

# Comments to NHTSA and US EPA on Methodological Considerations for Updated Social Cost of Carbon Dioxide Estimates

*Prepared for the National Highway Traffic Safety  
Administration (NHTSA) and Environmental Protection  
Agency (EPA)*

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## Methodological Considerations for Updated Social Cost of Carbon Dioxide Estimates

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On August 24, 2018, the Environmental Protection Agency (EPA) and National Highway Transportation Authority (NHTSA) issued a proposed rule: the “Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021-2026 Passenger Cars and Light Trucks” (SAFE Vehicles Rule).<sup>1</sup> With the proposed rule, EPA and NHTSA provided a preliminary regulatory impact analysis (henceforth, the PRIA) to quantify its effects.<sup>2</sup> The rule proposes to amend certain existing Corporate Average Fuel Economy and tailpipe carbon dioxide emissions standards for passenger cars and light trucks and establish new standards, all covering model years 2021 through 2026. If finalized, the rule would amend and replace a number of previous requirements that would reduce carbon dioxide emissions. The PRIA assesses the associated economic effects of the rule’s associated forgone climate benefits by employing an

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<sup>1</sup> 83 Fed. Reg. 42986.

<sup>2</sup> US Environmental Protection Agency, US National Highway Transportation Authority “Preliminary Regulatory Impact Analysis: Safer Affordable Fuel-Efficient (SAFE) Vehicles Rule for Model Years 2021-2026 Passenger Cars and Light Trucks.”

updated value for the federal government's social cost of carbon (SC-CO<sub>2</sub>), developed under Executive Order 13783. This updated value for the SC-CO<sub>2</sub> and the related methodological changes from the federal government's previous estimation process for the SC-CO<sub>2</sub> are the subject of this comment.

In this comment we make the following three points and associated recommendations for revising the PRIA:

1. The limited set of actions that EPA and NHTSA have taken to generate an updated value of the social cost of carbon under Executive Order 13783 are unresponsive to the comprehensive set of recommendations for improving such estimates that were provided in January 2017 at the request of the federal government by the National Academies of Sciences, Engineering, and Medicine (NASEM). We recommend that EPA and NHTSA undertake efforts to apply the near-term recommendations of the NASEM report to the estimation of the SC-CO<sub>2</sub> and in the interim rely on the previous SC-CO<sub>2</sub> estimates.
2. The central analysis focuses exclusively on a domestic value for the SC-CO<sub>2</sub> that omits important economic interactions and considerations related to the global nature of climate change. This biases the estimates downward relative to the true impact on US citizens. If EPA and NHTSA wish to consider domestically focused damages—in advance of scientific tools that meet the needs identified in the NASEM report—we recommend that EPA and NHTSA consider and present domestically focused SC-CO<sub>2</sub> estimates and global SC-CO<sub>2</sub> estimates together as a range in the central analysis.
3. The adoption of a 7 percent discount rate, which represents the before-tax rate of return on private capital under the Office of Management and Budget's (OMB) Circular A-4,<sup>3</sup> is conceptually inappropriate for SC-CO<sub>2</sub> estimation, as it is methodologically inconsistent with the output of the integrated assessment models used to generate the supporting damage estimates. We recommend that EPA and NHTSA implement the NASEM report's near-term recommendations for discounting and, in the interim, continue to use the previous estimates based on 2.5 percent, 3 percent, and 5 percent discount rates.

## The NASEM Report

In its discussion of uncertainty in the SC-CO<sub>2</sub>, the PRIA highlights potential areas for improvement of the methodology underpinning the federal government's estimation of the SC-CO<sub>2</sub>. In response to a study request in 2015 from the federal government's Interagency Working Group on the Social Cost of Carbon, that was formerly chartered with developing and maintaining estimates of the social cost of greenhouse gas emissions, a NASEM committee conducted a comprehensive evaluation of potential updates to the estimation methodology for the social cost of carbon dioxide.

