

**COMMENTS OF THE ATTORNEYS GENERAL OF THE STATES OF NEW YORK,
COLORADO, CONNECTICUT, DELAWARE, ILLINOIS, MARYLAND, MINNESOTA,
NEW JERSEY, NORTH CAROLINA, OREGON, VERMONT, AND WISCONSIN, THE
COMMONWEALTH OF MASSACHUSETTS, AND THE CALIFORNIA AIR
RESOURCES BOARD**

**ON THE OFFICE OF MANAGEMENT AND BUDGET’S
“NOTICE OF AVAILABILITY AND REQUEST FOR COMMENT ON ‘TECHNICAL
SUPPORT DOCUMENT: SOCIAL COST OF CARBON, METHANE, AND NITROUS
OXIDE INTERIM ESTIMATES UNDER EXECUTIVE ORDER 13990,”
86 FED. REG. 24,669 (MAY 7, 2021)**

OVERVIEW

The undersigned Attorneys General, representing states that are facing real and sustained damage from climate change, support the use of the social cost of greenhouse gases (SC-GHG) to assign a monetary value to changes in greenhouse gas emissions resulting from a government action. Many of our states have already implemented some version of the SC-GHG and have found it to be a useful tool for assessing and considering the monetary value of climate impacts associated with greenhouse gas emissions. We are generally optimistic about the approach to the SC-GHG set forth in President Biden’s Executive Order 13,990 (EO 13,990)¹ and the Interagency Working Group on Social Cost of Greenhouse Gases’ (IWG) recently published Technical Support Document (2021 TSD).² We provide these comments in response to the Office of Management and Budget’s (OMB) request for input both on use of the interim SC-

¹ *Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis*, 86 Fed. Reg. 7037 (Jan. 20, 2021).

² Interagency Working Group on Social Cost of Greenhouse Gases, *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimate Under Executive Order 13,990* (Feb. 2021).

GHG values presented in the 2021 TSD, and on ways to update and revise the SC-GHG values to reflect the latest developments in climate science and economics.³

As described in detail below, our states provide the following insights:

- Some version of the SC-GHG is already in use in many of our states. State legislatures as well as state public utility commissions (PUCs) have recognized the reliability and utility of the SC-GHG in cost-benefit analyses of government actions that will result in changes in greenhouse gas emissions. These state policymakers also have recognized the need to account for a global perspective on climate harms in determining SC-GHG values. Notwithstanding these state efforts, a robust and consistent federal approach to the SC-GHG is essential, both because many states have chosen to rely on the federal SC-GHG to develop their own SC-GHG values, and because federally approved projects will impact states and affect the achievement of state climate goals and policies.
- The SC-GHG should be used any time a federal agency conducts a cost-benefit analysis for any government action that could affect greenhouse gas emissions. The SC-GHG is methodologically, economically, and legally sound and relies on the best available science for estimating the monetary value of future climate impacts from a change in greenhouse gas emissions. However, the SC-GHG must (as the interim values do) account for the global impacts of climate change. The SC-GHG, including global impacts, has been relied upon by state policymakers and its use has been upheld, or even required, by federal courts.
- Recent evidence suggests that the 3% central discount rate used to calculate the interim SC-GHG values is too high. State experience and recent economic evidence support the use of, at most, a 2% central discount rate in conjunction with the interim values. Recalculating the interim values with a 2% discount rate could be implemented immediately and would place the social cost of a ton of carbon dioxide in 2020 at \$125. As IWG considers revising the SC-GHG, it should consider using even lower discount rates – including a 0% discount rate or a declining discount rate – to better account for the long-term, intergenerational impacts of climate change.

³ See *Notice of Availability and Request for Comment on “Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates Under Executive Order 13,990,”* 86 Fed. Reg. 24,669, 24,670 (May 7, 2021).

- Although the interim SC-GHG values are suitable for immediate use by federal agencies conducting cost-benefit analyses for actions that could affect greenhouse gas emissions, the IWG should update the SC-GHG models to include significant climate change-related impacts that are not quantified in the current SC-GHG models. Unquantified impacts of particular interest to the undersigned states include the combined effect of rising sea levels and storm surges, longer and more severe wildfire seasons, and damage to or complete loss of historical and culturally significant sites. IWG should also recommend that whenever agencies use the interim SC-GHG, they disclose that it likely underestimates the full impact of climate change and prominently describe and consider the major categories of impacts that are not quantified by the interim values.
- Updates to the SC-GHG models should reflect the reality that climate change impacts vary across socio-economic and demographic groups and geographic regions—in general, the lowest socioeconomic status communities will be the hardest hit. Updates to the SC-GHG should also include guidance for how federal agencies should consider and weigh the ethical implications of using any positive discount rate to devalue future generations.

I. STATE POLICYMAKERS ALREADY RELY ON THE SC-GHG WHEN ASSIGNING A MONETARY VALUE TO GREENHOUSE GAS EMISSIONS

In the absence of consistent federal policy on accounting for and addressing climate change-related impacts, many of our states (as well as states not included here) have taken a proactive approach to using estimates of the SC-GHG to assess the monetary impact of government decisions that may impact greenhouse gas emissions. Several examples are included below, although these are not intended to be exclusive. These examples demonstrate that the SC-GHG can be used—and has long been used—as a tool to assess the costs or benefits of government decisions that affect the emission of greenhouse gases.⁴ They also demonstrate a widespread consensus among the states to use a global – rather than local or domestic-only – assessment of climate change damages. A consistent and robust federal approach to the SC-GHG

⁴ Likewise, federal agencies have been using the SC-GHG since 2008.

is essential to these state programs for two reasons: (1) some state programs are directly tied to the federal SC-GHG, such that changes to the federal SC-GHG could affect state implementation; and (2) federal action could otherwise undermine state programs and goals to address climate change.

A. New York

In 2019, the New York Legislature enacted the New York Climate Leadership and Community Protection Act, which (among other things) directed the New York State Department of Environmental Conservation (NYSDEC), in consultation with the New York State Energy Research and Development Authority (NYSERDA), to establish an SC-GHG to be used by state agencies.⁵ NYSDEC and NYSERDA were directed to consider both the damages-based SC-GHG developed at the federal level by the IWG, as well as an approach to valuing emissions based on the marginal abatement cost.⁶ NYSERDA, working with Resources for the Future, prepared a detailed evaluation of the two approaches for use by NYSDEC in recommending a state-wide approach.⁷

NYSDEC ultimately recommended that state entities apply the damages-based approach to the SC-GHG established by IWG.⁸ NYSDEC noted that the damages-based approach developed by the IWG had a number of advantages over the marginal abatement cost, including the fact that it had been used by federal agencies and that it could be used to generate a range of

⁵ See N.Y. Environmental Conservation Law (ECL) § 75-0113.

⁶ *Id.*

⁷ See NYSERDA, *Estimating the Value of Carbon: Two Approaches* (October 2020), available at <https://www.rff.org/publications/reports/estimating-the-value-of-carbon-two-approaches/>.

⁸ See NYSDEC, *Establishing a Value of Carbon: Guidelines for Use by State Agencies*, at 9-15, available at https://www.dec.ny.gov/docs/administration_pdf/vocfguid.pdf.

values that could easily be evaluated by agency decisionmakers.⁹ NYSDEC did note that certain modifications to the federal SC-GHG were appropriate. In particular, NYSDEC determined that discount rates used by the IWG (2.5%, 3%, and 5%) were too high.¹⁰ NYSDEC explained that “multiple lines of research have concluded that the discount rate used by the federal IWG underestimate the value of avoided damages from greenhouse gas emissions.”¹¹ In particular, NYSDEC noted that the climate models underlying the SC-GHG failed to “properly account for the possibility of large-scale singular events or irreversible climatic tipping points.”¹² Although NYSDEC observed that this uncertainty could ideally be addressed in the modeling of damages, it concluded that the use of a lower discount rate could compensate in part for the likely underestimation of damages in the IWG climate models.¹³ NYSDEC settled on a central discount rate of 2%, with “sensitivity” analyses using discount rates of 1% and 3%.¹⁴ NYSDEC noted that the use of a lower discount rate or a declining discount rate would be considered, but “require[d] further development and review.”¹⁵

NYSDEC recommended that state agencies consider the SC-GHG when making budgeting and procurement decisions and provided an example of how the SC-GHG could be applied to a decision of whether to procure zero-emission vehicles.¹⁶ NYSDEC and other state agencies have also begun using the state SC-GHG to assess the value of greenhouse gas reductions from proposed government actions. For example, NYSDEC used the SC-GHG to

⁹ *Id.* at 9-10.

