan included only the projected climate-related effects that would accrue to the United States, and reported global benefits estimates separately. The latter RIA indicates that only about 14% of the former RIA's claimed benefits (for its 3% discount rate case) would accrue to the United States.[26]

API was pleased to observe that in the ANPRM for the repeal of the Clean Power Plan, EPA proposed to focus the Agency's cost-benefit analysis on claimed forgone *domestic* climate benefits, rather than forgone *global* climate benefits.[27]

c. Quantify, Disclose, and Appropriately Consider Uncertainty

When EPA is proposing to regulate based on uncertain or speculative benefits, the Agency should be particularly transparent about how it reaches its conclusions. To be clear, API is not suggesting that EPA should universally refrain from regulating when faced with uncertain environmental outcomes. API is suggesting, however, that, when outcomes are highly uncertain, EPA must

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[22] Settled principles of statutory interpretation further confirm that Congress did not intend to authorize EPA to rely on the foreign effects of U.S. emissions in promulgating regulations under the CAA. For one, statutes are construed to give effect to all provisions. *See, e.g., Hibbs v. Winn*, 542 U.S. 88, 101 (2004) ("A statute should be construed so that effect is given to all its provisions, so that no part will be inoperative or superfluous, void or insignificant….") (citations omitted). Section 115 would effectively be a nullity if EPA read the Act to provide the Agency with the authority to consider effects of domestic emissions on foreign countries without following the Section 115 process. Moreover, it is also a well-settled canon that if Congress addressed an issue in one provision, its failure to address that same issue elsewhere confirms its limited intent. *See, e.g., Russello v. United States*, 464 U.S. 16, 23 (1983) ("[W]here Congress includes particular language in one section of a statute but omits it in another section of the same Act, it is generally presumed that Congress acts intentionally and purposely in the disparate inclusion or exclusion.") (citations omitted).

[23] OMB, Circular A-4, at 15.

[24] *Id.*

[25] OMB, Circular A-4, at 15 (emphasis added).

[26] Regulatory Impact Analysis for the Review of the Clean Power Plan: Proposal; EPA-452/R-17-004, P. 168; (October 2017).

[27] Repeal of Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units, Proposed Rule, Docket ID No. EPA-HQ-OAR-2017-0355; FRL-9969-75-OAR, 82 Fed. Reg. 48035 (Oct. 16, 2017).

exercise utmost diligence in assuring that its cost-benefit analyses and each assumption, data gap, and source of uncertainty in that analysis is transparently portrayed and fully disclosed. This diligence and transparency in appropriately characterizing in uncertainty should be considered both with respect to uncertainty in the risk assessment as well as the uncertainty in the benefit economic value determination.

1. Uncertainty in Risk Assessment

One of the most important concerns regarding the lack of transparency and consistency in cost-benefit analyses is the lack of transparency in the estimation of risk which drives the benefit estimates. Benefit estimates remain far more uncertain than cost estimates due to the many uncertainties surrounding the risk assessment and benefit estimation process. These uncertainties are often inadequately examined or discussed in the risk assessment process. As a result, there is a significant lack of transparency with regard to the estimation of benefits that has its roots in the inadequate examination of uncertainties in the risk assessment process. Addressing these uncertainties in a clear manner based on specified criteria will help improve consistency and transparency in the evaluation of risk and subsequently benefits. Specific examples of lack of transparency in the risk assessment/benefit estimation process include the following:

- *Lack of transparency in the study selection/evaluation criteria when EPA selects studies/data sets to use for dose-response modeling to estimate risks and benefits.* EPA should include information on the search criteria the Agency uses to identify studies for evaluation and the criteria EPA uses to evaluate studies once identified. These criteria should be included in any proposed rule. In addition, EPA should be required to report the results of its evaluation of key studies and should treat studies equally, regardless of funding sources (as long as they are disclosed) or results so long as the identified studies meet the search criteria.

- *Lack of transparency in how EPA applies weight-of-evidence criteria to assess the quality of the evidence regarding potential health endpoints.* Greater transparency and consistency are required in how EPA assesses the overall quality of the evidence in determining the weight-of-evidence for specific health effects within an existing statutory program.

- *Lack of transparency in how EPA addresses inter- and intra-individual variability in assessing adverse effects.* EPA often relies on studies without giving adequate attention to assessing the intra- and inter-individual variability. This is particularly true of controlled human exposure studies which often drive revision to national ambient air quality standards.

- *Lack of analysis of model misspecification and exposure misclassification.* Model misspecification occurs when the model fails to account for everything that it should. Models that are miss-specified can have biased coefficients and error terms, or biased parameter estimates. EPA should require the use of available tests to analyze the potential for model misspecification. This will result in greater transparency regarding the potential accuracy of any given model. Exposure misclassification is a form of information bias that results from errors in exposure measurements. These errors can significantly impact the

results of any risk assessment and the estimates of benefits that may be attributed to any regulatory action.

- *Lack of transparency in understanding the impact of model selection on the risk and benefit estimates.* The application of models to assessing risks, especially when extrapolating from higher to lower concentration levels are often based on default assumptions regarding the shape of the dose-response or concentration response function. These default assumptions can significantly affect the benefit estimates. Greater transparency regarding the sensitivity of the results to the key assumptions regarding the shape of the dose-response models will help decision-makers and the public in interpreting results.

- *Lack of transparency regarding how all the significant sources of uncertainty interact to affect final estimates of risk and benefits.* In previous risk assessment and benefit estimate calculations, EPA often provides a qualitative discussion of key uncertainties but rarely includes a quantitative assessment of the cumulative impact of the uncertainties on the resulting risk and benefit estimates. As a result, the public and decision-makers are often inadequately informed of the true range of possible risk outcomes and benefit estimates. All Agency rules should include an integrated assessment of major sources of uncertainty that are identified through sensitivity analysis as having a significant effect on the resulting risk estimates.

2. Economic Uncertainty

When faced with uncertain economic outcomes, EPA should also undertake a meaningful effort to quantify uncertainty and factor uncertainty into its decision-making. In other words, EPA should conduct some discounting commensurate with the level of uncertainty of benefits. Further, in certain circumstances where projected outcomes are essentially speculative (for example, when the range of uncertainties can encompass the full range of benefits), EPA should exercise the full extent of the Agency's discretion to decline to use them as a basis for imposing new regulations and compliance costs. Here again, API is requesting that EPA adopt processes through regulation that are consistent with what OMB has already directed EPA to undertake in Circular A-4:

> *The treatment of uncertainty must be guided by the same principles of full disclosure and transparency that apply to other elements of your regulatory analysis. Your analysis should be credible, objective, realistic, and scientifically balanced. Any data and models that you use to analyze uncertainty should be fully identified. You should also discuss the quality of the available data used. Inferences and assumptions used in your analysis should be identified, and your analytical choices should be explicitly evaluated and adequately justified. In your presentation, you should delineate the strengths of your analysis along with any uncertainties about its conclusions. Your presentation should also explain how your analytical choices have affected your results . . . When uncertainty has significant effects on the final conclusion about net benefits, your agency should consider additional research prior to rulemaking. The costs of being wrong may outweigh the benefits of a faster decision. This is true especially for cases with irreversible or large upfront investments. If your agency decides to proceed with*

> *rulemaking, you should explain why the costs of developing additional information—including any harm from delay in public protection—exceed the value of that information.*[28]

Notwithstanding OMB's clear and logical guidance, EPA and other federal agencies have frequently ignored Circular A-4's directives. The federal government's 2013 Social Cost of Carbon estimate ("2013 SCC") developed by an Interagency Working Group provides a particularly striking example of a failure to account for uncertainty in agency decision-making. The SCC was based on three integrated assessment models (DICE, FUND, and PAGE) that produced very different outputs. For example, at a 3% discount rate, the cost per ton varies from a high of $71/ton for PAGE to a low of $21/ton for FUND, with the DICE estimate between these two costs at $38/ton. This is shown in the table below.[29]

Table A5: Additional Summary Statistics of 2020 Global SCC Estimates

Discount rate:	5.0%				3.0%				2.5%			
Statistic:	Mean	Variance	Skewness	Kurtosis	Mean	Variance	Skewness	Kurtosis	Mean	Variance	Skewness	Kurtosis
DICE	12	26	2	15	38	409	3	24	57	1097	3	30
PAGE	22	1616	5	32	71	14953	4	22	101	29312	4	23
FUND	3	560	-170	35222	21	22487	-85	18842	36	68055	-46	13105

While the differences in the "average" values between the models (a factor of ~3.5 between $21/ton from the FUND model to $71/ton from the PAGE model) are problematic enough, the variation in model outputs are even more striking, as shown in the table above.

This broad range reflects not only the effects of the various inputs and model structure uncertainties, but also the impact of taking the average of the three models for the five climate change scenarios at the four discount rates used in the SCC development analysis. The average values are much higher than the 50th percentiles for all three models but are particularly higher than the 50th percentile figure in the case of the PAGE model.

The high-end tail of the distribution of the PAGE model has an important influence on the final SCC Estimates. These final SCC Estimates should not have been viewed as central figures, but rather as skewed toward the upper tail of the distribution of SCC values. Further, there was no rational basis for "averaging" the results, on an equally-weighted basis, from the three IAM models, which differ significantly in the assumptions they use to estimate SCC. Rather than attempting to determine which of the three models provides the best estimates, the government instead combined all of the estimates and divided to obtain a simple average. This averaging effectively concealed the highly uncertain nature of the 2013 estimate.

This uncertainty was inherent in the impacts the Agencies endeavored to estimate – damage attributable to climatological phenomenon and stochastic events more than a century into the future. Although API supports the use of economic modeling, we believe there are limits to the effectiveness of certain modeling techniques. For

[28] OMB, Circular A-4, at 40.
[29] November 2013 TSD at 21, Table A5.

instance, the imprecision inherent in modeling assumptions, hypotheses, and judgments are significantly magnified when impacts (and costs) are projected over a longer time period. While certainty is not a characteristic of any modeling effort, the SCC Estimate pushed prognostications beyond the capabilities of current science and economic modeling such that the estimates should not be relied upon in rulemaking. There is a threshold beyond which uncertainties become so profound, widespread, and compounded that, when further undermined by data limitations and the inherent limitations of the models, render the ultimate estimate flawed and of little value.

In its response to an Information Quality Act ("IQA") request filed by API and other associations on the SCC estimates,[30] OMB seemingly acknowledged that such a tipping point exists whereby data are so uncertain they render the ultimate estimate unusable, and that "[i]n the absence of quantitative estimates, we would use a qualitative description of the types of impacts on society that we would expect."[31] OMB further stated that, "[i]t is not clear to us, however, how the SCC estimates would be near such a threshold."[32] While API welcomed OMB's acknowledgement that a threshold exists where quantitative estimates become unworkable, we did not share OMB's view that impacts predicted as far out as the year 2300 and monetized using inappropriately defined mean values from models with variances that were not "near such a threshold."

If anything, model variations in the model output that underlined the 2013 SCC Estimate should have led the government to question whether it could reliably calculate the benefit of avoiding the emission of a ton of carbon dioxide. To the extent estimating the SCC was nonetheless necessary, the government should have attempted to discount its estimate based on the known uncertainty or adopt another means of pricing carbon instead of giving equal credence to an estimate of an economic impact that occurs in 2250 as it does to an estimated impact that occurs in 2050, as it did in the Clean Power Plan. While discounting diminishes the relative effect of later impacts, it does not (and should not be used to) assign lower confidence to outcomes projected in the far future. The enormous uncertainty in climate impact estimates, particularly those that the SCC estimate ascribes to the far future, is discussed and characterized quantitatively in many studies, including NERA (2014a) and Smith (2015), which we include herewith as Exhibits 1 and 2.

Regardless of whether EPA exercises its discretion to refrain from regulating in the face of highly uncertain outcomes or conducts some discounting commensurate with the level of uncertainty of the surmised benefits, EPA should always take steps to transparently portray this uncertainty by disclosing its sources and, wherever possible, quantifying its extent. Once again, OMB Circular A-4 is instructive:

> *Attention should be devoted to first resolving or studying the uncertainties that have the largest potential effect on decision making. Many times, these will be the largest sources of uncertainties. In the absence of adequate data, you will need to make assumptions. These should be clearly identified and consistent with the relevant science. Your analysis should provide sufficient information for decision makers to*

[30] January 24, 2014 Letter from Howard A. Shelanski (Director, Office of Information and Regulatory Affairs to Wayne D'Angelo (Kelley Drye & Warren, LLP) ("OMB IQA Response").
[31] OMB IQA Response at 4.
[32] *Id*.

grasp the degree of scientific uncertainty and the robustness of estimated probabilities, benefits, and costs to changes in key assumptions.

