

February 26, 2014

VIA WWW.REGULATIONS.GOV

Administrator Howard Shelanski  
Office of Information and Regulatory Affairs  
Office of Management and Budget  
New Executive Office Building  
Washington, D.C. 20503

**Re: Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order No. 12866; Docket ID OMB-OMB-2013-0007; Comments of The American Chemistry Council, the American Coalition for Clean Coal Electricity, the American Exploration & Production Council, the American Forest & Paper Association, the American Fuel & Petrochemical Manufacturers, the American Iron & Steel Institute, the American Petroleum Institute, America's Natural Gas Alliance, the Brick Industry Association, the Council of Industrial Boiler Owners, The Fertilizer Institute, the Independent Petroleum Association of America, the National Association of Home Builders, the National Association of Manufacturers, the National Mining Association, the National Oilseed Processors Association, the Natural Gas Supply Association, the Portland Cement Association, and the U.S. Chamber of Commerce**

Dear Administrator Shelanski:

The American Chemistry Council, the American Coalition for Clean Coal Electricity, the American Exploration & Production Council, The American Forest & Paper Association, the American Fuel & Petrochemical Manufacturers, the American Iron & Steel Institute, the American Petroleum Institute, America's Natural Gas Alliance, , the Brick Industry Association , the Council of Industrial Boiler Owners, The Fertilizer Institute, the Independent Petroleum Association of America, the National Association of Home Builders, the National Association of Manufacturers, the Natural Gas Supply Association, the National Mining Association, the National Oilseed Processors Association, the Portland Cement Association, and the U.S. Chamber of Commerce (collectively, "the Associations")<sup>1</sup> hereby submit the following comments in response to the November 26, 2013, Office of Management and Budget ("OMB") invitation for public comments on the Technical Support Document entitled *Technical Update of*

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<sup>1</sup> See Attachment 1 for each organization's statement of interest.

*the Social Cost of Carbon (“SCC”) for Regulatory Impact Analysis Under Executive Order 12866.*<sup>2</sup>

Member companies of the Associations will be impacted by the SCC Estimates because many of them manufacture products that, when combusted, result in greenhouse gas (“GHG”) emissions (including carbon dioxide (“CO<sub>2</sub>”)), and because, in the course of their business, they emit CO<sub>2</sub>. When this Administration, or any subsequent one, promulgates further regulation of these products or emissions, under Executive Order 12866, such proposals and rules to the extent permitted by law, must be based on “a reasoned determination that the benefits of the intended regulation justify its costs.” The SCC Estimates are generated through a formal interagency process, whose purpose is to affect and bind agency regulatory actions and regulations. As such, the SCC Estimates, though subject to periodic re-examination, mark the consummation of the government’s cost-benefit analysis, which, in turn, is binding on federal agencies pursuant to Executive Order 12866. Indeed, the pattern and practice of the government has confirmed that federal agencies view the SCC Estimates as binding and already have relied upon them in crafting and adopting regulations that affect the Associations’ members.<sup>3</sup> Our members, therefore, have a direct and concrete interest in ensuring that any SCC Estimates are based on transparent processes, accurate information, and rational assumptions, and are within the reach of the current scientific understanding and impact models. To be clear, the Associations are not herein discussing the existence or potential causes of climate change. Instead, we are questioning the IWG’s estimates of the social cost of carbon, based on estimates of complex economic impacts hundreds of years in the future, which in turn are based on present day understanding of current and future carbon emissions.

These comments address issues related to the SCC Estimates published in February 2010<sup>4</sup> and May 2013,<sup>5</sup> including the most recent technical update issued in November 2013.<sup>6</sup> On

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<sup>2</sup> 78 Fed. Reg. 70,586 (Nov. 26, 2013).