¹⁰ *Id.* at 17-18.

¹¹ *Id.* at 18.

¹² *Id.* at 18.

¹³ *Id.*

¹⁴ *Id.* at 17.

¹⁵ *Id.* at 18.

¹⁶ *Id.* at 25-26

compare the costs of regulating the oil and gas industry in the state to the benefits resulting from the reduction of methane emissions.¹⁷

B. California

In 2006, the California Legislature established a comprehensive program to reduce the state's greenhouse gas emissions, including a requirement that the California Air Resources Board (CARB) develop and periodically update a Scoping Plan detailing the state's strategy to meet emission reduction goals.¹⁸ California Assembly Bill 197, passed in 2016, requires CARB to consider the social costs of greenhouse gases when developing regulations that go beyond the state's 2020 greenhouse gas limit and to evaluate cost-effectiveness, including avoided social costs, of emission reduction measures identified in subsequent updates to the climate change Scoping Plan.¹⁹ CARB's analyses of greenhouse gas regulations presently incorporate the 2016 IWG SC-GHG values, adjusted for inflation.²⁰ The most recent Scoping Plan update, published in November 2017, applied the 2016 IWG SC-GHG values and discount rates.²¹

¹⁷ See Regulatory Impact Statement Summary, Proposed Amendments to 6 NYCRR Part 203, at 6-7, available at https://www.dec.ny.gov/docs/air_pdf/prop203.pdf.

¹⁸ See California Global Warming Solutions Act, Chapter 488, Statutes of 2006, adding, *inter alia*, Health and Safety Code § 38561, available at https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=200520060AB32

¹⁹ See Chapter 250, Statutes of 2016, adding, *inter alia*, Health and Safety Code §§ 38506, 38562.5, and 38562.7, available at https://leginfo.ca.gov/faces/billNavClient.xhtml?bill_id=201520160AB197. Sec. 38506 defines “social costs” as “an estimate of the economic damages, including, but not limited to, changes in net agricultural productivity; impacts to public health; climate adaptation impacts, such as property damages from increased flood risk; and changes in energy system costs, per metric ton of greenhouse gas emission per year.”

²⁰ CARB has adjusted the 2016 IWG values for inflation using California's consumer price index (CPI-U), determined annually by the state Department of Finance. See <https://www.dof.ca.gov/Forecasting/Economics/Indicators/Inflation/>.

²¹ CARB, *California's 2017 Climate Change Scoping Plan*, at 39-44 (Nov. 2017), available at https://ww2.arb.ca.gov/sites/default/files/classic/cc/scopingplan/scoping_plan_2017.pdf. A Scoping Plan Update to Achieve Carbon Neutrality by 2045 is scheduled for publication in 2022.

Additional California programs have also incorporated the SC-GHG:

- Senate Bill 100, the 100 Percent Clean Energy Act of 2018, established a goal of carbon neutrality for California’s electric sector by 2045 and requires the California Energy Commission, Public Utilities Commission, and CARB to periodically issue a joint report on implementation.²² The initial SB 100 report, issued in March 2021, incorporates the inflation-adjusted IWG SC-GHG values and the IWG discount rates.²³
- The California Department of Transportation performs benefit-cost analyses and life cycle analyses for proposed federal interstate, state highway, and public transit projects. The Department incorporates the SC-GHG, as appropriate, into analyses of projects such as operational improvement, transportation management, highway expansion, and rail/transit. The tool employed for these analyses, Cal-B/C, applies the IWG SC-GHG values (adjusted for inflation), the 3 percent discount rate, and a 2 percent “uprater,” to reflect the IWG conclusion that “future emissions are expected to produce larger incremental damages as physical and economic systems become more stressed.”²⁴

See <https://ww2.arb.ca.gov/our-work/programs/ab-32-climate-change-scoping-plan/scoping-plan-meetings-workshops>.

²² Chapter 312, Statutes of 2018.

²³ Cal. Energy Commission et al., SB 100 Joint Agency Report, March 2021, Appendix C, available at https://www.energy.ca.gov/sb100#anchor_report.

²⁴ Cal. Dept. of Trans., Cal-B/C Parameter Guide Version 7.1, at 19-20 (Nov. 2019), available at https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/transportation-economics/cal-bc/cal-bc_parameter_guide_ada_final-11y.pdf, citing Interagency Working Group on Social Cost of Carbon, Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866, May 2013, Revised July 2015.

- For its Short-lived Climate Pollutant: Organic Waste Reduction regulations, finalized in 2020, the California Department of Resources Recycling and Recovery applied the IWG values, adjusted for inflation, and the IWG discount rates.²⁵
- The California Public Utilities Commission has adopted the IWG values for consideration of the cost-effectiveness of proposed utility investments under its Natural Gas Leak Abatement Program.²⁶
- For consideration of the cost-effectiveness of proposed electricity investments in the California Public Utilities Commission’s Integrated Resources Planning proceedings, the Commission decided to test use of both the IWG values with the 3 percent discount rate and the IWG’s “high impact values,” due to concern that the IWG central values “did not address all variables that directly impact California utilities,” including “damages from wildfires, costs of climate change associated with electricity infrastructure including effects of extreme heat, and impacts of flooding[.]”²⁷

²⁵ Updated Technical Documents and Appendix to the SB 1383 Short-Lived Climate Pollutants (SLCP) Regulations, at 33 (Nov. 26, 2019), *available at* <https://www2.calrecycle.ca.gov/Docs/Web/115980>.

²⁶ Cal. Public Utilities Commission, Second Phase Decision Approving Natural Gas Leak Abatement Program Consistent with Senate Bills 1371 and 1383, *Order Instituting Rulemaking to Adopt Rules and Procedures Governing Commission-Regulated Natural Gas Pipelines and Facilities to Reduce Natural Gas Leakage Consistent with Senate Bill 1371*, Decision 19-08-020 (Aug. 15, 2019), p. 38 *available at* <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M311/K449/311449621.PDF>.

²⁷ Cal. Public Utilities Commission, Decision Adopting Cost-Effectiveness Analysis Framework Policies for All Distributed Energy Resources, *Order Instituting Rulemaking to Create a Consistent Regulatory Framework for the Guidance, Planning, and Evaluation of Integrated Distributed Energy Resources*, Decision 19-05-019 (May 16, 2019), pp. 16, 39-41, *available at* <https://docs.cpuc.ca.gov/PublishedDocs/Published/G000/M293/K833/293833387.PDF> (“Staff recommends the Commission adopt the high value impact value as the value for the avoided social cost of carbon because the consensus view of the scientific community considers the other lower values to represent a lower bound for damage costs related to climate change. Furthermore, Staff believes there is extensive evidence that the average values underestimate the

C. Colorado

Since 2017, the Colorado PUC has directed the state’s utility company to include an analysis of the social cost of carbon, concluding that it represents “a reasonable quantification of the potential cost of externalities” related to climate change.²⁸ In 2019, Colorado’s General Assembly established requirements for “clean energy plans” and directed Colorado’s PUC to consider the net present value of carbon dioxide emissions in evaluating those and a number of other electric plans within its jurisdiction.²⁹ There, the legislature tied the cost of carbon to “the most recent assessment of the social cost of carbon dioxide developed by the federal government.”³⁰ In the legislative session that adjourned on June 8, 2021, the Colorado General Assembly expanded PUC’s consideration in these proceedings to include “carbon dioxide equivalent emissions.”³¹ Also in 2021, the General Assembly created new requirements that the Colorado Air Quality Control Commission include the “social cost of greenhouse gases” in its economic analysis of certain rules that “may materially affect greenhouse gas emissions.”³² In that legislation, the General Assembly explicitly tied the social cost of greenhouse gases to the

damage costs associated with climate change. Staff concludes that the high impact value is the more appropriate and defensible estimate.”).