For major rules involving annual economic effects of $1 billion or more, you should . . . try to provide some estimate of the probability distribution of regulatory benefits and costs. In summarizing the probability distributions, you should provide some estimates of the central tendency (e.g., mean and median) along with any other information you think will be useful such as ranges, variances, specified low-end and high-end percentile estimates, and other characteristics of the distribution.

Your estimates cannot be more precise than their most uncertain component. Thus, your analysis should report estimates in a way that reflects the degree of uncertainty and not create a false sense of precision. Worst-case or conservative analyses are not usually adequate because they do not convey the complete probability distribution of outcomes, and they do not permit calculation of an expected value of net benefits. In many health and safety rules, economists conducting benefit-cost analyses must rely on formal risk assessments that address a variety of risk management questions such as the baseline risk for the affected population, the safe level of exposure or, the amount of risk to be reduced by various interventions. Because the answers to some of these questions are directly used in benefits analyses, the risk assessment methodology must allow for the determination of expected benefits in order to be comparable to expected costs. This means that conservative assumptions and defaults (whether motivated by science policy or by precautionary instincts), will be incompatible with benefit analyses as they will result in benefit estimates that exceed the expected value. Whenever it is possible to characterize quantitatively the probability distributions, some estimates of expected value (e.g., mean and median) must be provided in addition to ranges, variances, specified low-end and high-end percentile estimates, and other characteristics of the distribution.[33]

The RIA that accompanied the 2015 Ozone NAAQS stands in stark contrast to the guidance quoted above. In an earlier RIA for EPA's 2015 revision to the Ozone NAAQS, EPA estimated that the additional annualized costs of achieving the new standard beyond the costs of attaining the then current standard of 75 ppb, for areas other than California, would be about $15.4 billion per year, of which about $4.2 billion would be "known" controls and about $11.3 billion would be "unknown" controls.[34]

To derive the estimate for "unknown controls" EPA used a single simplistic assumption that annualized control costs for these "unknown" controls would be equal to $15,000 per ton,

[33] OMB, Circular A-4, at 40.

[34] U.S. EPA, Regulatory Impact Analysis of the Proposed Revisions to the National Ambient Air Quality Standards for Ground-Level Ozone, EPA-452/P-14-006, Office of Air and Radiation, Research Triangle Park, NC, November 2014.

regardless of the state, the sector, or the amount of emission reduction required. This estimate was not based upon any evidence-based analyses of the nature of the emissions that may remain after "known" controls were in place, or of the costs of potential additional controls for these sources. Nor did this estimate consider inherent increases in the costs of controls as emissions limits are reduced past levels that can be achieved through more cost-effective controls.

Indeed, EPA provided no persuasive evidence for the Agency's assumption that currently "unknown" controls would emerge and be available in time for extensive use in attaining the proposed tighter NAAQS at a cost averaging only $15,000 per ton. To the contrary, whatever currently unknown controls might become available for widespread implementation prior to 2025 were far more likely to cost more than the more expensive currently known controls – well above $15,000 per ton.

As the consulting firm Environomics explained in the March 17, 2015 comments on the RIA submitted on behalf of API (provided herewith as Exhibit 3), EPA should have taken the time to research and collect the data necessary to identify a sufficient volume of specific controls that could be applied to achieve the deep emissions cuts needed to attain the new standard. EPA's failure to perform this important research was not an acceptable reason to leave the great majority of the reductions needed to attain the proposed tighter NAAQS as "unknown." To the extent these controls remained unknown, EPA should have provided a cost estimate that reflects this uncertainty and should have fully explained the precise data and process EPA used when calculating the cost of controls that the Agency was not even able to identify.

While emblematic, the NAAQS example above is simply one example of EPA's routine failure to adequately disclose, analyze, quantify, and respond to uncertainty. As discussed in Subsection III.e. below, EPA's model inputs and considerations of risk are frequently based on highly uncertain information. In many instances, EPA fails to disclose and account for this uncertainty, which, when combined with added uncertainty and imprecision in estimating compliance costs, significantly skews the proportionality of regulations' benefits to costs.

As such, this subsection represents API's request that EPA be more transparent about the uncertainty that underlies its regulatory determinations. It also reflects our recommendation that the Agency more fully consider and account for uncertainty by, for instance, discounting or refraining from acting when potential benefits are simply too remote or speculative. In the subsections that follow, we provide examples from recent Agency economic analyses to make specific recommendations to improve EPA's portrayal and consideration of uncertainty.

d. Focus Analysis on Pollutant EPA Proposes to Regulate

While OMB Circular A-4 states that cost-benefit "analysis should look beyond the direct benefits and direct costs of your rulemaking and consider any important ancillary benefits and countervailing risks,"[35] API is concerned that EPA's consideration of claimed health co-benefits has too often impaired the Agency's ability to meaningfully evaluate the rationality and necessity

[35] OMB, Circular A-4, at 26.

of regulating the pollutant/sources targeted by the rule. Co-benefits no longer play an ancillary role in EPA's justification for new regulations. API believes that when EPA is choosing whether or not to regulate or the level of regulation based on a cost-benefit analysis, decisions should be made based on the benefits from the primary pollutant being regulated. In instances when the co-benefits are necessary to make the case for any regulation of the subject pollutant or source, EPA should reconsider its regulatory approach.

This problem has been most acute for regulations promulgated under the CAA. Often, the benefits EPA projects for its air regulations are overwhelmingly driven not by the direct benefit of reducing the targeted pollutant but by the presumed co-benefit of reducing one or more other pollutants – particularly $PM_{2.5}$.[36]

The dominant role of $PM_{2.5}$ co-benefits in EPA's regulatory analyses has been questioned for many years, including by the Supreme Court in *Michigan v. EPA*, a case challenging EPA's Mercury and Air Toxics Standards ("MATS Rule").[37] This rule purported to address power plant emissions of mercury and other hazards air pollutants ("HAPs"). In that decision, the majority opinion noted that:

> *The Agency issued a 'Regulatory Impact Analysis' alongside its regulation. This analysis estimated that the regulation would force power plants to bear costs of $9.6 billion per year. The Agency could not fully quantify the benefits of reducing power plants' emissions of hazardous air pollutants; to the extent it could, it estimated that these benefits were worth $4 to $6 million per year. The costs to power plants were thus between 1,600 and 2,400 times as great as the quantifiable benefits from reduced emissions of hazardous air pollutants. The Agency continued that its regulations would have ancillary benefits— including cutting power plants' emissions of particulate matter and sulfur dioxide, substances that are not covered by the hazardous-air-pollutants program. Although the Agency's appropriate-and-necessary finding did not rest on these ancillary effects, the regulatory impact analysis took them into account, increasing the Agency's estimate of the quantifiable benefits of its regulation to $37 to $90 billion per year . . .*[38]

Over 90% of those benefits were based on Regulatory Impact Analysis ("RIA") estimates that between 4,200 and 11,000 premature deaths will be avoided per year (in 2016) as a result of the MATS Rule. Using these RIA estimates, EPA has made some misleading public statements, such as the following two bullets from its "Fact Sheet" for the MATS Rule:

> *The Mercury and Air Toxics Standards (MATS) will save thousands of lives and prevent more than 100,000 heart and asthma attacks each year while providing important health protections to the most vulnerable, such as children and older Americans . . . The updated standards will create thousands of good jobs for American workers who will be hired to build, install, and operate the equipment to*

[36] Bloomberg, Scott J., *EPA's Particulate Matter Co-Benefits: A Case of Ever-Declining Credibility*, Daily Env't Rep. (BNA) No. 104, at B-1 (May 31, 2016).
[37] 80 Fed. Reg. 8,442 (Feb. 17, 2015).
[38] *Michigan v. Envtl. Prot. Agency*, 576 U.S. at 4 (2015).

> *reduce health threatening emissions of mercury, acid gases, and other toxic air pollutants.*[39]

Based on statements such as this, many believed that the benefits were based on HAP reductions, and that those reductions could justify the MATS Rule's $10 billion annual cost. However, the reported benefits had nothing to do with HAPs at all. In fact, the total benefits EPA quantified for reductions in the HAPs that were the purpose of the MATS Rule were only between $500,000 and $6 million per year. Clearly, the disproportionality of the MATS Rule's large cost of $9.6 billion per year becomes evident. A closer read of the RIA revealed that all the "saved lives" and virtually all of the $37 billion to $90 billion[40] of estimated benefits EPA had attributed to the MATS Rule were purported coincidental reductions of a non-HAP ($PM_{2.5}$) that was already regulated to safe levels separately under the CAA.[41]

The MATS Rule at issue in *Michigan v. EPA* was certainly not the only instance where claimed co-benefits subsumed the benefits attributable to a rule's "targeted" pollutant. The RIA that accompanied the 2004 National Emission Standards for Hazardous Air Pollutants from Industrial, Commercial, and Institutional Boilers and Process Heaters (the "2004 Boiler MACT") estimated that there would be $16 billion of annual benefits due to reductions in sulfur dioxide and PM emissions. None of those benefits, however, were estimated to come from HAP reductions:

> *This analysis does not quantify the benefits associated with reductions in hazardous air pollutants (HAP). The magnitude of the unquantified benefits associated with omitted categories and pollutants, such as avoided cancer cases, damage to ecosystems, or materials damage to industrial equipment and national monuments, is not known.*[42]

Co-benefits also drove the Agency's justification in the RIA EPA prepared in support of the Clean Power Plan. In that RIA, EPA noted that reducing CO_2 emissions from the electricity sector would also reduce emissions of SO_2, NO_2, and directly emitted $PM_{2.5}$, which will, in turn, reduce ambient concentrations of $PM_{2.5}$ and ozone.[43] Depending on the discount rate that was applied, these co-benefits were estimated to be as much as an order of magnitude greater than the benefits EPA associated with reducing CO_2 emissions alone. In other words, it was the co-benefits—not CO_2 reductions—that underpinned EPA's assertion that the Clean Power Plan would produce net benefits.

In 2015, OMB's Office of Information and Regulatory Affairs ("OIRA") issued a report which purported to estimate the aggregated annual benefits and costs of regulations reviewed by OMB

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[39] EPA Fact Sheet: Mercury and Air Toxics Standard, "Benefits and Costs of Cleaning Up Toxic Air Pollution from Power Plants

[40] While this subsection is focused on the disproportionate role PM plays in the Agency's benefit analyses, we also note that this wide range of estimated benefits is indicative of the inherent uncertainty of these estimates.

[41] See *Prepared Statement of Anne E. Smith, Ph.D., Hearing on: The American Energy Initiative – A Focus on What EPA*'s *Utility MACT Rule Will Cost U.S. Consumers Before the Subcomm. on Energy and Power of the H. Comm. on Energy and Commerce*, (2012) (included herewith as Exhibit 9).

[42] U.S. EPA, Regulatory Impact Analysis for the Industrial Boilers and Process Heaters NESHAP, Final Report, February 2004, p. 10-1.

[43] RIA at ES-9.

over the last 10 years.[44] Of the 22 CAA rules considered, the highest estimated benefits were for three rules promulgated in 2005, 2007, and 2012.[45] For these rules, and others promulgated under the CAA, OIRA noted that:

> *the large estimated benefits of EPA rules issued pursuant to the Clean Air Act are mostly attributable to the reduction in public exposure to fine particulate matter (referred to in many contexts as PM). While some of these rules monetize the estimated benefits of emissions controls designed specifically to limit particulate matter or its precursors, other rules monetize the benefits associated with ancillary reductions in particulate matter that come from reducing emission of hazardous air pollutants which are difficulty (sic) to quantify and monetize because of data limitations.*[46]

EPA's increased use of co-benefits from coincidental reductions of criteria pollutants was first documented and discussed at length in a paper produced by NERA Economic Consulting in 2011, entitled "An Evaluation of the $PM_{2.5}$ Health Benefits Estimates in Regulatory Impact Analyses for Recent Air Regulations."[47] NERA (2011), included herewith as Exhibit 4, was based on a review of RIAs for regulations promulgated under the CAA dating back to the first $PM_{2.5}$ risk analysis in 1997 (which was used in the first $PM_{2.5}$ NAAQS rulemaking). The authors found that $PM_{2.5}$ co-benefits had become an increasingly important component justifying findings of benefits well in excess of costs in RIAs for all sorts of non-$PM_{2.5}$ regulations.