<sup>3</sup> E.g., The U.S. Environmental Protection Agency (“EPA”) frequently has used the 2010 SCC Estimates in cost-benefit analyses supporting Clean Air Act rules. See, e.g., 77 Fed. Reg. 62,624 (Oct. 12, 2012) (light-duty vehicle CAFE standards); 77 Fed. Reg. 49,489 (Aug. 16, 2012) (NESHAPs for the oil & gas source category); 77 Fed. Reg. 9,304 (Feb. 16, 2012) (NESHAPs for the power plant source category); 75 Fed. Reg. 25,324 (May 7, 2010) (tailpipe GHG/CAFE rules). The Department of Energy (“DOE”) has used the May 2013 SCC Estimates in connection with a rulemaking addressing the energy efficiency standard for microwave ovens. 78 Fed. Reg. 36,316 (June 17, 2013). Likewise, DOE used the May 2013 SCC Estimates to support a recently finalized energy efficiency rule for metal halide lamp fixtures (79 Fed. Reg. 7,746 (Feb. 10, 2014)) and proposal rules for commercial refrigeration equipment (78 Fed. Reg. 55,889 (Sept. 11, 2013)); walk-in coolers and freezers (78 Fed. Reg. 55,888 (Sept. 11, 2013)); residential furnace fans (78 Fed. Reg. 64067 (Oct. 25, 2013)); commercial and industrial electrical motors (78 Fed. Reg. 73,590 (Dec. 6, 2013)); Industrial Air Compressors (79 Fed. Reg. 6,839 (Feb. 5, 2014)); and, external power supplies (79 Fed. Reg. 7,846 (Feb 10, 2014)).

<sup>4</sup> Interagency Working Group on Social Cost of Carbon, United States Government, *Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866* (February 2010) (“2010 Estimate”).

<sup>5</sup> Interagency Working Group on Social Cost of Carbon, United States Government, *Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866* (May 2013; revised Nov. 2013) (“2013 Estimate”).

September 4, 2013, a group of trade associations, including many of the undersigned parties, submitted a Petition for Correction of the 2010 and 2013 Estimates pursuant to the Information Quality Act<sup>7</sup> (“IQA”) requesting that the Technical Support Documents (“TSD”) and SCC Estimates be withdrawn and not used in rulemaking and policymaking for a variety of reasons further explained herein.<sup>8</sup> Importantly, while OMB responded to that IQA Petition the evening of January 24, 2014, OMB’s response merely defended the TSD through text borrowed from the TSD, provided no additional details about the interagency processes that developed the TSD or the SCC Estimates, declined to withdraw the TSD or SCC Estimates, or prohibit their use in rulemaking.<sup>9</sup> Accordingly, the Associations request OMB reconsider its response to this IQA petition and continue to urge OMB to withdraw and instruct federal agencies to cease the rulemaking and policymaking uses of the SCC Estimates and TSDs for the following reasons:

1. The SCC Estimates fail in terms of process and transparency. The SCC Estimates fail to comply with Office of Management and Budget (“OMB”) guidance for developing influential policy-relevant information under the IQA. The SCC Estimates are the product of a “black box” process and any claims to their supposed accuracy (and therefore, usefulness in policymaking) are unsupported.
2. The models with inputs (hereafter referred to as “the modeling systems”) used for the SCC Estimates and the subsequent analyses were not subject to peer review.
3. Even if the process used to develop the SCC Estimates was transparent, rigorous, and peer-reviewed, the modeling conducted in this effort does not offer a reasonably acceptable range of accuracy for use in policymaking.
4. The Interagency Working Group (“IWG”) has failed to disclose and quantify key uncertainties to inform decision makers and the public about the effects and uncertainties of alternative regulatory actions as required by OMB.
5. By presenting only global SCC estimates and downplaying domestic SCC estimates in 2010 and 2013, the IWG has severely limited the utility of the SCC for use in cost-analysis and policymaking.
6. The IWG must (i) supplement the record to provide all of the data, models, assumptions and analyses relied on to arrive at the SCC Estimates, and (ii) allow the public a reasonable opportunity to review and comment on the supplemented record.