²⁸ See Phase I Decision Granting, with Modifications, Application for Approval of 2016 Electric Resource Plan, *In the Matter of the Application of Public Service Company of Colorado for Approval of Its 2016 Electric Resource Plan*, Proceeding No. 16A-0396E, at 29-30 (adopted Mar. 23, 2017), available at https://lpdd.org/wp-content/uploads/2020/03/C17-0316_16A-0396E.pdf.

²⁹ Colo. Rev. Stat. § 40-3.2-106 (2019); Colo. Sen. Bill 19-236.

³⁰ Colo. Rev. Stat. § 40-3.2-106(4) (2019).

³¹ Colo. Rev. Stat. § 40-3.2-106(3)(a) (2021). Colorado’s PUC was also directed to incorporate the social cost of carbon dioxide and methane emissions into beneficial electrification proceedings under Colo. House Bill 21-1238 and Colo. Sen. Bill 21-246. Relatedly, Colo. Sen. Bill 21-264 required the social cost of carbon dioxide and methane emissions by incorporated into gas utilities’ clean heat plans before the Commission.

³² Colo. House Bill 21-1266, sec. 16 (amending Colo. Rev. Stat. § 25-7-110.5(4)), passed June 8, 2021 and not yet enacted.

most recent federal determination of cost but no lower than the highest of the federally established cost in 2016 or that established by the IWG pursuant to EO 13,990, when using a 2.5% effective discount rate.³³

D. Connecticut

The Connecticut legislature has enacted the state's Global Warming Solutions Act mandating that the state meet a greenhouse gas emissions reduction goal to reduce economy wide emissions 45 percent by 2030 and 80 percent by 2050.³⁴ In addition, Governor Lamont has issued Executive Order No. 3, directing the state to analyze pathways to achieve a 100 percent zero carbon electric supply by 2040.³⁵ Connecticut state agencies have begun evaluating SC-GHG to assess the value of greenhouse gas emissions in a number of state programs and actions including the Conservation and Load Management Program, various clean energy procurements, the Integrated Resources Plan, and the Comprehensive Energy Strategy.

E. Illinois

In 2016, the Illinois Legislature created a program for the trading of "zero emission credits," which represented the "environmental attributes of one megawatt hour of energy produced from a zero [greenhouse gas] emission facility."³⁶ The value of a Zero Emissions

³³ *Id.*

³⁴ Conn. Gen. Stat. §§ 22a-200a.

³⁵ Ned Lamont, Governor of Connecticut, Executive Order No. 3 (Sept. 3, 2019), *available at* <https://portal.ct.gov/-/media/Office-of-the-Governor/Executive-Orders/Lamont-Executive-Orders/Executive-Order-No-3.pdf-rel=>

³⁶ 20 Illinois Compiled Statutes (ILCS) § 3855/1-10; *see* Ill. Public Act 99-906, S.B. 2814.

Credit was established using IWG’s social cost of carbon.³⁷ The Illinois ZEC program was upheld by a federal court as a valid exercise of the State’s legislative authority.³⁸

F. Massachusetts

In 2021, the Massachusetts General Court adopted legislation requiring the Massachusetts Department of Public Utilities to consider the avoided social cost of carbon emissions when assessing the benefits of savings from energy efficiency and demand response programs.³⁹ The *2021 Avoided Energy Supply Components Study* for New England, which provides estimates of the avoided costs of energy efficiency programs for the New England State regulators, recommends the Department implement its new statutory mandate by using a value of the social cost of carbon “that applies low discount rates, considers global damages, and considers the impact of high-risk situations”—and, in particular, recommends a levelized value of \$128 per short ton.⁴⁰ The *2021 Avoided Energy Supply Components Study* further recommends that the Department continually review, and revise as appropriate, its estimate of the social cost of carbon in light of the IWG’s forthcoming updates to the federal SC-GHG.⁴¹

G. Minnesota

In January 2018, the Minnesota PUC issued an order establishing the environmental costs of carbon dioxide and other greenhouse gases for use by utilities appearing before the Minnesota

³⁷ 20 ILCS § 3855/1-75(d-5)(1)(B).

³⁸ Memorandum Opinion and Order, *Village of Old Mill Creek v. Star*, Case No. 1:17-cv-01165 (N.D. Ill. July 14, 2017), *available at* 2017 WL 3008289.

³⁹ Mass. St. 2021, c. 8.

⁴⁰ Synapse Energy Economics, Inc. et al., *Avoided Energy Supply Components in New England: 2021 Report*, at 16 (as amended May 14, 2021), <https://www.synapse-energy.com/project/aesc-2021-materials>.

⁴¹ *Id.*

PUC.⁴² Following a contested administrative proceeding including representatives from a wide variety of stakeholders, the Minnesota PUC largely adopted the federal SC-GHG as established by the IWG, finding it to be “reasonable” and “the best available measure to determine a range of costs associated with the emission” of greenhouse gases.⁴³ The Minnesota PUC rejected arguments from opponents of the federal SC-GHG that its values were too uncertain to provide useful guidance.⁴⁴ The Minnesota PUC noted that “[t]he degree of rigor employed in the development” of the SC-GHG “and the timeliness of the underlying data and analyses, far exceeds any other framework in the record” (including those urged by opponents of the SC-GHG) and “relied upon the most credible and widely used sources of information in the scientific literature.”⁴⁵

H. New Jersey

In 2018, New Jersey enacted a ZEC program similar to that used in Illinois and described above, concluding that the IWG’s social cost of carbon “is an accepted measure of the cost of carbon emissions.”⁴⁶ In 2019, the state’s Energy Master Plan relied on the social cost of carbon, in part, to calculate the benefits of moving away from carbon-based power in the state.⁴⁷ In 2020,

⁴² See Order Updating Environmental Cost Values, Docket No. E-999/CI-14-643 (Jan. 3, 2018), available at

<https://www.edockets.state.mn.us/EFiling/edockets/searchDocuments.do?method=showPoup&documentId={5066BD60-0000-C71B-9B5B-305CF65BCAE1}&documentTitle=20181-138585-01>

⁴³ *Id.* at 5.

⁴⁴ *Id.* at 8-9.

⁴⁵ *Id.* at 15.

⁴⁶ New Jersey Statutes § 48:3-87.3(b)(8).

⁴⁷ 2019 New Jersey Energy Master Plan: Pathway to 2050, at 51, available at https://nj.gov/emp/docs/pdf/2020_NJBPU_EMP.pdf.

in an order implementing the state's 2018 law, the New Jersey PUC adopted IWG's social cost of carbon.⁴⁸

I. Washington

In 2019, the Washington Legislature enacted a law requiring its Utilities and Transportation Commission to use the IWG's social cost of carbon, applying a 2.5% discount rate, when evaluating the cost of greenhouse gas emissions.⁴⁹ Thereafter, the Utilities and Transportation Commission entered an order adopting the social cost of carbon and adjusting the value to 2019 dollars to account for inflation.⁵⁰

J. Other States

In 2020, the Virginia Legislature directed utilities to include, and public utilities commission to consider, the social cost of carbon in applications to construct new power plants.⁵¹ Pennsylvania relied on EPA's 2016 Social Cost of Carbon estimate as a benchmark in the 2018 Pennsylvania Climate Action Plan in order to evaluate the cost-effectiveness of GHG emission reduction strategies, as required by the Pennsylvania Climate Change Act.⁵²

Additionally, the PUCs of Maine, Maryland, and Nevada have used the federal social cost of

⁴⁸ Order Adopting the First New Jersey Cost Test, N.J. Public Utilities Comm'n, Docket Nos. QO19010040 & QO20060389 at 6 & Appx A at 16-17 (Aug. 24, 2020), *available at* <https://www.bpu.state.nj.us/bpu/pdf/boardorders/2020/20200824/8A%20-%20ORDER%20New%20Jersey%20Cost%20Test.pdf>.

⁴⁹ Revised Code of Washington (RCW) § 80.28.405.

⁵⁰ See Order 01: Adopting an Adjusted Cost of Greenhouse Gas Emissions Reflecting the Effect of Inflation, Wash. Utilities and Transportation Comm'n Docket No. U-190730 (July 30, 2020).

⁵¹ See Va. Stat. Ann. § 56-585.1(6).