Among the full set of RIAs that NERA initially studied, there were 27 finalized or still-proposed rules for which the RIAs quantified at least some benefits, and which were not directly targeting ambient $PM_{2.5}$. In 22 of those 27 (which are listed in table below), $PM_{2.5}$ co-benefits accounted for more than half of the non-$PM_{2.5}$ RIAs' presumed benefits.

Year	**RIAs for Rules NOT Based on Legal Authority to Regulate Ambient $PM_{2.5}$**	**$PM_{2.5}$ Co-Benefits Are >50% of Total**	**$PM_{2.5}$ Co-Benefits Are Only Benefits Quantified**
1997	Ozone NAAQS (.12 1hr=>.08 8hr)	×	
1997	Pulp&Paper NESHAP		
1998	NOx SIP Call & Section 126 Petitions		
1999	Regional Haze Rule	×	
1999	Final Section 126 Petition Rule	×	

[44] Office of Management and Budget, 2015 Report to Congress on the Benefits and Costs of Federal Regulations and Agency Compliance with the Unfunded Mandates Reform Act.
[45] The three rules are the Clean Air Fine Particle Implementation Rule issued in 2007, with benefits estimates ranging from $19 billion to $167 billion per year; the Clean Air Interstate Rule issued in 2005, with benefits estimates ranging from $12 billion to $152 billion; and the MATS Rule issued in 2012, with benefits estimates ranging from $28 billion to $77 billion (all figures in 2001$).
[46] OMB, 2015 Report to Congress, p. 13 [note omitted].
[47] NERA. 2011. An Evaluation of the $PM_{2.5}$ Health Benefits Estimates in Regulatory Impact Analyses for Recent Air Regulations, report prepared for Utility Air Regulatory Group. December.

2004	Stationary Reciprocating Internal Combustion Engine	×	
2004	Industrial Boilers & Process Heaters NESHAP	×	×
2005	Clean Air Mercury Rule	×	
2005	Clean Air Visibility Rule/BART Guidelines	×	
2006	Stationary Compression Ignition Internal Combustion		
2007	Control of HAP from mobile sources	×	×
2008	Ozone NAAQS (.08 8hr =>.075 8hr)	×	
2008	Lead (Pb) NAAQS	×	
2009	New Marine Compress'n-Ign Engines >30 L per	×	
2010	Reciprocating Internal Combustion Engines NESHAP	×	×
2010	EPA/NHTSA Joint Light-Duty GHG & CAFES		
2010	SO2 NAAQS (1-hr, 75 ppb)	×	> 99.9%
2010	Existing Stationary Compression Ignition Engines	×	×
2011	Industrial, Comm, and Institutional Boilers NESHAP	×	×
2011	Indus'l, Comm'l, and Institutional Boilers & Process	×	×
2011	Comm'l & Indus'l Solid Waste Incin. Units NSPS &	×	×
2011	Control of GHG from Medium & Heavy-Duty		
2011	Ozone Reconsideration NAAQS	×	
2011	Utility Boiler MACT NESHAP (Final Rule's RIA)	×	≥ 99%
2011	Mercury Cell Chlor Alkali Plant Mercury Emissions	×	
2011	Sewage Sludge Incineration Units NSPS & Emission	×	×
2011	Ferroalloys Production NESHAP Amendments	×	×

EPA's reliance on $PM_{2.5}$ co-benefits has only become more pronounced with time - $PM_{2.5}$ co-benefits accounted for 99% to 100% of the total benefits in 8 of the 12 non-$PM_{2.5}$ RIAs released during 2010-2011. Evidently, rather than using RIAs to provide a well-documented analysis of the merits of each new regulation and meaningfully considering the pollutant being regulated, EPA focused on the co-benefits of another pollutant that is already subject to its own, quite stringent, regulatory framework. According to EPA, reductions of $PM_{2.5}$ alone could provide the justification for virtually any air rule the Agency intended to promulgate.

As it were, and as discussed in detail in Subsection III.e below, the benefits EPA projects from reducing emissions of $PM_{2.5}$ either directly or as a co-benefit are likely significantly overstated.

Indeed, there is a strong scientific and statistical basis to question whether reductions of $PM_{2.5}$ to the levels EPA has previously suggested confer any health benefits at all.[48]

OMB Circular A-4's recommendation that cost-benefit "analysis should look beyond the direct benefits and direct costs of your rulemaking and consider any important ancillary benefits and countervailing risks,"[49] did not provide the Agency license to consider co-benefits that stretch the bounds of credibility. As such, API recommends that EPA abandon its prior approach to considering the co-benefit of $PM_{2.5}$ reductions in rules targeting other pollutants.

That said, we do not believe that EPA needs to wholly abandon all consideration of the co-benefits of reducing ancillary pollutants. These considerations may be appropriate if conducted in accordance with sound scientific, economic, and statistical principles. API simply requests that when utilizing cost-benefit analysis to justify rulemakings that EPA ensures through regulations that the pollutant being regulated drives the cost-benefit analysis. The following materials, on which we extensively relied in drafting this section, may provide EPA further guidance to improve the Agency's consideration of co-benefits:

- Smith, Anne E. et al., *Analysis of Projected Health Co-Benefits in EPA's Proposed Clean Power Plan: Report in Response to Virginia Senate Joint Resolution No. 273 (2015 Session)* (NERA Economic Consulting, December 2015) (included herewith as Exhibit 2).
- Smith, Anne E., *An Evaluation of the PM2.5 Health Benefits Estimates in Regulatory Impact Analyses for Recent Air Regulations* (NERA Economic Consulting, December 2011) (included herewith as Exhibit 4).
- Anne E. Smith & Scott J. Bloomberg, *Technical Comments on EPA's Regulatory Impact Analysis for the Proposed Repeal of the Clean Power Plan*, 19, (NERA Economic Consulting, April 2018) (included herewith as Exhibit 5).
- Anne E. Smith, Senior Vice President, *Should Co-Benefits Be Included in EPA's Benefit-Cost Analyses?* (APEE Conference Presentation, April 2, 2012) (included herewith as Exhibit 6).
- Bloomberg, Scott J., *EPA's Particulate Matter Co-Benefits: A Case of Ever-Declining Credibility*, Daily Env't Rep. (BNA) No. 104, at B-1 (May 31, 2016) (included herewith as Exhibit 7).
- *Prepared Statement of Anne E. Smith, Ph.D., Hearing on: The American Energy Initiative – A Focus on What EPA*'s *Utility MACT Rule Will Cost U.S. Consumers Before the Subcomm. on Energy and Power of the H. Comm. on Energy and Commerce*, (2012) (included herewith as Exhibit 8).

[48] See Subsection III.e. below
[49] OMB, Circular A-4, at 26.

e. Utilize Probabilistic Approaches, Realistic Operating Scenarios, and Appropriate Measures of Risk

As noted in our discussion of EPA's treatment of uncertainty, OMB Circular A-4 states that:

> *Worst-case or conservative analysis are [sic] not usually adequate because they do not convey the complete probability distribution of the outcomes, and they do not permit calculation of an expected value of net benefits.*[50]

Nonetheless, EPA too often bases its benefit analyses on scenarios that are considered either worst case or so overly conservative as to be improbable. This use of unrealistic assumptions about risk, exposure, operating scenarios, or emissions effectively skews the Agency's consideration and portrayal of proposed actions' presumed costs and benefits so that compliance costs may appear proportional to gains. Reliance on more realistic assumptions, on the other hand, allows EPA to more fully consider and project the real-world impact of its regulations and provide the Agency the information it needs to accurately assess the need to regulate when benefits are small, speculative or disproportionate to the estimated costs. As such, API is herein recommending that wherever permissible, EPA more closely follow OMB's directive to avoid worst-case and overly conservative assumptions. Instead, EPA should use more probabilistic approaches and account for worst case scenarios through the presentation of uncertainty (as discussed above). EPA should also scrutinize the science and data the Agency uses in regulatory analyses to ensure they remain valid, credible, devoid of obvious bias, consistent with EPA's Principles of Scientific Integrity[51], and realistic.

With these broad guideposts in place, we are also providing some specific examples of EPA's reliance on overly conservative and/or worst-case scenarios. Each of the assumptions discussed in these examples represent an opportunity for EPA to adopt a more credible and realistic approach to the Agency's economic analyses. API encourages EPA to address the underlying issues associated with these examples in any future rulemaking(s) related to this ANPRM.

1. Assumptions about $PM_{2.5}$ Mortality

Subsection III.e above describes a study (NERA (2011)) that detailed how the presumed co-benefits of reducing $PM_{2.5}$ emissions has underpinned EPA's justification of a large number of Agency actions targeting HAPs and other emissions. NERA (2011) also made a number of other observations regarding EPA's reliance on $PM_{2.5}$ co- benefits. Of relevance here, it described how the Agency had changed its assumptions for estimating such co-benefits in a manner that greatly increased its projections of population-wide risk from current levels of ambient $PM_{2.5}$ at approximately the same time co-benefits started to become the overriding benefit reported in most non-$PM_{2.5}$ RIAs.

More specifically, in about 2009, EPA started to assign mortality risk due to $PM_{2.5}$ at concentrations as low as zero, instead of to the lowest measured levels ("LML") utilized in the

[50] *Id.* at 40.
[51] EPA Programs of the Office of the Science Advisor (OSA): EPA's Principles of Scientific Integrity Fact Sheet. [Aug 3;, 2016];2016c http://www2.epa.gov/osa/epas-principles-scientific-integrity-fact-sheet

underlying epidemiological studies[52] or to the safe levels specified in the NAAQS program. As NERA (2011) showed, this single change in the co-benefit calculation more than tripled the quantity of annual deaths "attributable to $PM_{2.5}$" associated with then-current ambient concentrations – a reservoir of potential co-benefits that each new regulation that might coincidentally reduce a $PM_{2.5}$ precursor could tap.

Figure 1 below, which is NERA (2011)'s annotation of a similar table in the RIA for the MATS Rule,[53] helps illustrate the inflationary effect of EPA's extrapolation of risk to levels below the LML in the underlying statistical studies.[54] The vertical axis of this figure shows the percentage of EPA's estimate of the MATS Rule's $PM_{2.5}$ mortality co-benefits (*i.e.*, the 11,000 lives saved) that is attributable to ambient $PM_{2.5}$ concentrations at or below each level on the horizontal axis**.** ***It shows that nearly all (i.e., 100% on the vertical axis) of those 11,000 deaths are in populations that are in areas that were already in attainment with the previous $PM_{2.5}$ annual NAAQS of 15 µg/m³. As such, all of the estimated deaths are of people living in areas that EPA had determined to be protected with an "adequate margin of safety" from $PM_{2.5}$ risks.***

Figure 1 also shows that if EPA had not extrapolated below LMLs, about 89% of the estimated upper bound of MATS Rule's co-benefits would have been estimated as resulting in no benefit.[55] This is confirmed in the RIA, which reports that of the 11,000 estimated avoided premature deaths, only 1,200 were in areas where baseline $PM_{2.5}$ concentrations were above the LML.