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<sup>6</sup> See Howard Shelanski, Administrator of the Office of Information and Regulatory Affairs at the Office of Management and Budget, *Refining Estimates of the Social Cost of Carbon* (Nov. 1, 2013) (available at [www.whitehouse.gov/blog/2013/11/01/refining-estimates-social-cost-carbon](http://www.whitehouse.gov/blog/2013/11/01/refining-estimates-social-cost-carbon)) (“November 2013 Revision”).

<sup>7</sup> P.L. 106-554, §515, 144 Stat. 2763 (2001).

<sup>8</sup> The November 2013 Revision contained no substantive analytical changes. As such, the comments detailed regarding the February 2010 and May 2013 Estimate herein and in the Associations’ IQA Petition apply with equal force to the most recent SCC Estimate issued in November 2013.

<sup>9</sup> 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”).

Importantly, that OMB is now providing a mechanism for public comment does not make OMB's SCC estimation effort transparent or the process collaborative.<sup>10</sup> Despite repeated requests from Congress, the Associations, and many other individuals and organizations, OMB has not made available to the public all of the information necessary to allow the public and regulated community to evaluate the SCC Estimates. By not providing any information on the policy decisions, inputs, and assumptions that underpin the SCC Estimates, OMB's "request for comments" is meaningless. By withholding this information from the public, OMB deprives the IWG and this Administration of the benefit of outside input on the validity of the critical decisions, inputs, and assumptions that form the basis of the SCC Estimates. Providing an opportunity to comment, but then denying or withholding access to the data necessary to inform such comments, may be designed to give a superficial appearance of transparency and collaboration, but, in reality, merely perpetuates an impermissibly opaque process.<sup>11</sup> Instead of including the critical inputs and assumptions that serve as the basis for the SCC Estimates in the rulemaking docket or other public forum, some of the undersigned Associations have been compelled to seek these necessary documents through the Freedom of Information Act ("FOIA"). While some of the participating agencies have provided partial, and heavily redacted responses to the FOIA requests, many of the participating agencies unlawfully have refused to respond to these requests at all.<sup>12</sup> The record should remain open until these agencies have complied with the law and produced these documents.

That the Environmental Protection Agency ("EPA") and Department of Energy ("DOE") are proceeding to utilize the SCC Estimates<sup>13</sup> without even waiting for the comment period to close on the docket for such estimates confirms the tangible harm to the Associations' members

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<sup>10</sup> For example, several regulatory actions and proposals have been issued prior to OMB seeking public comment on the SCC Estimates, yet none have been retracted pending receipt and review of the comments sought here. *See, e.g.*, 78 Fed. Reg. 79,419 (Dec. 30, 2013) (U.S. DOE, *Energy Conservation Program for Consumer Products and Commercial and Industrial Equipment: Effect of Revised Estimates of the Social Cost of Carbon*). Critically, DOE even finalized one rule that relied on the SCC without awaiting the consummation of this rulemaking (metal halide lamps (78 Fed. Reg. 7,746)). EPA has identified 19 rulemakings since 2009 that utilized federal SCC Estimates. *See* Letter dated January 16, 2014, from Joel Beauvais, EPA Associate Administrator, Office of Policy, to Senator David Vitter (Table 1).

<sup>11</sup> To be able to meaningfully comment on the SCC Estimates, the public record must be supplemented with, at a minimum: (i) the specific versions of the IAMs upon which the government relied to generate the SCC Estimates (including the source codes for the models); (ii) the inputs and assumptions used in the model runs upon which the government relied to generate the SCC Estimates (including, but not limited to, assumptions on discounting, equilibrium climate sensitivity, and socio-economic variables); (iii) the results of any modeling runs or scenarios generated by the IAMs upon which the government relied; (iv) technical analyses regarding the government's decision on how it averaged the results of the IAM model runs; and (v) any analyses conducted by and conclusions reached by the government regarding the uncertainties associated with each of the IAMs and calculating the SCC Estimates. Without this information in the record, the public does not have a meaningful opportunity to understand, evaluate and comment upon the SCC Estimates

<sup>12</sup> 5 U.S.C. §552(a)(6).