⁵² See 71 Pennsylvania Statutes §§ 1361.1--1361.8. The 2018 Pennsylvania Climate Action Plan can be found on the Pennsylvania Department of Environmental Protection's website at: <http://www.depgreenport.state.pa.us/elibrary/GetDocument?docId=1454161&DocName=2018%20PA%20CLIMATE%20ACTION%20PLAN.PDF%20%20%20%20%3cspan%20style%3D%22color%3b%22%3e%28NEW%29%3c%20span%3e>

carbon in ratemaking proceedings or other studies or orders related to the value of carbon-free emissions.⁵³

II. THE SC-GHG IS THE BEST AVAILABLE TOOL FOR ASSIGNING A MONETARY VALUE TO CLIMATE CHANGE IMPACTS AND SHOULD BE USED BY ANY AGENCY CONDUCTING A COST-BENEFIT ANALYSIS OF AN ACTION THAT COULD AFFECT GREENHOUSE GAS EMISSIONS

The undersigned states support the robust use of the SC-GHG at the federal level, including use of the interim SC-GHG values set forth in the 2021 TSD until final updated SC-GHG values can be established. The SC-GHG values should be used by any federal agency conducting a cost-benefit analysis of a government action that could affect greenhouse gas emissions, unless specifically barred by statute.⁵⁴

A. The SC-GHG Is Methodologically Sound and Represents the Best Available Science Assigning a Monetary Value to the Impact of Greenhouse Gases

The SC-GHG developed by the IWG has repeatedly been recognized, by courts as well as federal and state agencies, to be methodologically sound and the best available method for assigning a monetary value to changes in greenhouse gas emissions. The IWG comprises

⁵³ See *Executive Summary: Maine Distributed Solar Valuation Study*, at 4-7 (revised Apr. 14, 2015), available at https://www.maine.gov/mpuc/electricity/elect_generation/documents/MainePUCVOS-ExecutiveSummary.pdf; *Benefits and Costs of Utility Scale and Behind the Meter Solar Resources in Maryland*, at 157 (draft dated Apr. 10, 2018), available at https://www.psc.state.md.us/wp-content/uploads/Mhttp://pucweb1.state.nv.us/PDF/AxImages/DOCKETS_2015_THRU_PRESENT/2017-7/32153.pdfD-Costs-and-Benefits-of-Solar-Draft-for-stakeholder-review.pdf; Order, Public Utilities Commission of Nevada, *Investigation and rulemaking to implement Senate Bill 65 (2017)*, Docket No. 17-07020 (Aug. 20, 2018), available at http://pucweb1.state.nv.us/PDF/AxImages/DOCKETS_2015_THRU_PRESENT/2017-7/32153.pdf.

⁵⁴ See *Regulatory Planning and Review*, Exec. Order No. 12,866 §§ 1, 6(a)(3)(C), 58 Fed. Reg. 51,735 (Oct. 4, 1993) (requiring agencies to assess “all costs and benefits” of regulatory actions and alternatives, including “quantifiable measures []to the fullest extent that [they] can be usefully estimated”).

economic and scientific experts from across the federal government.⁵⁵ Estimates of the SC-GHG are based on the best available, peer-reviewed literature and economic models.⁵⁶ These estimates were developed using the three leading climate models that link greenhouse gas emissions to physical changes and economic damages; each model has been published and extensively reviewed in the scientific literature.⁵⁷ The IWG has thoroughly and transparently discussed the models, inputs, and assumptions used, and has acknowledged the uncertainties of climate science.⁵⁸ The U.S. Government Accountability Office reviewed the IWG's process and concluded that the IWG:

(1) Used consensus-based decision making; (2) relied largely on existing academic literature and models, including technical assistance from outside resources; and (3) took steps to disclose limitations and incorporate new information by considering public comments and revising the estimates as updated research became available.⁵⁹

And, as this proceeding demonstrates, the IWG is committed to updating the SC-GHG as new information becomes available.

Actions by the states have underscored the reliability and usefulness of the IWG's SC-GHG, as noted above. State legislatures in California, Colorado, Illinois, New Jersey, New York, Virginia, and Washington have all enacted state clean energy laws that rely, to greater or lesser extent, on the federal SC-GHG.⁶⁰ In addition, public utility commissions in California, Colorado,

⁵⁵ 2021 TSD at 1, 10-12.

⁵⁶ *Id.* at 10-12.

⁵⁷ *Id.*

⁵⁸ *Id.* at 26-32.

⁵⁹ U.S. Gov't Accountability Off., *Regulatory Impact Analysis: Development of Social Cost of Carbon Estimates*, at 8 (July 2014), available at <https://www.gao.gov/assets/gao-14-663.pdf>.

⁶⁰ See Point I, *supra*.

Minnesota, Maine, Maryland, and Nevada have relied upon the federal SC-GHG to make state energy policy decisions.⁶¹

Courts have also accepted, and at times required, the use of the SC-GHG in valuing climate-change related impacts. The Seventh Circuit upheld the Department of Energy's (DOE) use of the SC-GHG in evaluating the benefits of its refrigeration efficiency standards.⁶² The Court concluded that DOE's use of the SC-GHG to conduct an assessment of the rule's environmental benefits was authorized by the Energy Policy and Conservation Act (EPCA),⁶³ which provided for consideration of "the need for national energy . . . conservation."⁶⁴ The Court also turned aside a variety of objections to the development and reliability of the SC-GHG, concluding that DOE had appropriately responded to those objections and determined that the SC-GHG could be used to assess environmental benefits.⁶⁵

Moreover, courts have rejected agency action for failure to consider the SC-GHG. For example, in *Center for Biological Diversity v. National Highway Traffic Safety Administration*, the Ninth Circuit held that the National Highway Traffic Safety Administration (NHTSA) acted arbitrarily and capriciously when it established vehicle efficiency standards under EPCA, without monetizing the benefits of greenhouse gas emissions reductions.⁶⁶ The Court rejected NHTSA's argument that the value of reducing greenhouse gas emissions was "too uncertain" to quantify.⁶⁷ The Court stressed that "while the record shows that there is a range of values, the

⁶¹ *Id.*

⁶² *Zero Zone, Inc. v. U.S. Dep't of Energy*, 832 F.3d 654, 678-80 (7th Cir. 2016).

⁶³ 49 U.S.C. §§ 32901-32919

⁶⁴ *Zero Zone, Inc.*, 832 F.3d at 677.

⁶⁵ *Id.*

⁶⁶ 538 F.3d 1172, 1198-1203 (9th Cir. 2008).

⁶⁷ *Id.* at 1200.

value of carbon emissions reduction is certainly not zero.”⁶⁸ Moreover, the Court observed that NHTSA had monetized the value of *other* uncertain benefits, including the reduction of criteria pollutants, crashes, and increases in energy security.⁶⁹

Other courts have held that if an agency quantifies the economic benefits of an action that could increase greenhouse gases, it must also employ SC-GHG to quantify the costs of the increased emissions.⁷⁰ These court decisions recognize that the SC-GHG is a reliable and scientifically validated approach to monetizing climate change impacts that should be incorporated into federal decision-making. Moreover, the science underlying the SC-GHG has only improved and the urgency of the need to reduce greenhouse gas emissions has increased.

B. The SC-GHG Must Include Global Impacts

The undersigned states agree with the IWG’s restatement that “a global perspective is essential for [SC-GHG] estimates because climate impacts occurring outside U.S. borders can directly and indirectly affect the welfare of U.S. citizens and residents.”⁷¹ Indeed, the states that have adopted SC-GHG estimates have all accounted for global climate harms. And as far back as 2008, under the Administration of President George W. Bush, EPA recognized that:

GHGs are global pollutants. Economic principles suggest that the full costs to society of emissions should be considered in order to identify the policy that maximizes the net benefits to society, i.e., achieves an efficient outcome. Estimates of global benefits capture more of the full value to society than domestic estimates and can therefore help guide policies towards higher global net benefits for GHG reductions. Furthermore, international effects of climate change may also affect domestic benefits directly and indirectly to the extent U.S. citizens value international impacts (e.g., for tourism

⁶⁸ *Id.*

⁶⁹ *Id.* at 1202.