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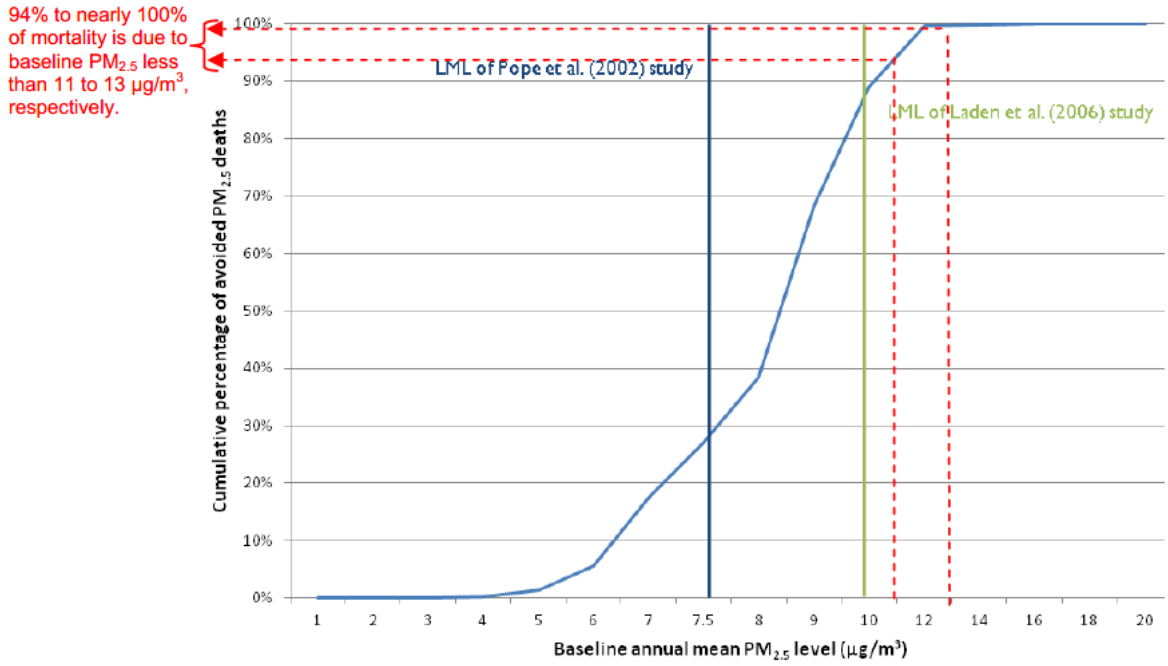
[52] Estimates of $PM_{2.5}$-attributed deaths (such as the 4.200 to 11,000 that EPA is attributing to the MATS Rule) are based entirely on statistical associations between total mortality rates in various locations of the U.S. and their respective monitored, region-wide ambient $PM_{2.5}$ concentrations. These mortality estimates are merely inferences drawn after making a host of assumptions about how to convert a statistical association into a concentration-response function, and all of the risk estimates that the RIA attributes to $PM_{2.5}$ are based on a presumption that the associations in the epidemiological literature are causal in nature – a presumption that remains under debate. A much more extensive explanation of the uncertainties and difficulties with this statistical body of evidence is provided in NERA (2011).

[53] Figure 5-15, p. 5-102.

[54] LML represent the lowest level at which adverse impact of a pollutant has been observed. As such, risks projected to occur from $PM_{2.5}$ at concentrations below the LML are extrapolations – in fact, simulations – of impacts that have never been observed in scientific literature.

[55] The epidemiological study that generates the upper bound co-benefits estimate is the Laden et al. (2006) study, whose LML is show at the green vertical line in the figure. That green line intercepts the blue curve at 89%, indicating that 89% of the total mortality is based on people in locations where the average ambient $PM_{2.5}$ concentration is less than the LML of 10 µg/m³.

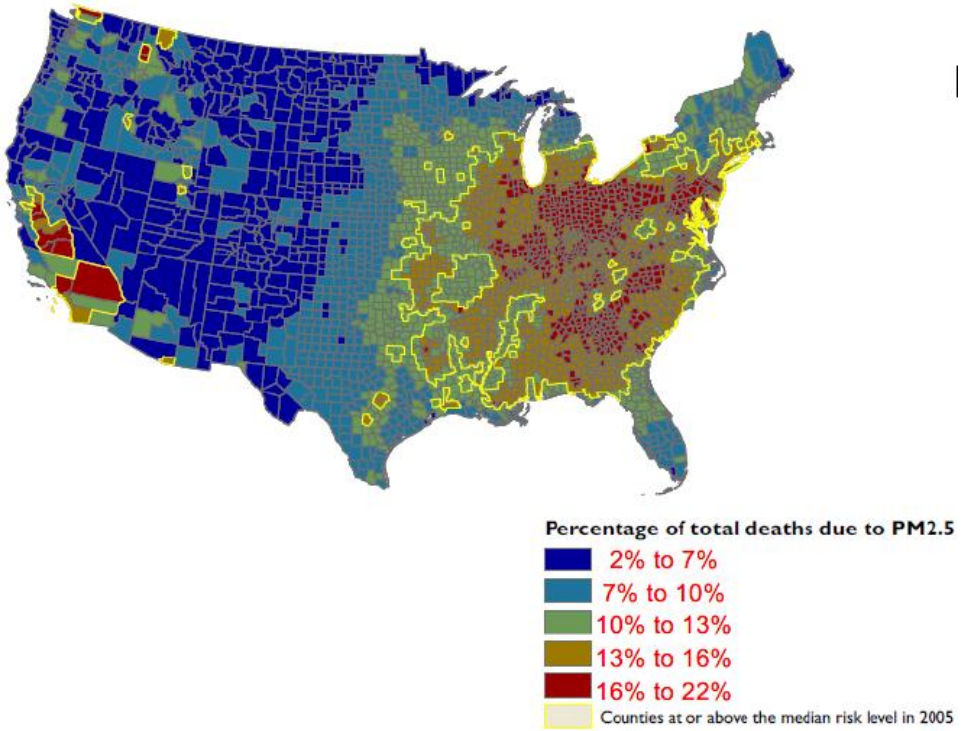
Figure 1: Copy of Figure 5-15 from EPA's RIA for the Final EGU MACT Rule Showing that 94% to Nearly 100% of the $PM_{2.5}$ Co-Benefits in that RIA Are Due to Changes in Exposures to Annual Average Ambient $PM_{2.5}$ that Will Still Be Deemed Safe by EPA after Revising the $PM_{2.5}$ NAAQS.



The dotted lines in the table reflect the range of standards (11 to 13 µg/m^3) that EPA was considering during its $PM_{2.5}$ NAAQS review at the time NERA (2011) was published. EPA ultimately adopted a primary standard of 12 µg/m^3 and a secondary standard of 15 µg/m^3. As such, the point remains – EPA identified in the MATS Rule significant levels of mortality from $PM_{2.5}$ at concentrations EPA deemed protective with an adequate margin of safety in the $PM_{2.5}$ NAAQS. If those concentrations were safe, then it was not appropriate for EPA to calculate them as co-benefits in order to justify non-PM regulations or as primary benefits to justify a hypothetical PM rule.

Extensive extrapolation of potential benefits and impacts generally increases the uncertainty and undermines the credibility of estimates to be very uncertain and generally lacking in credibility. However, the inflationary impact of this specific extrapolation reveals a true credibility deficit. Figure 2 below shows the percent of all mortality in the United States in 2005 on which the EPA's upper bound $PM_{2.5}$ co-benefits estimate for the MATS Rule is based. (Each colored zone on the map is a county.) This figure shows that, according to EPA, as recently as 2005, up to 22% of all deaths in many parts of the U.S. (*i.e.*, all of those counties colored dark red on the map) were "due to $PM_{2.5}$."

Figure 2: EPA-Produced Map Showing Percentage of Total Deaths due to $PM_{2.5}$ in the Year 2005, with Legend Adjusted by NERA to Represent the $PM_{2.5}$ Risk Slope that EPA Uses for its Upper Bound $PM_{2.5}$ Risk Calculations.



While this estimate may seem improbable, it is even more difficult to believe when it is further unpacked. EPA has not identified the particular types of causes of death that account for its $PM_{2.5}$-mortality associations, but usually states that cardiovascular deaths are the most likely candidate. In 2005, 35% of deaths in the U.S. were due to major cardiovascular diseases. If the predicted $PM_{2.5}$-related deaths are indeed cardiovascular in nature, 22% of all deaths being "due to $PM_{2.5}$" would mean that nearly two-thirds of all cardiovascular deaths in 2005 were "due to" $PM_{2.5}$. Given all the other risk factors that are known to be major contributors to cardiovascular mortality, such as smoking and obesity, the estimates co-benefits are certainly overstated.

Another inference can be made from EPA's post-2009 method of extrapolating $PM_{2.5}$-related mortality risks below the LML. EPA's extrapolation implies that about 25% of all deaths *nationwide* were due to $PM_{2.5}$ as recently as 1980—more than cancer and car accidents combined.[56] These assumptions, which underpin EPA's co-benefits calculations in numerous rules are plainly implausible and undercut the credibility of all of EPA's $PM_{2.5}$-related mortality benefits estimates. API therefore recommends that EPA transparently revisit and reconsider the credibility and validity of its method of extrapolating $PM_{2.5}$-related mortality risks below the LML.

While it is recognized that some analysts do not view the current data as being able to define a specific threshold, this is not the same as concluding that data demonstrates that there is no

[56] CDC/NCHS National Vital Statistics System, Mortality, Vital Statistics of the United States, Vol II, Mortality, Part A.

threshold for effects. The studies used to develop the $PM_{2.5}$ mortality estimates are subject to several significant uncertainties due to a lack of individual exposure data, simultaneous exposures to pollutants other than $PM_{2.5}$, geographic trends in mortality rates, unexplained associations with other factors such as education[57], and other potentially confounding variables. Consideration of these substantial uncertainties provides additional reasons for EPA to refrain from extrapolation of $PM_{2.5}$ mortality below the LML.[58]

2. Overreliance on Deterministic Air Quality Models

As EPA has lowered NAAQS to levels at or very near background, EPA's use of overly-conservative modeling assumptions have made compliance demonstrations and impact assessments more difficult, if not impossible. Current EPA guidance requires "deterministic" air quality models that use a facility's maximum operating rate and maximum allowable emissions as opposed to actual operating and emissions rates that are frequently well below operational and/or permitted limits. The result of EPA's use of "deterministic" models, and the unrealistic operating scenarios contained therein, is a substantially overstated estimate of the potential impact a new or modified facility will have on air quality.

In the context of cost-benefit analyses, EPA's problematic use of deterministic models and unrealistic operating scenarios is more pronounced because EPA frequently attempts to estimate costs probabilistically (rather than worst case, as is done with benefits). The probabilistic evaluation of costs, when weighed against EPA's deterministic evaluation of worst-case operational and emissions scenarios presents an apples-to-oranges comparison the result of which is an analysis that obscures the disproportionality of the action being reviewed and inaccurately represents the uncertainty inherent to the analysis.

EPA should not use "deterministic" air quality models, particularly when the Agency is aware of approaches that can more accurately predict real-world impacts. Probabilistic modeling, for example, takes into account the variability of both background air quality and emission rates for modeled sources.

3. Value of a Statistical Life ("VSL")

In the RIA accompanying the 2015 Ozone NAAQS, more than 96% of EPA's estimated benefits involved avoided premature mortality. Most of the premature mortalities that EPA contended could be avoided as a result of reduced ozone and $PM_{2.5}$ concentrations are within older populations. Those populations have many fewer average years of life expectancy remaining than the populations assessed in the studies on which EPA relied in estimating the VSL.

The studies upon which EPA relies calculate values based in large part on the wage premium paid to workers in hazardous occupations. When deaths occur in these occupations, the deaths usually cut the life expectancy of the deceased worker by 20, 30, 40, or even 50 or more years. In contrast, the RIA for the 2015 Ozone NAAQS stated that about half of the avoided premature mortality

[57] Health Effects Institute, Revised Analyses of Time-Series Studies of Air Pollution and Health; Revised Analyses of the National Morbidity, Mortality, and Air Pollution Study, Part II; May 2003
[58] https://www3.epa.gov/ttn/ecas/regdata/Benefits/thresholdstsd.pdf

associated with ozone exposure would occur among populations between ages 75 and 99.[59] Accordingly, the RIA for the 2015 Ozone NAAQS grossly overstated the VSL and therefore the presumed benefits of the rule.

EPA should have attempted to calibrate the VSL to account for EPA's own projection that the avoided premature mortality would be among the elderly population – not individuals in their highest earning years.[60] API has observed this issue in other Agency cost-benefit analyses as well. As such, we recommend that, at a minimum, EPA should provide more information on its Mortality Risk Valuation and the use and measurement of the VSL in economic analyses.

4. Hypothetical Populations

EPA should also reconsider its use of hypothetical populations to model exposure and risk. While "hypothetical populations" can be useful and illustrative tools for understanding the impact of regulations, EPA has increasingly based regulatory analyses on hypothetical populations that the Agency projects to be exposed at levels that are wholly unrealistic.

In the MATS Rule, for instance, EPA explained that, because a "relatively small fraction of total mercury deposition [is] contributed by U.S. [power plants] on average . . . even substantial reductions in U.S. deposition . . .[are] unlikely to substantially affect total risk."[61] When the Agency utilized hypothetical populations, however, EPA was able to estimate some level of benefit to justify the rule. The Agency was able to do so by examining, what it identified as a highly susceptible demographic and assuming that they consumed massive quantities of fish procured overwhelmingly or exclusively from the waterbodies most extensively impacted by mercury deposition. EPA then attributed an unrealistic percentage of that mercury deposition to power plants, thereby creating the presumption that the MATS Rule would produce health benefits from mercury reduction (as opposed to the $PM_{2.5}$ reductions that actually drove EPA's benefits calculus).