<sup>13</sup> 78 Fed. Reg. 79,419 (Dec. 30, 2013); *See* Regulatory Impact Analysis for the Proposed Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources: Electric Utility Generating Units (EPA-452/R-13-003 (Sept. 2013)).

and unambiguously confirms that OMB does not intend to use the public comment process as a means of updating and improving its SCC Estimates or to obtain the best available information.

Although the Associations are concerned that OMB is simply replacing the IWG's "black box" analysis with its own opaque process, the importance of this issue compels us to provide input to the best of our abilities using the limited (and inadequate) information made available to the Associations. As such, the Associations reiterate that, given the significant issues described herein, the SCC Estimates and Technical Support Documents should be withdrawn, pending correction through a transparent, public process.<sup>14</sup> Further, we request OMB not to utilize, and to direct publicly other executive branch agencies not to utilize, the SCC Estimates for any regulatory action or policymaking.

## **I. BACKGROUND**

In June 2013, the IWG released the revised TSD on SCC recommended for use in Regulatory Impact Analysis ("RIA"). In the revised TSD, the IWG continued to express the SCC as the dollars/ton of monetized damages associated with an incremental increase in carbon emissions in a given year. The IWG used the same basic methodology that it used in 2010 to estimate the SCC figures. As per the 2010 TSD, the SCC values were estimated using the average results from the same three integrated assessment models at the same discount rates – 2.5%, 3%, and 5% – and a fourth value using the 95<sup>th</sup> percentile estimate at the 3% discount rate. The IWG used the same five climate change scenarios utilized in 2010. The IWG indicated the only changes that altered the SCC values were the new versions and runs of the three assessment models.

For example, the new SCC values estimated for 2020 in 2007 dollars were \$12, \$43, \$65, and \$129 for the 5%, 3%, 2.5%, and 95<sup>th</sup> percentile of the 3% discount rates, respectively. By comparison, the SCC values in the 2010 TSD for 2020 were \$7, \$26, \$42, and \$81, respectively (all in 2007 dollars). At the key discount rate of 3% (considered the central value), the new SCC

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<sup>14</sup> Such a process is mandated by Executive Order 13563, January 18, 2011, which states:

Sec. 2. Public Participation. (a) Regulations shall be adopted through a process that involves public participation. To that end, regulations shall be based, to the extent feasible and consistent with law, on the open exchange of information and perspectives among State, local, and tribal officials, experts in relevant disciplines, affected stakeholders in the private sector, and the public as a whole.

(b) To promote that open exchange, each agency, consistent with Executive Order 12866 and other applicable legal requirements, shall endeavor to provide the public with an opportunity to participate in the regulatory process. To the extent feasible and permitted by law, each agency shall afford the public a meaningful opportunity to comment through the Internet on any proposed regulation, with a comment period that should generally be at least 60 days. To the extent feasible and permitted by law, each agency shall also provide, for both proposed and final rules, timely online access to the rulemaking docket on regulations.gov, including relevant scientific and technical findings, in an open format that can be easily searched and downloaded. For proposed rules, such access shall include, to the extent feasible and permitted by law, an opportunity for public comment on all pertinent parts of the rulemaking docket, including relevant scientific and technical findings.

Estimate of \$43 is approximately 65% higher than the 2010 value. By comparison, in 2009, the IWG estimated a central value of \$19 and, in 2008, the U.S. Department of Transportation (“DOT”) estimated a central value of \$7.<sup>15</sup> Thus, in a span of five years, the central SCC Estimate to be used in regulation has changed multiple times and increased 600 percent.