On January 11, 2017, the NASEM committee released the culmination of its evaluation in the form of the report, [\*Valuing Climate Damages: Updating Estimation of the Social Cost of Carbon Dioxide\*](#) (henceforth, the NASEM report). The report puts forward conclusions and recommendations on how to

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<sup>3</sup> Executive Office of the President of the United States, Circular A-4 (2003), available at [https://www.whitehouse.gov/omb/circulars\\_a004\\_a-4](https://www.whitehouse.gov/omb/circulars_a004_a-4) (accessed November 4, 2017).

improve the conceptual underpinnings, empirical methods, and data used to calculate the SC-CO<sub>2</sub>, as well as the transparency and flexibility of the process by which future estimates are generated.<sup>4</sup>

The results and recommendations of this report, though focused on the calculation of damages resulting from the emissions of carbon dioxide, are also broadly applicable to the social costs of other greenhouse gases, such as methane and nitrous oxide. The NASEM report addresses many of the issues highlighted in the PRIA, among others.

### **Major Recommendations of the NASEM Report: Integrated Framework, Scientific Criteria, and Process**

The NASEM report offers:

“Both near- and longer-term recommendations [that] provide guidance to improve the scientific basis, characterization of uncertainty, and transparency of the SC-CO<sub>2</sub> estimation framework within the federal regulatory context for which the SC-CO<sub>2</sub> was developed.

“The committee specifies criteria for future updates to the SC-CO<sub>2</sub>. It also recommends an integrated modular approach for SC-CO<sub>2</sub> estimation to better satisfy the specified criteria and to draw more readily on expertise from the wide range of scientific disciplines relevant to SC-CO<sub>2</sub> estimation. Under this approach, each step in SC-CO<sub>2</sub> estimation is developed as a module—socioeconomic, climate, damages, and discounting—that reflects the state of scientific knowledge in the current, peer-reviewed literature.

“Because it is important to update estimates as the science and economic understanding of climate change and its impacts improve over time, the committee recommends that estimates of the SC-CO<sub>2</sub> be updated in a three-step process at regular intervals of approximately 5 years. This timing would balance the benefit of incorporating evolving research against the need for a thorough and predictable process. For each module, the committee recommends near-term changes given the current state of the science. The recommended changes would be feasible to implement in the next 2-3 years and would improve the performance of each part of the analysis with respect to the primary criteria.”<sup>5</sup>

We note with concern that the technical efforts and process involved in producing the new SC-CO<sub>2</sub> estimates as part of EPA and NHTSA's proposed rule are not responsive to the NASEM report's major recommendations for establishing an integrated framework, applying recommended scientific criteria, or following a regularized process that incorporates scientific peer review and focused public comment. We recommend that EPA and NHTSA undertake efforts to apply the near-term recommendations of the NASEM report to the estimation of the SC-CO<sub>2</sub> and in the interim rely on the previous SC-CO<sub>2</sub> estimates.

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<sup>4</sup> National Academies of Sciences, Engineering, and Medicine (NASEM), *Valuing Climate Damages: Updating Estimation of the Social Cost of Carbon Dioxide* (Washington, DC: National Academies Press, 2017), available at <https://doi.org/10.17226/24651>.

<sup>5</sup> NASEM, *Valuing Climate Damages*, Executive Summary, pp. 2–3.

## Adoption of Domestic Rather than Global Damages

An important departure from the federal government's previous methodology for estimating the SC-CO<sub>2</sub> is EPA and NHTSA's decision to count only direct domestic benefits from carbon mitigation in the calculation of updated SC-CO<sub>2</sub> values under Executive Order 13783. Though this choice is consistent with a narrow application of prior regulatory analysis practice under OMB's Circular A-4, it is unnecessarily and unreasonably constrained for addressing inherently global pollutants such as greenhouse gases. US greenhouse gas emissions account for about 14 percent of the global total. If all countries considered only the domestic effects of their greenhouse gas emissions, about 86 percent of climate change impacts on US citizens would be ignored—considered in no decision. An analytic focus solely on direct impacts to the United States of US emissions, when generalized, therefore omits the vast majority of the total impacts the United States faces from climate change.