As with most analytical tools, hypothetical populations can be useful proxies in the absence of actual exposure data, but often they can be mechanisms to skew a cost-benefit analysis. As OMB Circular A-4 directs, worst-case or conservative analyses are not usually adequate because they do not convey the complete probability distribution of the outcomes, and they do not permit calculation of an expected value of net benefits. As such, API recommends that EPA limit its use of these tools and take steps to validate the assumptions it builds into these hypothetical populations so that they can be used to provide more realistic assessments of potential impacts. At a minimum, EPA should explain each of the assumptions on which it relied in its use of hypothetical populations and the uncertainties associated with the assumptions.

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[59] As previously discussed, this calculation was an extrapolation of impacts below the LML.

[60] See Cass R. Sunstein, "Lives, Life-Years, and Willingness to Pay," 104 Columbia Law Review, 2004; See also OMB Circulator Article at 12-14

[61] Proposed Mercury Risk TSD at 53; See also 77 Fed. Reg. at 9,356.

f. Select an Appropriate Baseline

In order to evaluate the costs and benefits of a proposed action, OMB Circular A-4 directs agencies to "measure the benefits and costs against a baseline . . . assessment of the way the world would look absent the proposed action."[62] Selecting an appropriate baseline "may require consideration of a wide range of potential factors, including:

- Evolution of the market;
- Changes in external factors affecting the expected benefits and costs;
- Changes in regulations promulgated by the agency or other government entities; and
- The degree of compliance by regulated entities with other regulations.[63]

Accordingly, the selection of a baseline scenario from which to measure a proposed action's potential impacts requires EPA to project potential impacts from unrelated regulated actions and market forces so that EPA can "net out" the impact of ancillary actions/forces that will occur irrespective of the action under consideration. It is only by removing these collateral sources of change that the Agency can credibly and realistically establish baseline scenario from which to measure the impacts of an action.

Given the pace of rulemaking and regulatory justifications that are increasingly reliant on the co-benefits of reducing non-targeted pollutants, EPA has had significant difficulty identifying baseline conditions that account for the emissions reductions that could credibly be attributed to a single specific proposed regulatory action. In fact, in the past EPA has frequently failed to segregate the precise pollutant reductions attributable to any one action. Instead EPA conflated the benefits of multiple rules as if each one was finalized alone, and without taking into account the impact of the other rules on the baseline. EPA assumed that companies have already incurred compliance costs for auxiliary rules, thereby reducing the estimated cost to comply with the rule being analyzed. Historically, this practice of double-counting regulatory benefits projected for each proposed rule while also spreading compliance costs across multiple rules has undermined the credibility of EPA's cost-benefit analyses and made it much more difficult to accurately assess the rationality of Agency action.

Because EPA's regulatory justifications for CAA rules are most often driven by reductions of emissions of criteria pollutants, their baseline emissions are the most difficult to estimate. There are a few important reasons for this. For one thing, NAAQS must be reviewed every five years, which has resulted in several revisions of the standards for pollutants like $PM_{2.5}$, ozone, and the ozone precursors. Following the establishment of a new NAAQS, however, key aspects of the prior NAAQS can continue in force and can actually increase in stringency. As such, in order to understand the potential benefit of a proposed new NAAQS standard, EPA needs to consider the reductions that may be attributable to continued compliance with the prior standard and new, more stringent requirements that the prior standard may trigger in the future (*i.e.*, NAAQS non-attainment area bump-ups). Establishing a baseline emissions scenario for NAAQS is therefore

[62] OMB Circular A-4 at 15.
[63] OMB Circular A-4 at 15.

exceptionally complicated. This complexity, however, only increased when EPA, within the span of a few years, promulgated the Cross-State Air Pollution Rule, MATS Rule, Clean Power Plan, new NAAQS for $PM_{2.5}$ and ozone, multiple NAAQS implementation rules, and other rules projected to reduce emissions of $PM_{2.5}$, ozone, and ozone precursors.

Baseline estimates during this period had to also account for significant state actions to implement the various NAAQS as well as important shifts in energy markets. Suffice it to say that the multitude of regulations EPA expected would reduce emissions of the same few pollutants led to substantial errors in apportioning the benefits reasonably expected from any one rule.

Baseline issues have also undermined EPA's analyses of the benefits of reducing CO_2 in the Clean Power Plan and the SCC Estimate utilized in the Clean Power Plan's RIA. In that analysis, the estimate of the social cost of a ton of carbon emitted in a given year is affected by the total amount of baseline greenhouse gases assumed to be emitted after that year until the end of the time horizon. EPA averaged SCC estimates from five alternative baseline projections of future emissions that are assumed by the SCC-estimating models to be invariant to any emissions control decisions made as a result of the resulting SCC estimate.[64] Four of these five baseline projections assume no long-term emissions reduction efforts domestically or internationally, even if the resulting elevation in estimated near-term SCC values associated with those no-future-control assumptions do motivate actions to decrease emissions now (and in the future). A more logically-coherent approach would imply lower baseline emissions in at least four of the five baseline projections now used by the U.S. government, which, in turn, would imply lower average estimates of SCC than those previously used.

In the ANPRM for the proposed repeal of the Clean Power Plan, EPA noted its recognition that "[i]n practice, the extent of compliance costs actually avoided would depend on economic conditions which change over time," and cites regularly changing forecasts for electricity demand and costs for capital and fuel expenditures.[65] In the ANPRM, EPA further observes that it plans to update its modeling of avoided compliance cost estimates before finalizing a decision on whether to repeal the Clean Power Plan.[66] API supports this updated modeling effort, and encourages EPA to take further steps to more broadly update its approach to establishing credible baselines from which to measure the costs and benefits of proposed actions.

This issue, however, is not limited to the CAA. In regulations promulgated under the CWA, Agency cost-benefit analyses have similarly suffered from the impromptu selection and use of baseline conditions. In particular, in 2014, the EPA and the U.S. Army Corps of Engineers ("the Corps") issued a Proposed Definition of Waters of the United States ("WOTUS") under the CWA, which purported to establish the extent of federal jurisdiction and regulatory control over various waterbodies and categories of waters.[67] Both the 2014 proposal and 2015 final WOTUS rule

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[64] Each baseline projection also assumes future levels of gross domestic product ("GDP"), and population. The government adopts the simple average of all the alternative SCC estimates for a given discount rate as "the" SCC value for that discount rate.
[65] See 2017 RIA for Clean Power Plan Repeal ANRPM at 32-33 (EPA-HQ-OAR-2017-0355).
[66] *Id.* at 32 n.13.
[67] 79 Fed. Reg. 22,188 (Apr. 21, 2014).

attempted to exercise jurisdiction over vast areas and waters over which the Agencies did not previously have regulatory jurisdiction. Yet, when the Agencies analyzed the cost of the 2014 proposed WOTUS rule, [68] they underestimated the costs of this massive jurisdictional expansion in numerous ways, including (as relevant here) by selecting an inappropriate baseline from which to estimate the cost impact of proposed WOTUS rule's jurisdictional assertions.

Specifically, the Agencies used records contained in the Corps' Operation and Maintenance Business Information Link, Regulatory Module ("ORM2") database from fiscal years 2009 and 2010. ORM2 included information on actual impacted areas only for projects for which a jurisdictional determination or permit was requested by project proponents. As such, it did not include or provide a means of estimating increases for areas outside the project impacts, for those projects which did not require a permit, or for those projects which would not have been envisioned as requiring a permit. It also excluded all Preliminary Jurisdictional Determinations, *i.e.*, those which project proponents have questions about jurisdiction but decline to pursue them in the interests of reducing permit processing time. This may help to explain why some 98 percent of tributaries and 98.5 percent of adjacent wetlands were found to be already jurisdictional, prompting the Agencies to erroneously assume that any increase in jurisdiction for these classes of waters would be negligible.

As noted in analysis provided by API, there were many scenarios and developments in the arid Southwest and the Midwest that did not previously require a permit but would require permits under the 2014 WOTUS proposal. Additionally, the Agencies' Economic Analysis used the ORM2 data records from fiscal years 2009 and 2010 – a time when the U.S. economy was in a recession with the lowest number of housing starts on record.[69] Similarly, 2009-2010 was also characterized by a decrease in industrial development due to a reduction in capital expenditures. This time period included the only reduction in capital expenditure spending by the oil and gas majors in the past 20 years,[70] and came just prior to a dramatic and continuing upturn in drilling and production associated with shale gas and liquids development, which has transformed markets and prospects for U.S. energy security. This brief "snapshot" of conditions was not at all representative of realistic baseline conditions in the long term. Accordingly, the selection of data for 2009-2010 surely led to an understatement in the number of permits submitted and the types of water evaluated; and therefore, were not a proper representation of the baseline economic conditions from which to estimate the potential impacts of the proposed WOTUS Rule.

Similarly, in EPA's 2015 proposed Effluent Limitations Guidelines ("ELGs") and Standards for the Oil and Gas Extraction Point Source Category,[71] the Agency proposed to ban the indirect discharge of produced water (called "UOG extraction wastewater" in the proposal) to publicly owned treatment works ("POTWs"). Under the CWA, treatment standards (in this case, a pretreatment ban), must be based on an analysis of "the best available technology economically

[68] "Economic Analysis of Proposed Revised Definition of Waters of the United States" (March 2014).
[69] https://www.censu.gov/construction/nrc/pdf/startsan.pdf
[70] Bloomberg - http://www.resilience.org/stories/2014-03-04/beginning-of-the-end-oil-companies-cut-back-on-spending
[71] 80 Fed. Reg. 18557 (April 7, 2015) ("Proposed Rule").

achievable . . . which will result in reasonable further progress toward the national goal of eliminating the discharge of all pollutants."[72] Explicit within this analysis ("BAT analysis") is the requirement that standards be economically feasible. EPA "determines economic achievability on the basis of total costs to the industry and the effect of compliance with BAT limitations on overall industry and subcategory financial conditions."[73] The legislative history underscores that Congress "believes that there must be a reasonable relationship between costs and benefits if there is to be an effective and workable program."[74]

Notwithstanding this statutory mandate, EPA's proposed ELGs provided no analysis of costs, and instead provided a justification for not conducting a cost-benefit analysis.

> *because this [proposed ban] represents current industry practice nationwide, no facilities will incur incremental costs for compliance with the propos[al] . . . and, therefore, the propos[al] . . . is economically achievable. For the same reasons, the propos[al] . . . will result in no incremental non-water quality environmental impacts. . . Finally, EPA determined that the propos[al] present[s] no barrier to entry into the market for new sources. While EPA cannot say with certainty exactly how new sources will manage their UOG extraction wastewater, information in the record indicates that new sources would manage their UOG wastewater following current industry practice. EPA has found that overall impacts from the proposed standards on new sources would be minimal, as is the case for existing sources, since the costs faced by new sources generally would be the same as those faced by existing sources.*[75]

Put more simply, EPA concluded that this proposed rule would result in zero costs and zero environmental benefits. The proposed rule's conclusion that there would be no cost to the oil and natural gas industry is premised on EPA's summary conclusion that the proposed rule was simply memorializing current industry practices. This conclusion about the baseline conditions, however, was misleading and incorrect.

Until 2011, about 20 POTWs in Pennsylvania accepted UOG extraction wastewater, like they likely accepted conventional produced water before the advent of modern hydraulic fracturing.[76] That practice stopped entirely in 2011 based in large part on EPA's actions. EPA objected to pollutant limits for POTWs that Pennsylvania promulgated in 2009, and strongly signaled to the Pennsylvania Department of Environmental Protection ("PADEP") that EPA would require the POTWs to discontinue accepting wastewater if PADEP did not issue such an order itself. EPA's role in stopping the acceptance of UOG extraction wastewater at POTWs in Pennsylvania was well-documented.

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[72] *See* CWA § 301(b)(2)(A).
[73] Effluent Limitations Guidelines and Standards for the Dental Category, 79 Fed. Reg. 63258, 63261 (proposed Oct. 22, 2014) (to be codified at 40 C.F.R. pts. 403 and 441).
[74] *BP Exploration & Oil, Inc. v. EPA*, 66 F.3d 784, 789 (6th Cir. 1995).
[75] 80 Fed. Reg. at 18,572.
[76] TDS at 110.