⁷⁰ See *Montana Env’tl Info. Ctr. v. U.S. Office of Surface Mining*, 274 F.Supp.3d 1074, 1095-99 (D. Mt. 2017); *High County Conservation Advocates v. U.S. Forest Serv.*, 52 F.Supp.3d 1174, 1189-92 (D. Col. 2014).

⁷¹ 2021 TSD, at 3.

reasons, concerns for the existence of ecosystems, and/or concern for others); U.S. international interests are affected (e.g., risks to U.S. national security, or the U.S. economy from potential disruptions in other nations); and/or domestic mitigation decisions affect the level of mitigation and emissions changes in general in other countries (i.e, the benefits realized in the U.S. will depend on emissions changes in the U.S. and internationally). The economics literature also suggests that policies based on direct domestic benefits will result in little appreciable reduction in global GHGs.⁷²

The consideration of global impacts is also fully within the authority of federal agencies. In *Zero Zone*, the Seventh Circuit specifically upheld DOE’s consideration of global – not just national – benefits, accepting DOE’s explanation that “climate change involves a global externality, meaning that carbon released in the United States affects the climate of the entire world.”⁷³

In fact, ignoring global climate change impacts would be arbitrary and capricious. In *California v. Bernhardt*, the Northern District of California held that the Bureau of Land Management (BLM) erred in evaluating only the domestic costs of increases in greenhouse gas emissions from BLM’s repeal of regulations to reduce waste at natural gas wells.⁷⁴ The Court noted that “focusing solely on domestic effects has been soundly rejected by economists as improper and unsupported by science.”⁷⁵ The Court concluded that BLM could not “construct a model that confirms a preordained outcome while ignoring a model that reflects the best science available.”⁷⁶

⁷² *Regulating Greenhouse Gas Emissions Under the Clean Air Act*, 73 Fed. Reg. 44,354, 44,415-16 (July 30, 2018) (internal citations and footnotes omitted).

⁷³ *Zero Zone*, 832 F.3d at 679.

⁷⁴ 472 F.Supp.3d 574, 608-14 (N.D. Cal. 2020), *appeal pending* Docket Nos. 20-16794, 20-16801 (9th Cir.).

⁷⁵ *Id.* at 613.

⁷⁶ *Id.* at 614.

Consistent with longstanding EPA policy, the decisions in *ZeroZone* and *California v. Bernhardt*, and the common sense, consensus approach utilized by the states, the IWG should continue to take a global perspective on the SC-GHG.

C. Use of the SC-GHG Is Not Precluded by the Major Questions Doctrine or Any Other Legal Doctrine

Opponents of the SC-GHG have raised a number of misplaced complaints regarding its use. No sooner had the ink dried on EO 13,990 than a group of states challenged it, arguing that the EO's re-institution of the IWG and the EO's direction for the IWG to issue interim SC-GHG values and to consider revisions SC-GHG violated the separation of powers.⁷⁷ Those same states have also submitted comments to the Federal Energy Regulatory Commission (FERC) arguing that use of SC-GHG implicated matters of "vast economic and political significance" requiring a clear statement from Congress to implement.⁷⁸ However framed, the concern that any SC-GHG will upend the economy or exceed the bounds of executive authority is without legal or factual basis.

The SC-GHG, by itself, does not dictate or require any federal action or inaction – it is an analytical tool that is used by agencies to translate certain impacts of greenhouse gas-emitting actions that they may consider (such as fuel efficiency standards) into dollars. This dollar figure can then be compared to other projected costs or benefits to better inform agency decision-making. This approach is consistent with longstanding practice: Executive Orders and White House guidance documents have, for decades and across Presidential administrations, instructed agencies to "use the best available techniques to quantify anticipated present and future benefits

⁷⁷ See First Amended Complaint, *State of Missouri v. Biden*, E.D. Mo., Case No. 4:21-cv-00287-AGF, Doc. #6 (Mar. 26, 2021).

⁷⁸ See Comment on the Use of the Social Cost of Carbon, FERC Docket No. PL-18-1-000, Accession No. 20210427-5027 (filed Apr. 27, 2021).

and costs as accurately as possible.”⁷⁹ The U.S. Supreme Court has held that “[c]onsideration of cost reflects the understanding that reasonable regulation ordinarily requires paying attention to the advantages *and* the disadvantages of agency decisions.”⁸⁰ And agencies across the federal government, as well as state agencies and local governments, have incorporated some form of SC-GHG for years now, resulting in an increase in the rationality of agency decision-making, not the imposition of any unwarranted economic harm.⁸¹ Indeed, an evaluation of the cost and benefits of an agency action that will impact greenhouse gas emissions that does not use the SC-GHG would be woefully incomplete.⁸²

Nor do any of the cases upholding federal environmental reviews that declined to use the SC-GHG demonstrate that the SC-GHG *cannot* be employed by federal agencies. For example, in *EarthReports, Inc. v. FERC*, the D.C. Circuit only held that FERC was not *required* to use the SC-GHG, based on the specific record before it, but did not suggest FERC was barred from using the SC-GHG.⁸³ FERC itself has more recently requested guidance on whether and how to use the SC-GHG.⁸⁴ Clear guidance from the IWG on when and how the SC-GHG should apply,

⁷⁹ *Improving Regulation and Regulatory Review*, Exec. Order No. 13,563 § 1(c), 76 Fed. Reg. 3,821 (Jan. 18, 2011); *accord Regulatory Planning and Review*, Exec. Order No. 12,866 §§ 1, 6(a)(3)(C), 58 Fed. Reg. 51,735 (Oct. 4, 1993) (requiring agencies to assess “all costs and benefits” of regulatory actions and alternatives, including “quantifiable measures []to the fullest extent that [they] can be usefully estimated”); OMB, *Circular A-4: Regulatory Analysis* at 2, 18 (2003) (OMB Circular A-4) (instructing agencies that expression of “potential real incremental benefits and costs” of their actions “in monetary units” provides “useful information for decision makers and the public”).

⁸⁰ *Michigan v. U.S. Evt’l Prot. Agency*, 576 U.S. 743, 753 (2015).

⁸¹ *See, e.g.*, Section I, *supra*; 2021 TSD at 2.

⁸² *See Center for Biological Diversity*, 538 F.3d at 1200-1201.

⁸³ 828 F.3d 949, 956 (D.C Cir. 2017).

⁸⁴ *Certification of New Interstate Natural Gas Facilities*, 86 Fed. Reg. 11,268, 11,272 (Feb. 24, 2021).

the appropriate discount rates for federal agencies to use, and the assumptions underlying the SC-GHG, would support the use of SC-GHG in such situations.

III. THE IWG SHOULD RECALCULATE THE INTERIM SC-GHG VALUES USING A 2% DISCOUNT RATE AND IWG SHOULD CONSIDER LOWER OR DECLINING DISCOUNT RATES FOR USE IN THE REVISED SC-GHG VALUES

OMB seeks comment on the “discount rates appropriate for intergenerational analysis when using the interim [SC-GHG].”⁸⁵ The undersigned states support the immediate use of a 2% discount rate, and consideration of even lower discount rates – including a 0% or a declining discount rate – for use in the revised final SC-GHG values.

As IWG now recognizes, “the 3 percent discount rate used by the IWG to develop its range of discount rates is likely an overestimate of the appropriate discount rate.”⁸⁶ Since 2008, federal agencies have recognized that:

There are reasons to consider even lower discount rates in discounting the costs of benefits of policy that affect climate change. First, changes in GHG emissions—both increases and reductions—are essentially long-run investments in changes in climate and the potential impacts from climate change. When considering climate change investments, they should be compared to similar alternative investments (via the discount rate). Investments in climate change are investments in infrastructure and technologies associated with mitigation; however, they yield returns in terms of avoided impacts over a period of one hundred years and longer. Furthermore, there is a potential for significant impacts from climate change, where the exact timing and magnitude of these impacts are unknown. These factors imply a highly uncertain investment environment that spans multiple generations.

When there are important benefits or costs that affect multiple generations of the population, EPA and OMB allow for low but positive discount rates (e.g., 0.5-3% noted by U.S. EPA, 1-3% by OMB).⁸⁷

⁸⁵ 86 Fed. Reg. at 24,670.