The size and frequency of these increases to IWG’s SCC Estimates call into question the accuracy and reliability of the IWG’s most recent estimate (the third proffered in 2013 alone), and further indicate that the process and models through which the estimates were generated were either flawed or unsuitable for generating estimates that reasonably could inform important regulatory and policy decisions. As discussed further below, the first step in addressing these potential flaws and suitability issues is for OMB and IWG to shed light on these processes, allow for an informed and transparent discussion, and present IWG’s estimates as accurately as possible.

## **II. INFORMATION QUALITY ACT GUIDELINES**

The process for generating the SCC Estimates violates the IQA. The IQA requires federal agencies to take steps to maximize the quality, objectivity, and integrity of the information they disseminate, and to provide a mode of redress to correct flawed or incomplete information. Consistent with its directive to other agencies and entities, OMB developed its own guidelines (“IQA Guidelines”) that require that the information it disseminates meets standards for objectivity, utility, and integrity.<sup>16</sup> The “objectivity standard” focuses on whether the information is “accurate, reliable, and unbiased and whether the information is presented in an accurate, clear, complete, and unbiased manner.”<sup>17</sup> The “integrity standard” refers to information security, such as protection of information from unauthorized access or revision, while the “utility standard” refers to the usefulness of the information for the intended audience’s anticipated purposes.<sup>18</sup>

OMB’s Guidelines require it to maximize the quality of disseminated information that it classifies as influential. “Influential information” generally refers to information that “will have a clear and substantial impact on important public policies or important private sector decisions.”<sup>19</sup> Without question, the SCC Estimates, upon which a number of agencies already have based regulations and which numerous agencies may base billions, if not trillions, of dollars of regulation, are “influential information” that has had and will have a clear and substantial impact on important public policies and important private sector decisions.<sup>20</sup>

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<sup>15</sup> 2010 TSD at 4.

<sup>16</sup> Office of Management and Budget, *Information Quality Guidelines* (Oct. 1, 2002).

<sup>17</sup> *Id.* at 8.

<sup>18</sup> *Id.* at 1.

<sup>19</sup> *Id.* at 8.

<sup>20</sup> *Id.*

Further, under OMB Guidelines, such influential information must meet a higher level of “transparency.”<sup>21</sup> According to OMB, transparency requires that its findings be reproducible, within an acceptable range of imprecision, by third parties.<sup>22</sup> Influential information must also be transparent with respect to: (1) the source of the utilized data; (2) the various assumptions employed; (3) the analytic methods applied; and (4) the statistical assumptions employed.<sup>23</sup> All these transparency elements are important considerations in any objective, third-party review and analysis of Agency information.

OMB imposes these guidelines on itself as well as on the information on which it relies. It requires OMB staff, and the working groups it oversees, to acquire relevant information by acceptable and unbiased methods.<sup>24</sup> Further, information collected must generally display indicia of reliability such as being subjected to peer review or being founded on transparent and reproducible methods.

OMB’s obligations under the IQA are significant, requiring OMB to issue government-wide guidelines that “provide policy and procedural guidance to Federal agencies for ensuring and maximizing the quality, objectivity, utility, and integrity of information (including statistical information) disseminated by Federal agencies.” These obligations were put in place by Congress and are supported by an Administration-wide effort to make informed and transparent decisions based on sound science.<sup>25</sup> The IQA guidelines, peer review guidelines, and internal protocols that OMB uses are intended to ensure the Administration’s disseminations are objective, unbiased, and robust. Importantly, OMB, as the entity that developed and oversees the IQA’s guidelines to federal agencies, has a profound and unique interest in ensuring those guidelines are followed to the greatest extent possible in its own regulatory decision making. As detailed below, the development of the SCC Estimates failed to follow these OMB guidelines.