EPA's actions in Pennsylvania effectively banned POTW use in Pennsylvania and, because Pennsylvania was the only state where POTWs accepted UOG extraction wastewater, EPA had achieved in 2011 exactly the result the Agency intended to memorialize in the proposed ELGs. As such, EPA avoided identifying additional costs for a ban on POTW use by comparing its proposed action to the already higher costs industry incurred when EPA effectively banned POTW use in 2011. The difference in cost between the Agency's proposed "final pretreatment ban" and the cost of EPA's "interim pretreatment ban" was therefore calculated by the Agency as zero.

This is a particularly egregious example of an Agency decision to evaluate costs and regulatory impacts relative to a highly improper portrayal of baseline conditions, but it perfectly exemplifies the nature of API's concern. The Agency's chosen baseline did not just bias the EPA's analysis, it allowed EPA to effectively ignore a statutory mandate to consider costs and resulted in a conclusion that EPA's proposed action would result in zero compliance costs and zero environmental benefits. API therefore recommends that EPA transparently promulgate and utilize guidelines for establishing credible baselines from which to measure the costs and benefits of proposed actions.

g. Calculate the Full Spectrum of Costs

EPA's estimates of the anticipated costs of proposed regulations have generally focused on consideration of the costs of installing and running the technologies that will control the emissions/effluents that are the target of the regulation, and not indirect costs incurred by companies or the macro-economic impacts on overall economic productivity. This narrow consideration necessarily leads to underestimates of costs and undermines the reliability of cost-benefit analysis. API therefore recommends that EPA direct that its cost-benefit analyses consider indirect costs and the broader impacts of proposed regulatory actions, including jobs, energy security, and viability of the regulated community and indirectly impacted industries. API further recommends that EPA work with potentially impacted industries to obtain the best understanding possible of the nature and extent of the costs that will be incurred as a result of a proposed regulatory action.

1. Work with Impacted Industries

API recommends that EPA, to the maximum extent possible, rely on compliance cost estimates provided by impacted industries and validated by EPA. Industries often compile this data at great expense in order to help EPA better understand the potential costs of its regulatory actions and often these assessments are not incorporated in rulemaking cost-benefit analyses. For example, API engaged Environmental Resources Management, Inc. ("ERM") to conduct a review and analysis of EPA's RIA for the then-proposed changes to the New Source Performance Standards for New, Reconstructed, and Modified Sources in the oil and natural gas section.[77] That report found EPA underestimated the technical costs of control by nearly $500 million ($310 million

[77] *See* API Comments on the Proposed Rulemaking – Standards of Performance for New Stationary Sources: Oil and Natural Gas Production and Natural Gas Transmission and Distribution – Attachment E, API's Review of EPA's Cost Benefit Analysis

versus $806 million).[78] Using this compliance information, which was obtained by the affected industry, ERM calculated that the rule would result in social net costs, not benefits, over approximately $410 million by 2025.[79]

API has previously expressed concern that cost estimates developed following the suggested procedures within EPA's Air Pollution Control Cost Manual ("Manual") will reflect only a fraction of actual costs; potentially biasing regulatory decision making. Recommendations for changes to address the methodology concerns identified by API in previous comments on the Manual should be taken into account.[80]

2. Fully Consider Indirect Costs

While API believes that EPA should undertake a more meaningful effort to understand and incorporate the indirect costs of its actions, we cannot herein provide a comprehensive list of all the direct and indirect compliance costs that EPA typically fails to consider in cost-benefit analyses because different rules necessarily create different direct and indirect compliance costs. API suggests that EPA engage with the regulated industry to gain a full understanding of the indirect costs prior to conducting RIAs. We believe that EPA's Draft Control Techniques Guidelines for the Oil and Natural Gas Industry ("CTG") provides an important example of the Agency overlooking readily identifiable indirect compliance costs that had profound impacts on EPA's cost analysis.[81]

One of the indirect effects that EPA failed to consider in estimating the impacts of the CTG's Reasonable Available Control Technology ("RACT") requirements on existing sources was the cost of disturbance of land to install new controls. Industry standards and insurance typically require that combustion devices must be placed 50-150 feet from equipment containing hydrocarbon to avoid explosions from thermal radiation. Due to the spacing requirement for control devices, adding a control device often requires additional surface disturbance beyond the existing pad location. There are numerous repercussions of additional land disturbance – none of which were considered by EPA as part of its cost analysis:

- Additional land may have to be purchased.
- Wetlands may be further impacted requiring additional wetland mitigation and/or a 404 Permit under the Clean Water Act.
- The additional land needed may encroach on endangered species habitat and may not be allowed to be developed or require additional mitigation.
- Federal land will potentially require National Environmental Policy Act ("NEPA") analysis for the additional disturbance.
- National Historic Preservation Act review may be required for the additional disturbance.

[78] *Id*. at 5.
[79] *Id*.
[80] See three API Comments on EPA-HQ-OAR-2015-0341 (Oct. 19, 2017, Dec. 21, 2016, and Sept. 10, 2015).
[81] 80 Fed. Reg. 56,577 (Sept. 18, 2015).

3. Conduct Economy-Wide Modeling

In addition to failing to consider the full suite of compliance costs likely to be incurred by the entities subject to the proposed regulation, EPA's prior analyses of the costs of regulations rarely, if ever, address macro-level effects. The total macroeconomic cost of a regulation, however, is not just the sum of the costs absorbed at each affected facility, plus directly-related market impacts. There are also long-term effects on overall economic productivity. For instance, when EPA proposed the Clean Power Plan in 2014, the Agency failed to use full economy modeling to evaluate employment impacts. EPA only evaluated employment impacts in a few select industries, while ignoring the larger employment impacts likely to be faced by non-utilities. Given the breadth and complexity of EPA's Clean Power Plan proposal, adverse impacts on employment were almost certain to occur across a wide range of sectors. In addition, downstream employment effects on consumers of electricity were also likely to occur. EPA's partial economy model failed to address those impacts when it reported that the rule would have a positive net effect on unemployment.[82] Had EPA conducted full economy modeling that addressed the full range of employment impacts on all affected sectors, it almost certainly would have reached a much different conclusion.

Unlike a partial economy approach, which focuses on a narrow subset of affected industry sectors, a whole economy approach focuses more broadly on the economic and employment impacts of proposed actions by taking into account the cascading effects of a regulatory change across interconnected industries and markets nationwide. To be effective in measuring employment and economic impacts across the entire U.S. economy, a whole economy model must include the following criteria.

1. First, the model must include sufficient industry sector detail to evaluate both direct and indirect impacts. In other words, a model must not needlessly sacrifice depth of analysis to evaluate broad economy-wide impacts.

2. Second, a model must include sufficient detail at the regional level to identify changes in the regional distribution of output and employment, which may add additional costs on industry due to relocation of labor and capital.

3. Third, a model must include international trade flows to evaluate how regulations will affect tradable sectors. This is of particular importance for trade-exposed industries that face strong foreign competition.

4. Fourth, a model should include dynamic analyses to examine adjustments in labor and capital markets in response to regulations over time. Static analyses that consider only a single timeframe can mask key impacts that can occur over time.

In 2013, NERA Economic Consulting conducted a review of EPA's methods for estimating the employment impact of its regulations.[83] That report (provided herewith as Exhibit 9), found that EPA has utilized a whole economy model for only two rules (the Clean Air Interstate Rule and the

[82] See 79 Fed. Reg. at 34,935.
[83] NERA Economic Consulting, *Estimating Employment Impacts of Regulations: A Review of EPA's Methods for Its Air Rules* 3 (Feb. 2013).

Clean Air Visibility Rule and Best Available Retrofit Technology Guidelines) and, in each case, EPA reported no projected employment growth in response to the regulations.[84] In contrast, EPA's more recent partial economy models have consistently predicted large gains in employment as a result of environmental regulations.[85]

EPA has failed to consider economy-wide impacts in other, non-employment contexts as well. In the Agency's 2015 RIA for the then-proposed revisions to the ozone NAAQS, EPA included no recognition or analysis of the costs of nonattainment New Source Review ("NSR") and the restrictions on economic growth that result from a stricter NAAQS. EPA effectively ignored the well-established fact that the cost to a community of being in nonattainment with a NAAQS includes not only the cost of the controls that must be implemented to attain the standard, but also the economic losses from being subject to nonattainment NSR and transportation conformity requirements while in nonattainment. EPA's New Source Review: Report to the President (June 2002) concluded that NSR requirements applied to existing power plants, refineries and other industrial facilities impede or result in the cancellation of a variety of projects that would provide needed capacity or efficiency improvements.[86] The impediments to growth, investment and modernization from application of nonattainment NSR have been among the primary concerns cited by State and local officials contesting EPA's designation of broad ozone nonattainment areas, including counties with non-attaining monitors and the additional areas with sources thought to be contributing to nonattainment.

Requirements for Lowest Achievable Emission Reduction ("LAER") and offsets for new sources and major modifications in nonattainment areas are costly; NOx offsets in Southern California and the Houston area can cost in excess of $150,000 per ton as the consulting firm Environomics explained in the March 17, 2015 comments on the RIA submitted on behalf of API (page 32, provided herewith as Exhibit 4). . Nonattainment areas can also lose their federal highway and transit funds if their transportation plans will not yield the mobile source emissions reductions needed for attainment. Given that EPA's RIA found that "known controls" will be insufficient for attainment of the proposed NAAQS in several areas of the country and that reductions approaching 90% of all anthropogenic NO_x emissions can be necessary, the risks of these adverse economy-wide impacts was far from speculative.

Accordingly, API recommends that EPA utilize, as appropriate, economy-wide modeling and take other efforts to consider the full range of impacts that will result from its proposed action.

IV. UNLESS EXPRESSLY PROHIBITED BY STATUTES, EPA SHOULD CONDUCT, AND BASE REGULATORY DECISIONS ON, COST-BENEFIT ANALYSES

[84] *Id.*
[85] *Id.*
[86] U.S. Envtl. Prot. Agency, *New Source Review: Rep. to the President* (2002), https://www.epa.gov/sites/production/files/2015-08/documents/nsr_report_to_president.pdf

"Federal administrative agencies are required to engage in 'reasoned decision-making.'"[87] "Not only must an agency's decreed result be within the scope of its lawful authority, but the process by which it reaches that result must be logical and rational."[88] "It follows that agency action is lawful only if it rests 'on a consideration of the relevant factors.'"[89] The precise "relevant factors" requiring agency consideration can differ from statute to statute or within the same statute; however, unless the statute expressly directs otherwise, a weighing of costs against benefits is a relevant factor which must be considered by agencies.

In *Michigan v. EPA*, the Supreme Court evaluated whether EPA had properly promulgated the MATS Rule. In particular, the court considered whether the CAA Section 112(n)(1)(A) requirement that the Agency promulgate rules that were "appropriate and necessary" to control power plant emissions mandated consideration of cost. A majority of the Supreme Court concluded that the phrase "appropriate and necessary" did amount to a congressional mandate to consider cost. More importantly, however, the Court found that this congressional mandate was not exclusively embodied in the phrase "appropriate and necessary:"

> *Agencies have long treated cost as a centrally relevant factor when deciding whether to regulate. Consideration of cost reflects the understanding that reasonable regulation ordinarily requires paying attention to the advantages and the disadvantages of agency decisions. It also reflects the reality that 'too much wasteful expenditure devoted to one problem may well mean considerably fewer resources available to deal effectively with other (perhaps more serious) problems.'*[90]

The Supreme Court in *Michigan v. EPA* further held that:

> *One would not say that it is even rational, never mind 'appropriate,' to impose billions of dollars in economic costs in return for a few dollars in health or environmental benefits. In addition, 'cost' includes more than the expense of complying with regulations; any disadvantage could be termed a cost. EPA's interpretation precludes the Agency from considering any type of cost— including, for instance, harms that regulation might do to human health or the environment. The Government concedes that if the Agency were to find that emissions from power plants do damage to human health, but that the technologies needed to eliminate these emissions do even more damage to human health, it would still deem regulation appropriate. . . . No regulation is 'appropriate' if it does significantly more harm than good.*[91]

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[87] *Michigan v. EPA*, 135 S. Ct. 2699, quoting *Allentown Mack Sales & Service, Inc. v. NLRB*, 522 U. S. 359, 374 (1998) (internal quotation marks omitted).
[88] *Ibid.*
[89] *Michigan v. EPA*, 135 S. Ct. 2699, quoting *Motor Vehicle Mfrs. Assn. of United States, Inc. v. State Farm Mut. Automobile Ins. Co.*, 463 U. S. 29, 43 (1983).
[90] *Michigan v. EPA*, quoting *Entergy Corp. v. Riverkeeper, Inc.*, 556 U. S. 208, 233 (2009) (BREYER, J., concurring in part and dissenting in part).
[91] *Michigan v. EPA* at 7.