⁸⁶ 2021 TSD at 17.

⁸⁷ 73 Fed. Reg. at 44,354.

Indeed, recent studies show support for a long-term discount rate of “no higher than 2 percent.”⁸⁸

The use of a sub-3% discount rate is consistent with existing federal regulatory guidance.

OMB Circular A-4 notes:

Special ethical considerations arise when comparing benefits and costs across generations. Although most people demonstrate time preference in their own consumption behavior, it may not be appropriate for society to demonstrate a similar preference when deciding between the well-being of current and future generations. Future citizens who are affected by such choices cannot take part in making them, and today’s society must act with some consideration of their interest.⁸⁹

OMB Circular A-4 further notes that some economists believe that “government should treat all generations equally,” and suggests an appropriate discount rate for intergenerational analysis would be “from 1 to 3 percent.”⁹⁰

As previewed above, states are already taking the lead in adopting sub-3% discount rates. In developing New York’s approach to the SC-GHG, the State reviewed various sources before concluding that the discount rates used by IWG are “dated” and that an appropriate discount rate would be closer to 2%.⁹¹ Previously, the Colorado PUC has directed utilities appearing before it

⁸⁸ See Tamma Carleton, et al., *Updating the United States Government’s Social Cost of Carbon*, Energy Policy Institute at the University of Chicago, Working Paper No. 2021-04, at 23 (Jan. 2021), available at https://epic.uchicago.edu/wp-content/uploads/2021/01/BFI_WP_202104_Final.pdf; accord Expert Report, *The Use of the Social Cost of Carbon in the Federal Proposal “Safer Affordable Fuel-Efficiency (SAFE) Vehicles Rule,”* (attached to comments of California Air Resources Board on EPA Docket No. EPA-HQ-OAR-2017-0355), Maximilian Auffhammer, October 24, 2018, at 12; Council of Economic Advisers, *Discounting for Public Policy: Theory and Recent Evidence on the Merits of Updating the Discount Rate*, Issue Brief, at 3 (January 2017), available at https://obamawhitehouse.archives.gov/sites/default/files/page/files/201701_cea_discounting_issue_brief.pdf.

⁸⁹ OMB Circular A-4, at 35.

⁹⁰ *Id.* at 35-36.

⁹¹ *Estimating the Value of Carbon*, *supra* n.7, at 8-9.

to run sensitivity analyses using a 0% discount rate.⁹² In recent legislation, Colorado’s General Assembly established the discount rate for certain state air quality rules at no more than 2.5%.⁹³ And Washington’s recent clean energy law directs its Utility and Transportation Commission to use a 2.5% discount rate.⁹⁴ Use of a lower discount rate – in line with the rates adopted by various states – could be implemented immediately, without need for further administrative rulemaking. Applying a 2% discount rate to calculate the interim IWG values would result in a social cost of carbon for 2020 of \$125,⁹⁵ and the social cost values for other greenhouse gases can also readily be calculated to account for a 2% discount rate.

As IWG considers final revisions for the SC-GHG, the undersigned states support consideration of discount rates even lower than 2%. In the context of investments intended to improve quality of life over a multi-generational timespan, even a 2% discount rate results in a rapid devaluation of human life. For reference, applying a 2% discount rate, the value of the life of a person born today would be *twice* the value of a person born in 2055. Across very long timeframes, the value of a human life declines dramatically when using *any* non-zero discount rate.⁹⁶ IWG should consider applying a 0% discount rate, or perhaps a very low but non-zero discount rate, when assessing the value of saving human lives far into the future.⁹⁷

⁹² See Phase I Decision Granting, with Modifications, Application for Approval of 2016 Electric Resource Plan, *In the Matter of the Application of Public Service Company of Colorado for Approval of Its 2016 Electric Resource Plan*, Proceeding No. 16A-0396E, at 33.

⁹³ Colo. House Bill 21-1266, sec. 16.

⁹⁴ RCW § 80.28.405.

⁹⁵ See *Updating the United States Government’s Social Cost of Carbon*, *supra* n. 88, at 1.

⁹⁶ See Section IV.C, *infra*.

⁹⁷ See 73 Fed. Reg. at 44,354 (“When there are important benefits or costs that affect multiple generations of the population, EPA and OMB allow for low but positive discount rates”).

IWG should also consider using a declining discount rate in its final revised SC-GHG. “[A]n increasingly prevalent view among economists supports the use of declining interest rates because of uncertainties about future economic growth.”⁹⁸ A declining discount rate would reflect the reality that assumptions about long-term economic growth become more tenuous over longer timeframes.⁹⁹ The United Kingdom, for example, employs a declining discount rate when assessing economic effects over increasing periods of time: up to 3.5% for the first 30 years, with a series of decreases in the discount rate eventually reaching as low as 0.86% for periods of 301 years or longer.¹⁰⁰ Moreover, climate change itself poses a grave risk to future economic growth: a 2015 survey of 365 economics experts found that “[m]ore than three-quarters . . . believe[d] that climate change will have a long-term, negative impact on the *growth rate* of the global economy” and that in a scenario where global temperatures increase by 3 degrees Celsius, global GDP was likely to drop by at least 10%, with a 20% likelihood that global GDP would drop 25% or more.¹⁰¹ Accordingly, IWG should consider use of a discount rate that declines over time to a value approaching 0%.

⁹⁸ Daniel A. Farber, *The Case for Declining Discount Rates*, *The Regulatory Review* (Apr. 7, 2014), available at <https://www.theregreview.org/2014/04/07/07-farber-discount-rates/>. See also Arrow, et al., *Should Governments Use a Declining Discount Rate in Project Analysis*, *Review of Environmental Economics and Policy*, Vol. 8, No. 2 (Summer 2014); Cropper, et al., *Declining Discount Rates*, *American Economic Review: Papers and Proceedings* (2014), available at <http://eprints.lse.ac.uk/57052/1/Declining%20Discount%20Rates.pdf>.

⁹⁹ See OMB Circular A-4, at 36 (“A second reason for discounting the benefits and costs accruing to future generations at a lower rate is increased uncertainty about the appropriate value of the discount rate, the longer the horizon for the analysis.”).

¹⁰⁰ Joseph Lowe, *Intergenerational wealth transfer and social discounting: Supplementary Green Book guidance*, at 5 (July 2008), available at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/193938/Green_Book_supplementary_guidance_intergenerational_wealth_transfers_and_social_discounting.pdf.

¹⁰¹ Peter Howard, et al., *Expert Consensus on the Economics of Climate Change*, at 1-2 (Dec. 2015), available at https://www.edf.org/sites/default/files/exp_ertconsensusreport.pdf.

IV. ALTHOUGH THE INTERIM SC-GHG VALUES ARE APPROPRIATE FOR IMMEDIATE USE, IWG SHOULD UPDATE THE SC-GHG TO INCLUDE OR DISCLOSE AND CONSIDER NON-QUANTIFIED IMPACTS AND ETHICAL CONSIDERATIONS

Although the interim SC-GHG values published in the 2021 TSD provide reliable and useful values for immediate use, IWG should update the SC-GHG values to include or more robustly describe and account for significant categories of damages that are currently unquantified in the SC-GHG, as well as varying impacts of climate change across socio-economic and demographic groups and geographic regions. IWG should also provide guidance on how federal agencies can consider the ethical implications of using any discount rate. Until the SC-GHG values are updated, IWG should advise federal agencies using the interim values to disclose that they likely underestimate the true cost of climate change and disclose and consider known and significant climate change impacts that have not been quantified in the SC-GHG.

A. Categories of Significant Damages That Are Currently Not Quantified By the SC-GHG Should Be Included in the Final Revised Values or Disclosed and Considered by Agencies Using Interim or Revised Values

In order to “adequately take account of climate risk, environmental justice, and intergenerational equity,”¹⁰² the undersigned states recommend that IWG better identify climate change impacts that are omitted or incompletely included in the interim SC-GHG values, and either update the underlying climate models to include those impacts or recommend disclosure and consideration of significant variables that are known to be unquantified by federal agencies using the SC-GHG values. Although the 2021 TSD appropriately recognizes that there are “many known GHG-induced damages omitted” by the models underlying the SC-GHG, it provides just one example: ocean acidification.¹⁰³ The IWG should be more forthright in

¹⁰² 86 Fed. Reg. at 24,670.