### **III. THE SCC ESTIMATES ARE THE PRODUCT OF A FUNDAMENTALLY FLAWED AND IMPERMISSIBLY OPAQUE PROCESS**

The SCC Estimates represent specific monetary values per metric ton of CO<sub>2</sub> intended to be used in regulatory impact analyses required under Executive Order 12866 to estimate the costs and benefits of major federal regulations.<sup>26</sup> These values, developed by the IWG, reflect an incredibly broad range that corresponds to different assumed discount rates that purport to translate estimated future dollar damages from current emissions into a present value. These estimates are derived from values obtained from computer models, known as the Integrated

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<sup>21</sup> *Id.* at 2.

<sup>22</sup> *Id.*

<sup>23</sup> 67 Fed. Reg. 369, 374 (Jan. 3, 2002).

<sup>24</sup> *Id.* at 23.

<sup>25</sup> See President Obama’s Memorandum for the Heads of Executive Departments and Agencies: Transparency and Open Government (74 Fed. Reg. 4685 (Jan. 21, 2009)) (“My Administration is committed to creating an unprecedented level of openness in Government.”); see also President Obama’s Memorandum for the Heads of Executive Departments and Agencies: Scientific Integrity. (“Science and scientific processes must inform and guide decisions of my Administration on a wide range of issues.”).

<sup>26</sup> Neither the TSDs nor the SCC Estimates attempt to monetize costs of methane emissions. See 2010 TSD.

Assessment Models (“IAMs”), that, in short, purport to represent the linkage from (1) greenhouse gas emissions, to (2) global temperature changes, to (3) the “climate change impacts” projected to result from these temperature changes, to (4) the monetized economic damages of these effects. The 2010 and 2013 SCC Estimates were derived by inputting a set of undisclosed assumptions developed by the IWG into three particular IAMs selected by the IWG from a wider class of IAMs: DICE (Dynamic Integrated model of Climate and Economy), FUND (Framework Uncertainty, Negotiation and Distribution), and PAGE (Policy Analysis for the Greenhouse Effect).<sup>27</sup>

The process of selecting the models and input assumptions, including much of the basic information underlying these decisions, has been insulated from public scrutiny. The resulting SCC Estimates are a product of this fundamentally flawed process that failed to comply with basic IQA requirements designed to enhance and ensure the credibility of data used to make critical regulatory decisions.<sup>28</sup> These flaws are discussed in detail below.

#### **A. The IWG Estimation Process Was Not Transparent**

In his March 9, 2009, “Memorandum for the Heads of Executive Departments and Agencies” on “Scientific Integrity” (“Scientific Integrity Memo”), President Obama called on his Administration to commit to procedures and a code of conduct that ensures scientific integrity and builds public trust. President Obama’s opening line of that memorandum could not be more relevant and directly applicable to the SCC Estimates and the processes which underlie them:

Science and the scientific process must inform and guide decisions of my Administration on a wide range of issues, including improvement of public health, protection of the environment, increased efficiency in the use of energy and other resources, mitigation, and protection of national security. The public must be able to trust the science and the scientific process informing public policy decisions.

In furtherance of these important goals, President Obama instructed “[t]o the extent permitted by law, there should be transparency in the preparation, identification, and use of scientific and technological information in policymaking.” The requirement of transparency is at the core of

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<sup>27</sup> DICE (W. Nordhaus, Yale University), PAGE (C. Hope, University of Cambridge UK), and FUND (R. Tol, Ireland Economic and Social Institute and Carnegie Mellon University).

<sup>28</sup> In addition to the procedural flaws discussed in detail below, the SCC Estimate itself is contrary in significant ways to OMB’s own guidance on conducting cost-benefit calculations intended to guide regulatory agency decision makers. See OMB Circular A-4, “Regulatory Analysis” (Sept. 2003) (as amended) (“OMB Circular A-4”). For example, cost-benefit normally applies to specific decisions relating to individual rulemakings. OMB Circular A-4 states that a good regulatory analysis cannot be formulaic. *Id.* at 2, ¶5. Yet the SCC Estimate provides a formulaic result – developed in isolation – that is intended to be applied to any regulatory action addressing carbon emissions. It is necessary only to plug in the proper cost number and calculate benefits for any planned regulatory actions. The SCC Estimate similarly ignores Circular A-4’s requirement that costs and benefits must be evaluated and compared to each other. The SCC Estimate is based entirely on the projected benefit of avoiding each ton of carbon that is modeled to cause damage at some point in the future. Further concerns with OMB’s compliance with Circular A-4 are discussed in subsequent sections of these Comments.



the OMB's IQA reproducibility standards mandated for "influential information" such as the SCC Estimates.