Moreover, while the dissent in *Michigan v. EPA* disagreed with the majority on the precise point in the rulemaking process that EPA was required to evaluate costs under CAA Section 112(n)(1)(A), the dissenting justices agreed with the majority that agencies must consider costs in all instances unless expressly prohibited:

> *Cost is almost always a relevant—and usually, a highly important—factor in regulation. Unless Congress provides otherwise, an agency acts unreasonably in establishing a standard-setting process that ignores economic considerations. At a minimum, that is because such a process would threaten to impose massive costs far in excess of any benefit. And accounting for costs is particularly important in an age of limited resources available to deal with grave environmental problems . . .* [92]

While the phrase "appropriate and necessary" was at issue in *Michigan v. EPA*, both the majority and the minority clearly indicated that EPA's obligation to consider costs in rulemaking was inherent in the Agency's obligation to engage in "reasoned decision-making," and not a function of that precise phrase. Indeed, the Supreme Court has identified similar mandates in statutes requiring consideration of economic and technological feasibility[93] and "best technology."[94] Although the type of cost consideration differs, the Supreme Court has also held that the word "significantly" permitted EPA to consider compliance costs.[95] As Judge Kavanaugh noted in dissent in the United States Court of Appeals decision on the MATS Rule that was appealed to the Supreme Court in *Michigan v. EPA*, where the "only statutory discretion is to decide whether it is 'appropriate' to go forward with the regulation ... common sense and sound government practice" warrant consideration of both costs and benefits.[96]

Moreover, balancing of costs and benefits has long been part of the regular administrative rulemaking process. Executive Order No. 13,563, reaffirming Executive Order No. 12,866 (1993),[97] recognizes that "[o]ur regulatory system must protect public health, welfare, safety, and our environment while promoting economic growth, innovation, competitiveness, and job creation."[98] Other regulatory and statutory provisions, if not inconsistent with other statutory authority, require an agency to consider alternative regulatory options that would reduce compliance costs and burdens.[99] Indeed, in many important instances, EPA itself has recognized

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[92] *Michigan v. EPA* at 6-7.
[93] *See Am. Textile Mfrs. Inst., Inc. v. Donovan*, 452 U.S. 490, 513 n.31 (1981) (noting "any standard that was not economically or technologically feasible would *a fortiori* not be 'reasonably necessary or appropriate' under [OSHA]") (citing *Industrial Union Dept. v. Hodgson*, 499 F.2d 467, 478 (D.C. Cir. 1974));
[94] *See Entergy Corp.*, 556 U.S. at 218 (finding, based on "common parlance," that "'best technology' may also describe the technology that *most efficiently* produces some good") (emphasis in original).
[95] *EPA v. EME Homer City Generation, LP.*, 134 S. Ct. 1584 (2014).
[96] *White Stallion Energy Ctr, LLC v. Envtl. Prot. Agency*, No. 12-1100 (D.C. Cir. 2014) (Kavanaugh, J. dissenting).
[97] Executive Orders addressing regulatory impact analysis date back to 1981 when President Ronald Reagan issued Executive Order No. 12,291, 46 Fed. Reg. 13,193 (Feb. 19, 1981)
[98] 76 Fed. Reg. 3821, 3821 (Jan. 21, 2011).
[99] See 77 Fed. Reg. at 9433-9440.

that its obligation to engage in "reasoned decision-making" required the Agency to consider costs even in the absence of express stator language.[100]

API recognizes that the Supreme Court has weighed in on the narrow role of the consideration of costs in promulgation of the NAAQS in *Whitman v. American Trucking Ass'ns, Inc.*,[101] It should be noted, however, that, *American Trucking* does not stand for the proposition that the absence of a specific statutory requirement to consider costs connotes congressional intent to prohibit consideration. "[T]hat an agency is not *required* to do so does not mean that an agency is not *permitted* to do so."[102] Conversely, given EPA's obligation to engage in "reasoned decision-making," more often than not, ambiguous language and congressional silence should be considered as directives to consider costs.

While multiple statutes require and/or allow EPA to consider costs when promulgating regulations, an examination of just one statute – the CAA – demonstrates the significant breadth of the authority described above. According to the Congressional Research Service ("CRS"), of the 67 provisions of the CAA that authorize EPA to promulgate regulations, roughly half (34) specifically mention cost or economic considerations.[103] Several major regulatory authorities are among the 34 provisions with explicit cost considerations, including the authority to:

- set emission standards for new stationary sources (power plants, refineries, *etc*.) in Section 111;
- go "beyond the floor" in emission standards for sources of 187 hazardous air pollutants, under Section 112(d);
- set emission standards for motor vehicles (beyond the standards specifically listed in the act), under Sections 202(a) and 202(i);
- control mobile source air toxics, under Section 202(l);
- control or prohibit the manufacture and sale of fuels and fuel additives under Section 211(c);
- require the sale of reformulated gasoline in nonattainment areas, under Section 211(k);
- set emission standards for nonroad vehicles and engines, including construction equipment, recreational equipment, agricultural machinery, electric generators, and other sources, under Section 213; and

[100] *See Ass'n of Battery Recyclers, Inc. v. EPA*, 716 F.3d 667, 673-74 (D.C. Cir. 2013) (affirming consideration of costs in determining whether to revise emissions standards under 42 U.S.C. § 7412(d)(6)); *Natural Res. Def. Council v. EPA*, 529 F.3d 1077, 1083 (D.C. Cir. 2008) (affirming consideration of costs in determining whether to establish residual risk standards under 42 U.S.C. § 7412(f)(2)(B)).
[101] 121 S. Ct. 903 (2001).
[102] *See Entergy Corp.*, 556 U.S. at 1508.
[103] Specialist in Environmental Policy, Cong. Research Serv., R44840, *Cost and Benefit Considerations in Clean Air Act Regulations* (2017).

- set emission standards for locomotives, buses, and aircraft, under Sections 213, 219, and 231. [104]

Regardless of whether *American Trucking* is viewed narrowly or expansively, these 34 provisions affirmatively require EPA to consider costs because Congress explicitly directed this result. In eight other provisions of the Act, EPA's authority to consider costs is implied (*e.g.*, where it requires a standard that is "practicable" or "reasonably achievable.").[105] As explained above, the Supreme Court's decisions in *Michigan v. EPA* and *Entergy Corp. v. Riverkeeper* interpreted these types of phrases as mandates to engage in reasoned decision-making that considers relevant factors such as compliance costs. These provisions of the CAA include directives to:

- consider the "remaining useful life of the existing source" to which an emission standard will apply, under Section 111(d);
- provide for the use of "generally available control technologies" to control area sources of hazardous air pollutants, under Section 112(d)(5);
- promulgate "reasonable regulations and appropriate guidance to provide, to the greatest extent practicable, for the prevention and detection of accidental releases" of extremely hazardous substances and take into consideration "the concerns of small business," under Section 112(r)(7);
- consider "the availability and feasibility of pollution control measures" in classifying nonattainment areas under Section 172;
- consider "such other factors as he [the Administrator] deems pertinent" and take into consideration "the restraints of an adequate lead-time for design and production" in setting vapor recovery standards for gasoline under Section 202(a)(5);
- impose emissions standards or emissions control technology requirements that "reflect the best retrofit technology and maintenance practices reasonably achievable" for retrofit of urban buses under Section 219(d);
- decide whether a requirement is "practicable, taking into account technological achievability, safety, and other relevant factors" in establishing an accelerated schedule for phasing out production and consumption of ozone-depleting substances under Section 606; and,
- consider "the purpose or intended use of the product, the technological availability of substitutes ..., safety, health, and other relevant factors" in regulating nonessential products that release class I ozone depleting substances under Section 610 (except for two specific categories of products that are listed in the statute).[106]

In addition to the CAA's explicit and implicit directives to consider costs, several provisions of the CAA do not mention cost at all. EPA should interpret this congressional silence, consistent with *Entergy v., Riverkeeper*, as permission to consider a relevant factor – not as a prohibition.

[104] *Id.* at 2.
[105] *Id*. at 3.
[106] *Id.* at 4.

Indeed, Congress was not completely silent regarding EPA's obligation to engage in reasonable decision-making. The "primary goal" of environmental statutes such as the CAA is to "encourage or otherwise promote *reasonable* Federal, State, and local governmental actions" for pollution prevention.[107]

Moreover, balancing of costs and benefits has long been part of the regular administrative rulemaking process. Executive Order 13777 requires each Agency to impanel Regulatory Reform Task Forces that identify and attempt to eliminate existing and prospective regulations that, *inter alia*, "impose costs that exceed benefits."[108] Executive Order 13771 requires, *inter alia*, that "any new incremental costs associated with new regulations shall, to the extent permitted by law, be offset by the elimination of existing costs associated with at least two prior regulations."[109] Executive Order No. 13,563, reaffirming Executive Order No. 12,866 (1993),[110] recognizes that "[o]ur regulatory system must protect public health, welfare, safety, and our environment while promoting economic growth, innovation, competitiveness, and job creation."[111] Other regulatory and statutory provisions, if not inconsistent with other statutory authority, require an agency to consider alternative regulatory options that would reduce compliance costs and burdens.[112]

As such, there are only a handful of CAA provisions under which Congress expressly restricted EPA's discretion to consider costs or required purely health-based regulations. It is these few provisions – and only these provisions – that potentially prohibit EPA's ability to consider costs. In all other cases, EPA's obligation to engage in reasoned decision-making likewise obligates EPA to consider relevant and important information like compliance costs.

It is not enough, however, that EPA consider costs and benefits in all rulemaking efforts (unless expressly prohibited) – the Agency must also select regulatory outcomes that are informed by its analyses. As such, API recommends that EPA not only expansively interpret its authority to consider costs under the Agency's governing statutes, but to actually make regulatory decisions that are consistent with the outcome of EPA's analyses. API suggests EPA issue a rule to specifically address this issue and ensure that agency decisions are based on sound cost-benefit analyses unless expressly prohibited to do so. Due to the varying ways in which EPA must consider costs under different statutes or portions thereof, API suggests that EPA may need to consider statute-specific rulemakings to ensure that the necessary variations are taken into account.

"No regulation is 'appropriate' if it does significantly more harm than good."[113] And yet, in many of the examples described in these comments (like the Clean Power Plan and MATS Rule), EPA proposed regulatory action that it understood could reasonably result in far more costs than

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[107] 42 U.S.C. § 7401(c) (emphasis added); *see also Entergy Corp*., 556 U.S. at 234 (Breyer, J., concurring in part and dissenting in part) (noting, in considering Section 316(b) of the Clean Water Act, that a "test of reasonableness" would not compel EPA "to impose massive costs far in excess of any benefit").
[108] 82 Fed. Reg. 12,285 (Mar. 1, 2017).
[109] 82 Fed. Reg. 9,339 (Jan. 30, 2017).
[110] Executive Orders addressing regulatory impact analysis date back to 1981 when President Ronald Reagan issued Executive Order No. 12,291, 46 Fed. Reg. 13,193 (Feb. 19, 1981)
[111] 76 Fed. Reg. 3821, 3821 (Jan. 21, 2011).
[112] *See* 77 Fed. Reg. at 9433-9440.
[113] *Michigan v. EPA* at 7.

benefits. The adverse consequences of this problematic approach to rulemaking is not borne by regulated entities alone. "Consideration of cost . . . reflects the reality that 'too much wasteful expenditure devoted to one problem may well mean considerably fewer resources available to deal effectively with other (perhaps more serious) problems."[114] Therefore, API believes that EPA can improve its rulemaking processes and environmental outcomes by genuinely relying on cost-benefit analyses as a decision-making tool.

V. EXAMINE CUMULATIVE COSTS

Congress crafted the CAA and other federal environmental laws to strike a balance between economic, employment, and environmental considerations. EPA cannot effectively evaluate those considerations through the narrow examination of a single rule under development. Indeed, there are few environmental regulations which singularly shift the profitability, competitiveness, and viability of an industry. It is typically the cumulative burden imposed by multiple rules and regulations under multiple statutes that most often impacts the viability of a company or industry and yet EPA has never fully assessed the cumulative impact of its regulations on the regulatory community.