¹⁰³ 2021 TSD at 27.

disclosing that the interim SCG values likely underestimate the true cost of climate change, and in urging federal agencies that use the SCG values to disclose and consider climate change impacts that are not monetized or otherwise quantified in the interim values.

Disclosure and consideration of costs or benefits that have not been monetized in a particular cost-benefit analysis is consistent with OMB Circular A-4, which provides that, “[i]f monetization is impossible,” any agency should “explain why and present all available quantitative information.”¹⁰⁴ Moreover, if an agency is “not able to quantify the effects” of an action, it should “present any relevant quantitative information along with a description of the unquantified effects[.]”¹⁰⁵ In other words, the undersigned states are advocating only that existing regulatory guidance be applied to the unique challenges presented by global climate change: quantification of significant known costs and benefits, coupled with discussion and disclosure of significant impacts that are known but not amenable to quantification.

Economists reviewing the SC-GHG models have extensively analyzed areas of damages that are not quantified or are otherwise underestimated.¹⁰⁶ As New York’s evaluation of appropriate SC-GHG values observed, “[t]he [climate models] only partially account for, or omit, many significant impacts of climate change that are difficult to quantify or monetize, including ecosystems, increased fire risk, the spread of pests and pathogens, mass extinctions,

¹⁰⁴ OMB Circular A-4, at 27.

¹⁰⁵ *Id.*

¹⁰⁶ See, e.g., Ruth DeFries, et al., *The missing economic risks in assessments of climate change impacts* (Sept. 2019), available at <https://www.lse.ac.uk/granthaminstitute/wp-content/uploads/2019/09/The-missing-economic-risks-in-assessments-of-climate-change-impacts-2.pdf>; Institute for Policy Integrity, *A Lower Bound: Why the Social Cost of Carbon Does Not Capture Critical Climate Damages and What that Means for Policymakers* (Feb. 2019), available at https://policyintegrity.org/files/publications/Lower_Bound_Issue_Brief.pdf; Peter Howard, *Omitted Damages: What’s Missing from the Social Cost of Carbon*, at 30 (Mar. 13, 2014).

large-scale migration, increased conflict, slower economic growth, and potential catastrophic impacts.”¹⁰⁷ We highlight here several areas of unquantified damages that are particularly important to the states: (1) combined effects of storm surges and rising sea levels, (2) health impacts from wildfires, and (3) loss of culturally and historically significant assets.

The combined effects of storm surges and rising sea levels are not accounted for in the climate models underlying the SC-GHG.¹⁰⁸ But this is an area of tremendous concern to the undersigned states: the 2018 National Climate Assessment noted that, “[a]lthough storms, floods, and erosion have always been hazards, in combination with rising sea levels they now threaten approximately \$1 trillion in national wealth head in coastal real estate.”¹⁰⁹ Under a high-end model of climate impacts, “coastal communities will be transformed by the latter part of this century, and even under lower scenarios, many individuals and communities will suffer financial impacts as chronic high tide flooding leads to higher costs and lower property values.”¹¹⁰ Indeed, a recent study concluded that higher sea levels caused by anthropogenic climate change increased the damage caused to the eastern seaboard by Superstorm Sandy in 2012 by more than \$8 billion.¹¹¹ Any update to the models underlying the SC-GHG should account for the effects of sea level rise and storm surges on coastal flooding. If quantification proves impossible, IWG should recommend that federal agencies using the SC-GHG disclose that this factor has not been quantified. In the meantime, IWG should recommend that agencies using the interim SC-GHG

¹⁰⁷ *Estimating the Value of Carbon*, *supra* n.7, at 3.

¹⁰⁸ *See Lower Bound*, *supra* n. 106, at 4.

¹⁰⁹ U.S. Global Change Research Program, *Fourth National Climate Assessment*, at 324 (2018).

¹¹⁰ *Id.*

¹¹¹ Benjamin H. Strauss, et al., *Economic damages from Hurricane Sandy attributable to sea level rise caused by anthropogenic climate change* (May 18, 2021), available at <https://www.nature.com/articles/s41467-021-22838-1>.

values disclose and consider that the combined effects of sea level rise and storm surges have not been quantified.

The climate models underlying the SC-GHG values also do not account for impacts from wildfires, which include both health and economic effects.¹¹² Each year, millions of Americans suffer through lengthy episodes of extremely unhealthy air due to wildfires, as the wildfire season becomes lengthier and more destructive due to climate change. Indeed, the *Fourth National Climate Assessment* highlighted health risks from wildfires as a major consequence of climate change, stating that “[e]xposure to wildfire smoke increases the risk of respiratory disease and mortality ... Wildfires are projected to become the principal driver of summertime PM_{2.5} concentrations, offsetting even large reductions in emissions of PM_{2.5} precursors.”¹¹³ Most Americans would reasonably assume that any effort to account for the social cost of greenhouse gases would include such a high-profile effect of climate change. The updated SC-GHG should include these impacts if recent advances in science and economics make it possible. If the updated SC-GHG still does not account for such damages, that fact should be highlighted and considered whenever the updated SC-GHG is used. In the meantime, IWG should recommend that agencies using the interim SC-GHG values disclose and consider that wildfire impacts have not been quantified.

Another area of unquantified damages identified by the National Academy of Sciences is the “loss of goods and services that are not traded in markets and so cannot be valued using market prices,” such as “loss of cultural heritage, historical monuments, and favored

¹¹² See *Lower Bound*, *supra* n.106, at 5; *Omitted Damages*, *supra* n.106, at 20, 30.

¹¹³ *Fourth National Climate Assessment*, *supra* n.109, at 521-22.

landscapes.”¹¹⁴ The federal government has a longstanding policy of “provid[ing] leadership in the preservation of the historic property of the United States and of the international community of nations” as well as supporting state efforts to “expand and accelerate their historic preservation programs and activities.”¹¹⁵ But many historic and culturally significant monuments and sites are located on the coast, where they are particularly susceptible to coastal flooding caused by rising tides and storm surges. Nor will impacts be limited to coastal historic sites – wildfires, drought, and extreme heat threaten inland locations, as well. The Union of Concerned Scientists has identified many historic sites and landmarks at risk from climate change:

- Boston historic districts and Faneuil Hall, MA
- The Statue of Liberty and Ellis Island, NY
- Harriet Tubman National Monument, MD
- Historic Annapolis, MD
- Historic Jamestown, VA
- Fort Monroe National Monument, VA
- NASA’s Coastal Facilities, FL and TX
- Cape Hatteras Lighthouse, NC
- Historic Charleston, SC
- Historic St. Augustine, FL
- Mesa Verde National Park, CO
- Bandalier National Monument, NM
- Cesar Chavez National Monument, CA.¹¹⁶

The loss of these unique sites would exceed the monetary value of the land upon which they are located. Any update to the SC-GHG should either attempt to include impacts to these historically significant locations or disclose that they have not been included. In the meantime, IWG should

¹¹⁴ National Academy of Sciences, *Valuing Climate Damages: Updating Estimation of the Social Cost of Carbon Dioxide*, at 152 (2017).

¹¹⁵ 54 U.S.C. § 300101(2), (6).

¹¹⁶ Union of Concerned Scientists, *National Landmarks at Risk: How Rising Seas, Floods, and Wildfires Are Threatening the United States’ Most Cherished Historic Sites*, at 4-32, 36-40, 44 (2014).

recommend that agencies using the interim SC-GHG values disclose and consider that impacts to historic and culturally significant sites have not been quantified.

B. The Final Revised SC-GHG Should Account for the Varying Impact of Climate Change on Socio-economic Classes, Demographic Groups, and Geographic Regions

OMB also seeks comment on “approaches to adequately take account of . . . environmental justice” in revising the SC-GHG.¹¹⁷ Indeed, EO 13,990 emphasizes the importance of considering the environmental justice implications of the SC-GHG.¹¹⁸ Recent studies indicate that “climate change is projected to disproportionately harm today’s poorest populations, exacerbating concerns about environmental justice.”¹¹⁹ In fact, “climate change is projected to cause economic damages in the poorest 5 percent of [U.S.] counties that are approximately nine times larger on average by the end of the century than in those in the richest 5 percent.”¹²⁰ Not only will counties with lower socioeconomic status suffer greater economic damage than richer counties, but they will be less able to cope with that damage, “increas[ing] preexisting inequality in the United States.”¹²¹ Similarly, “[a]cross all climate risks, children, older adults, low-income communities, some communities of color, and those experiencing discrimination are disproportionately affected Other populations might [also] experience increased climate risks due to a combination of exposure and sensitivity[.]”¹²² Updates to the

¹¹⁷ 86 Fed. Reg. at 24,670.