In addition, damages from US emissions of greenhouse gases are felt not just within US borders, but also abroad. Though such damages occur on foreign soil, their economic effects can be felt within the United States through the globally interconnected economy. As the NASEM report stated, current integrated assessment models do not take full account of "potential implications of climate impacts on, and actions by, other countries, which also have impacts on the United States,"<sup>6</sup> which could affect the United States "through such pathways as global migration, economic destabilization, and political destabilization."<sup>7</sup> Regulatory actions taken by the United States also may be reflected in policy actions taken by other countries; perhaps the clearest example of such reciprocal action is the Canadian government's full incorporation in its own regulatory analysis of the prior US federal values for the social costs of carbon dioxide, methane, and nitrous oxide.

This set of complicated global interactions is an important component of any complete calculation of damages felt by US citizens from domestic emissions, but it is omitted in EPA and NHTSA's revised methodology. In the absence of this full set of considerations, EPA and NHTSA's updated SC-CO<sub>2</sub> estimates are biased downward. Although the scientific, economic, and geopolitical basis of climate change as a global problem should inform reasoned decisionmaking, if EPA and NHTSA wish to consider domestically focused damages—in advance of scientific tools that meet the needs identified in the NASEM report—we recommend that EPA and NHTSA consider and present domestic-focused SC-CO<sub>2</sub> estimates and global SC-CO<sub>2</sub> estimates together as a range in the central analysis.

## Use of a 7 Percent Discount Rate

EPA and NHTSA have also departed from the federal government's prior approach to discounting in its calculation of the SC-CO<sub>2</sub> by adopting a 7 percent discount rate. Though the addition of an estimate calculated using a 7 percent discount rate is consistent with past regulatory guidance under OMB Circular A-4, it is inappropriate for use in estimating the SC-CO<sub>2</sub> through EPA and NHTSA's methodology. The integrated assessment models used to generate the estimates report their output in terms of "consumption-equivalent" impacts, which are intended to reflect the effective impact on people's consumption (as opposed to investment). Standard economic practice is to discount consumption equivalents at the "consumption rate of interest"—which, according to OMB's current guidance, is a 3 percent discount rate.

It is therefore inappropriate to use such modeling results with OMB's 7 percent discount rate, which is intended to represent the historical before-tax return on private capital. None of the researchers whose

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<sup>6</sup> NASEM, *Valuing Climate Damages*, Conclusion 2-4, pp. 9, 53.

<sup>7</sup> NASEM, *Valuing Climate Damages*, pp. 9, 53.

model results were used to generate the updated values employ a discount rate as high as 7 percent in their work. In addition to using the 3 percent rate, the prior SC-CO<sub>2</sub> estimates also included sensitivities using 2.5 percent and 5 percent discount rates, which were modifications of the 3 percent consumption discount rate to take into account uncertainty in future economic growth and potential correlations between economic growth and climate damages. Moreover, a recent report from the Council of Economic Advisers found that evidence supports a rate lower than 3 percent as the norm for the consumption rate of discount, which it suggested should be at most 2 percent, given historical trends and expected future conditions.<sup>8</sup>

The NASEM report recommended that discounting occur via use of what is termed the "Ramsey formula" with parameters "that are consistent with theory and evidence and that produce certainty-equivalent discount rates consistent, over the next several decades, with consumption rates of interest."<sup>9</sup> This recommendation is relatively straightforward to implement, as it does not require significant new model development. Nonetheless, this recommendation not been adopted in the PRIA. Rather, as described above, the PRIA introduces a discount rate that is not based on the consumption rate of interest.

For these reasons, we recommend that EPA and NHTSA implement the near-term recommendations of the NASEM report with respect to discounting and, in the interim, continue to use the previous estimates based on 2.5 percent, 3 percent, and 5 percent discount rates.

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<sup>8</sup> Council of Economic Advisers (CEA), *Discounting for Public Policy: Theory and Recent Evidence on the Merits of Updating the Discount Rate* (2017), available at [https://obamawhitehouse.archives.gov/sites/default/files/page/files/201701\\_cea\\_discounting\\_issue\\_brief.pdf](https://obamawhitehouse.archives.gov/sites/default/files/page/files/201701_cea_discounting_issue_brief.pdf) (accessed November 4, 2017).

<sup>9</sup> NASEM, *Valuing Climate Damages*, Recommendation 6-2, pp. 19, 180.