EPA's maturity as an agency justifies a shift in emphasis from program development to program evaluation as forty years of rulemaking has produced a sizable corpus of regulations that EPA must oversee. Rather than focusing solely on expanding into new frontiers, EPA must ensure that the ever-increasing body of existing regulations is, and remains, effective and does not become unduly burdensome, irrelevant, or obsolete. This need is especially great when the combination of existing regulatory burdens and the uncertainty surrounding recently promulgated rules risk stifling innovation, economic growth, and job creation.

Cumulative impacts of regulation cannot be identified one rule at a time. EPA must have the ability to work across programs, divisions, and regions to measure the cumulative effects of regulation, and to sort out instances of double-counting. API's members are subject to a wide variety of regulations promulgated by EPA and other agencies, the cumulative burden of which can stifle growth and even threaten the members' economic viability. While cumulative evaluations are important, they cannot be accomplished solely through highly aggregated summaries of speculative benefits and costs, such as CAA Section 812 reports.[115] Instead, EPA must disaggregate benefits and costs to prevent poorly performing programs from hiding behind their better-performing peers and must verify which regulations are achieving their intended goals and which ones are falling short.

Disaggregating benefits and costs would also allow EPA to understand how specific regulations interact with each other and how they can impact other Agency goals. Many inter-program effects can only be identified and addressed through a cumulative and comprehensive review process that

[114] *Michigan v. EPA*, quoting *Entergy Corp. v. Riverkeeper, Inc.*, 556 U. S. 208, 233 (2009) (BREYER, J., concurring in part and dissenting in part).
[115] The Benefits and Costs of the Clean Air Act from 1990 to 2020, Final Report, EPA Office of Air and Radiation, March 1, 2011.

disaggregates benefits and costs and looks outside the confines of a single regulatory program. As such, API suggests EPA consider undertaking a cross-cutting review of the cumulative impact of its air regulations on specific industry sectors. EPA should use this analysis to better understand the compatibility of rules promulgated across different programs and to more fully recognize an industry sector's accumulative regulatory burden when considering whether to impose a new regulatory requirement. This type of analysis is particularly important when one or more industry sectors may be impacted by multiple rules that are promulgated in quick succession. The rapid promulgation of multiple rules is not altogether rare and can be particularly burdensome as the impacted industries struggle with managing multiple additional compliance costs in a short time. EPA should therefore use this analysis to better understand the compatibility of rules promulgated across different programs and to more fully recognize an industry's accumulative regulatory burden when considering whether to impose a new regulatory requirement, and on what timeframe.

VI. CONSIDER RETROSPECTIVE ANALYSIS

Executive Order 13563, "Improving Regulation and Regulatory Review," requires agencies to "consider how best to promote retrospective analysis of rules that may be outmoded, ineffective, insufficient, or excessively burdensome." Notwithstanding this requirement, EPA has historically not taken meaningful steps to improve existing regulations and rulemaking processes through retrospective review and has instead devoted the bulk of its resources to the development and issuance of new regulations.

This is unfortunate because retrospective analyses could provide useful data to help EPA improve environmental outcomes while minimizing regulatory burdens.[116] Retrospective analyses will not only help EPA promulgate better regulations, they can help EPA improve the analytical framework through which EPA makes regulatory decisions. Unless EPA looks back to evaluate its prior analyses of costs and benefits of rules, it is unlikely to substantially improve its prospective analyses. Once a rule has been finalized and implemented, EPA has an opportunity to examine whether the Agency's prior projections of risks, benefits, and costs were reasonable. This is useful data in identifying sources of over- and under-estimation and provides a basis for more realistic calibration of prospective estimates.

As such, API was encouraged that Executive Order 13777, "Enforcing the Regulatory Reform Agenda," fostered a renewed emphasis on retrospective review of regulations. We also appreciate the Agency's efforts to implement the provisions of E.O. 13777. EPA's request for comment on regulations that may be appropriate for repeal, replacement, or modification[117] provided a strong

[116] See Tengs, Tammy O., and John D. Graham. "The opportunity costs of haphazard social investments in lifesaving." In Risks, costs, and lives saved: Getting better results from regulation, Robert Hahn, Ed. (1996): 172; See also Aldy, Joseph E. "Learning from experience: an assessment of the retrospective reviews of agency rules and the evidence for improving the design and implementation of regulatory policy." Administrative Conference of the United States (2014).
[117] EPA-HQ-OA-2017-0190.

start to that effort, and this ANPRM takes an important next step. API is pleased to participate and provide constructive feedback on both of these efforts.

While API supports EPA's interest in conducting more retrospective reviews of its regulations, we caution that there are many challenges which EPA must first work through before undertaking any extensive efforts. Additionally, retrospective review of cost and benefits can be a resource intensive effort for both the Agency and the impacted industry. EPA will need to ensure that the retrospective reviews are conducted to minimize the costs on industry and still yield meaningful improvements to the Agency's cost and benefit calculations. API suggests that EPA ensure that the impacted industry has the ability and desire to support such an effort. Stated differently, EPA could refrain from conducting a retrospective review unless the impacted industry requests such an effort for a specific rulemaking. If there is a process to initiate this effort in advance of an industry's efforts to achieve compliance with a rule, tracking of costs could be significantly improved.

That said, there are still many complications which create challenges in accurately conducting a retrospective review to deliver meaningful results. EPA will need to address these challenges prior to engaging with any specific retrospective review. One such complication is that it is very difficult to calculate *ex post* costs that can reliably be compared to *ex ante* compliance cost estimates. EPA's Science Advisory Board ("SAB") noted this difficulty in 2012 when it was asked to review and comment on the *Retrospective Cost Study of the Costs of EPA Regulations: An Interim Report of Five Case Studies* (March 2012) ("RCS").[118] The RCS was composed of five case studies developed by EPA's National Center for Environmental Economics ("NCEE") to investigate how well the Agency has predicted the costs of regulatory compliance by comparing EPA's cost estimates to *ex post* costs.

Dr. Anne E. Smith of NERA Economic Consulting provided written comments and testimony in the SAB's proceedings, which we provide herewith as Exhibits 10 and 11. As noted in those comments, in retrospective comparisons of costs, it is difficult to establish the counterfactual, and to separate regulation-specific costs from other simultaneously-occurring costs. These difficulties are no different than the difficulties of establishing an appropriate baseline when estimating future compliance costs (see Section III.f above). This implies that *ex post* estimates may be no more reliable than their *ex ante* counterparts. As such, EPA's efforts to improve the means by which it estimates costs can also improve the Agency's ability to analyze compliance costs retrospectively.

As we discussed in Section III.g above, EPA's cost estimates have generally been limited to consideration of the costs of installing and running the technologies that will control the emissions/effluents that are the target of the regulation, and not the potential secondary costs incurred by the control technology's interference with other functions of the total plant system or the long-term macro-economic impacts on overall economic productivity. API recommends that EPA focus on improving the Agency's consideration of these costs in cost-benefit analyses as a means to also improve EPA's ability to evaluate these costs retrospectively. Moreover, if EPA

[118] See https://yosemite.epa.gov/sab/sabproduct.nsf/MeetingCalBOARD/A5BF2EBDD450EEB585257A4000567F3A?OpenDocument (accessed 6/28/18).

decides to conduct retrospective costs analyses and/or further evaluate its ability to conduct meaningful comparisons of *ex ante* and *ex post* costs, it should specifically seek out *ex post* evidence of unanticipated indirect cost and economy-wide impacts that may have been incurred.

Finally, the SAB's 2012 review ultimately concluded that the RCS's small sample size of cases and exclusive reliance on publicly available information to estimate ex post compliance costs made it impossible to determine whether EPA tended to over- or under-estimate compliance costs in cost-benefit analyses.[119] While API recognizes that EPA may be able to improve its *ex post* compliance cost estimates by requesting actual *ex post* compliance cost data from companies, we do not believe it is appropriate for the Agency to compel companies to provide this information. We believe that EPA should ensure that the impacted industry is interested and willing to participate in a retrospective review prior to beginning the information collection process. Compliance cost information can be very sensitive and is typically treated as highly-confidential business information and will need to be managed in a particularly sensitive manner by EPA. This is particularly true when considering indirect costs like process impediments, production decreases, or increased energy usage. Moreover, this information can be very difficult to compile.

The regulated community already has voluminous reporting requirements and has labored under far too many Agency information collection requests. API therefore requests that EPA not undertake any retrospective review that further burdens the regulated community with more compulsory information requests, unless it first engages with the impacted industry to ensure that a retrospective review can be supported by the impacted industry.

VII. POTENTIAL FOR ISSUING REGULATIONS TO GOVERN EPA'S APPROACH IN FUTURE RULEMAKINGS

As noted above, given the number of different contexts and statutory provisions under which the Agency conducts cost-benefit analyses, API recognizes that EPA likely cannot adopt a single one-size-fits-all approach. Regardless, we believe there is significant value in standardizing the way in which EPA calculates costs and benefits and the way in which EPA communicates cost-benefit analysis. That said, while we support increased consistency regarding the consideration of costs, we have tried to craft our recommendations to preserve for EPA the flexibility it needs to appropriately consider costs and benefits for rulemaking decisions.

We believe EPA can and should improve its approach to cost-benefit analyses through multiple regulatory actions avoiding the use of guidance documents to the extent possible. Regulatory actions have the benefit of ensuring that EPA follows the same approach each time, thus increasing trust in the rulemaking process. Specifically, API suggests EPA consider a statute-specific approach as we believe this would strike the right balance between the need for consistency and

[119] See https://yosemite.epa.gov/sab/sabproduct.nsf/MeetingCalBOARD/A5BF2EBDD450EEB585257A4000567F3A?OpenDocument (accessed 6/28/18).

the challenges associated with the variations from statute to statute. API also suggests that EPA begin its statute-specific rulemakings with the one for the CAA.

API also believes EPA should improve how the Agency documents cost-benefit analysis in rulemakings and should specifically address this in any regulatory actions which build upon this ANPRM. Specifically, API believes that improvements in two areas related to documentation would significantly improve the consistency and transparency of EPA's cost-benefit analysis.

1. EPA needs to present the results of its cost-benefit analysis in a simple manner so that it can be easily understood by the general public. This will also allow comparison across multiple regulations. This could be most easily accomplished through the development of a standardized form which EPA includes in all rulemakings. The form should be limited to one page and should include all elements for both the cost of a regulation (direct, indirect, economy-wide, *etc*.) and the benefits of regulations (primary pollutant benefits, co-benefits, international benefits, *etc*.) including uncertainties. The form should present the values for each element using the 3% and 7% discount rate alongside any other discount rate used in the RIA. The form should also include all major assumptions which are built into the cost-benefit analysis.

2. EPA needs to present a full accounting of each RIA including detailed explanations for each decision and assumption so that interested stakeholders have a complete understanding of EPA's methodology. As discussed above, many of EPA's past RIAs contained significant gaps in information and/or explanation which led to significant lack of transparency. When promulgating regulations to improve consistency and transparency for cost-benefit analysis EPA should address areas that we have commented on above including the calculation of uncertainty and any modeling which was conducted by EPA.

Broadly applicable principles, such as those recommended in these comments, should be developed through notice-and-comment rulemaking. EPA should also improve its cost-benefit approach on a more granular scale in the multiple fact- and context-specific circumstances in which they arise. These fact-specific changes to EPA's approach to cost-benefit analyses should also be conducted through notice-and-comment rulemaking whenever possible.

Notice-and-comment rulemaking under the Administrative Procedure Act ("APA")[120] can help refine and improve EPA's approach to cost-benefit analyses through robust stakeholder engagement, can provide more consistency and transparency to EPA's regulatory decision-making processes. Regardless of whether the Agency seeks to improve its approach to cost-benefit analyses through rules, guidance, or both, EPA should proceed through a highly transparent process that solicits and responds to stakeholder input. The improvements EPA seeks to make to its cost-benefit analyses are, at base, improvements to Agency transparency, consistency, and accountability. As such, these considerations must be central to EPA's effort.

The Agency's solicitation of stakeholder feedback through this ANPRM suggests that EPA is cognizant of the benefits of transparency and stakeholder input. API appreciates the Agency's

[120] 5 U.S.C. § 551 *et seq.*

noted interest in transparency and consistency and encourages EPA to maintain its focus on these principles throughout this effort.