¹¹⁸ See 86 Fed. Reg. at 7,040.

¹¹⁹ *Updating the United States Government’s Social Cost of Carbon*, supra n. 88, at 6; accord Hsiang, S., Kopp R., et al. *Estimating Economic Damage from Climate Change in the United States*, Science 356, at 1367 (2017), available at <https://science.sciencemag.org/content/sci/356/6345/1362.full.pdf>.

¹²⁰ *Updating the United States Government’s Social Cost of Carbon*, supra n.88, at 6.

¹²¹ *Estimating Economic Damage from Climate Change in the United States*, supra n.119, at 1363.

¹²² See *Fourth National Climate Assessment*, supra n.109, at 547.

final SC-GHG should account for the disproportionate impact on lower socioeconomic status communities and other disparately impacted groups using methods and values founded in robust science and data, not a simple multiplier approach. If these disproportionate impacts cannot be quantified, IWG should urge federal agencies to disclose and consider that the economic damage from climate change will not be spread evenly amongst socio-economic and demographic groups.

Additionally, updates to the SC-GHG values should account for the varying impacts of climate change across geographic regions. Recent research

has uncovered that many socioeconomic outcomes display a strongly nonlinear relationship with climate variables—that is, the effects of climate change are not identical everywhere, but are instead sensitive to prior socioeconomic and climatic conditions. For example, both extreme cold and extreme heat increase mortality rates, while moderate temperatures have little impact. In addition, the research has documented large differences in climate impacts relationships between rich and poor, hot and cold, and agricultural and non-agricultural regions.¹²³

In other words, “a given increase in temperature will have very different impacts in Arizona than it will in northern Minnesota.”¹²⁴ In the United States, studies suggest “that warming causes a net transfer of value from Southern, Central, and Mid-Atlantic regions toward the Pacific Northwest, the Great Lakes region, and New England.”¹²⁵

Updates to the SC-GHG accordingly should incorporate the latest methods for assessing any disparities or inequities (whether socio-economic, geographic, demographic, or otherwise) in

¹²³ *Updating the United States Government’s Social Cost of Carbon*, *supra* n.88, at 15-16.

¹²⁴ *Id.* at 14.

¹²⁵ *Estimating Economic Damage from Climate Change in the United States*, *supra* n.119, at 1363.

climate change impacts.¹²⁶ To the extent these varying impacts cannot be quantified in the SC-GHG, IWG should advise federal agencies using the SC-GHG to disclose, describe, and consider those impacts.¹²⁷ In the meantime, IWG should recommend that agencies using the interim SC-GHG values disclose and consider that climate change impacts will vary across socio-economic and demographic groups and geographic regions.

C. IWG Should Provide Guidance on How Federal Agencies Can Consider the Ethical Implications of Using Any Discount Rate

EO 13,990 directs IWG to “seek the advice of ethics experts” in developing the updated SC-GHG values.¹²⁸ In the 2021 TSD, IWG correctly identifies ethics as one of the “highly contested and exceedingly difficult questions” raised by the selection of a discount rate.¹²⁹ The ethical choices are most obvious when it comes to loss of life. The compounding effect of the discount rate results in the rapid devaluation of human lives. Using a 3% discount rate, the value of a life today is twice the value of a life in 2044.¹³⁰ Even under a 2% discount rate, a life today would be considered twice as valuable as a life in 2056. This suggests we would spend twice as much to save our own generation than we would spend to save the next generation, a proposition that many parents would find morally problematic.

¹²⁶ See, e.g., *Updating the United States Government’s Social Cost of Carbon*, *supra* n.88, at 14-15; *Estimating Economic Damage from Climate Change in the United States*, *supra* n.119, at 1362-65.

¹²⁷ See OMB Circular A-4, at 27.

¹²⁸ 86 Fed. Reg. at 7041.

¹²⁹ 2021 TSD at 17.

¹³⁰ The effects of discount rates over various period of time can be calculated using readily available “Present Value Calculators,” such as that available at <https://financialmentor.com/calculator/present-value-calculator>

Over longer periods of time, the ethical implications of discounting the value of human life become even more apparent.¹³¹ Assuming that the interim SGC uses the current EPA life-value of approximately \$10 million,¹³² the value of a life 500 years from now is:

- Using a 3% discount rate, \$3.81. Assuming the population of the world 500 years from now is the same as it is today - 7.8 billion - this means that the complete destruction of the human race in 2521 would “cost” \$29.7 billion, implying that it would be economically unsound to spend \$30 billion today to prevent the extinction of *homo sapiens* by climate change in 2521.
- Using a 2.5% discount rate, \$43.46. Using this figure, the complete destruction of the human race in 2521 would “cost” \$368 billion – just over half the 2020 budget for the Pentagon.
- Using a 2% discount rate, \$501.09. Using this figure, the complete destruction of the human race in 2521 would “cost” \$3.9 trillion, less than the budget of the Federal government in 2020.

But of course, the damage caused by climate change – including ongoing losses of lives - will persist for thousands of years.¹³³ Using a 3%, or even a 2.5%, discount rate, the present value of

¹³¹ Although this discussion may reflect an oversimplification of the use of discount rates, it is intended to demonstrate the drastic – some would say unrealistic – economic outcomes that the use of discount rates over very long time periods produces.

¹³² See EPA, Mortality Risk Valuation, <https://www.epa.gov/environmental-economics/mortality-risk-valuation> (last visited June 21, 2021). EPA values a statistical life at \$7.4 million in 2006 dollars, which when adjusted for inflation is \$9.88 million in 2021 dollars.

¹³³ EPA, *Understanding Global Warming Potentials*, <https://www.epa.gov/ghgemissions/understanding-global-warming-potentials> (last visited June 17, 2021) (“CO₂ emissions cause increases in atmospheric concentrations of CO₂ that will last thousands of years.”); See also Zickfeld, et al., *Centuries of thermal sea-level rise due to anthropogenic emissions of short-lived greenhouse gases*, PNAS Vol. 114, no.4, at 659 (Jan. 24, 2017) (“surface-air warming remains approximately constant for 1,000 y after elimination of CO₂ emissions.”); Wilder, et al., *Taking the Long View: The ‘Forever Legacy’ of Climate*

a life in 3021 approaches zero.¹³⁴ Using a 1% discount rate, it is \$477.22. The ethical concerns raised by devaluing human lives in this manner are profound yet obviously unquantifiable. We believe that, to ensure that the public understands the ethical choices involved, it is essential that the effect of different discount rates over long time periods be presented in clear and readily accessible terms.

CONCLUSION

Fully accounting for the long-term costs and benefits of agency actions that affect greenhouse gas emissions is vitally important to the undersigned states and their residents. The interim SC-GHG values are suitable for immediate use, although the undersigned states recommend that they be adjusted to reflect a 2% or lower discount rate. By updating the underlying models and acknowledging any assumptions, unquantified damages, and ethical concerns, the SC-GHG can be further improved.

Change, YaleEnvironment360 (Sept. 12, 2017), <https://e360.yale.edu/features/taking-the-long-view-the-forever-legacy-of-climate-change> (“the world’s oceans can be expected to continue rising for many thousands of years even after temperatures stabilize.”).

¹³⁴ Notably, the climate models underlying the SC-GHG do not appear to even consider climate change impacts beyond 2300. EPA, Fact Sheet: Social Cost of Carbon (Dec. 2016), *available at* https://www.epa.gov/sites/production/files/2016-12/documents/social_cost_of_carbon_fact_sheet.pdf. As EPA has noted, “selection of a fixed end year” for modeling climate change impacts “will place downward pressure” on the SC-GHG. *Id.*

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