Under OMB's IQA Guidelines, "influential information" must meet a higher level of "transparency."<sup>29</sup> According to OMB, transparency requires that the OMB/IWG findings be reproducible, within an acceptable range of imprecision, by third parties.<sup>30</sup> Influential information must be transparent with respect to: (1) the source of the utilized data; (2) the various assumptions employed; (3) the analytic methods applied; and (4) the statistical assumptions employed. All of these elements of transparency are important considerations in any objective, third-party critical review and analysis of the SCC Estimate.<sup>31</sup>

According to OMB in the IQA Rule:

[T]he primary benefit of public transparency is not necessarily that errors in analytic results will be detected, although error correction is clearly valuable. The more important benefit of transparency is that the public will be able to assess how much an agency's analytic results hinge on the specific analytic choices made by the agency. Concreteness about analytic choices allows, for example, the implications of alternative technical choices to be readily assessed. This type of sensitivity analysis is widely regarded as an essential feature of high-quality analysis, yet sensitivity analysis cannot be undertaken by outside parties unless a high degree of transparency is achieved.<sup>32</sup>

OMB, as the disseminator of the SCC Estimates, and the overseer of the IWG, has a duty to ensure the transparency of the IWG estimation process. That duty has not been met. The public knows nothing about the IWG other than the identity of the agencies and entities that make up the group and the fact that this group of unspecified officials provided three substantially different SCC estimates in the period between 2010 and 2013.

OMB has not revealed the identity of the IWG participants or any information from which to make an assessment as to their expertise or qualification to participate in a group tasked to estimate the SCC. According to OMB Circular A-4's directive to agencies (presumably applicable also to OMB): "You should also disclose the use of outside consultants, their qualifications, and history of contracts and employment . . . ."<sup>33</sup> The public does not even know whether all the IWG's listed agencies and entities provided personnel or what levels of engagement each of the agencies actually had in the development of the SCC Estimates. The public does not know whether or how government contractors were used in the development process. Further, OMB has not revealed how these unidentified individuals collaborated. The public does not know whether, or how often, they met, what was discussed, what information

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<sup>29</sup> OMB IQA Guidelines at 2.

<sup>30</sup> 67 Fed. Reg. at 378.

<sup>31</sup> 67 Fed. Reg. at 374.

<sup>32</sup> 67 Fed. Reg. at 374.

<sup>33</sup> OMB Circular A-4 at 17.

was considered, what information was rejected, or how decisions were made. This information must be made available so that the public can conduct a critical review.

For sake of perspective, consider EPA's recent efforts to evaluate whether the Agency can quantify with sufficient accuracy the "economy-wide" impacts of its air regulations.<sup>34</sup> Unlike OMB's SCC Estimates, which attempt to monetize global impacts of U.S. emissions of a ubiquitous substance centuries into the future, EPA's efforts are far more modest because the Agency is only attempting to consider: (1) domestic costs; (2) of traditional pollutants with more direct "dose-response" functions; (3) emitted by far fewer industrial sources; (4) within discrete timeframes.

Even still, EPA claims its effort presents "serious technical challenges . . ."<sup>35</sup> To address these challenges, EPA presented the issue to the independent Science Advisory Board ("SAB") and provided public notice in the Federal Register. EPA published detailed draft charge questions it would present to the SAB and a similarly detailed analytical blueprint and list of materials for the SAB to consider. Importantly, EPA provided public notice of the provision of all these materials and is seeking comment on them.

In undertaking the far more complex and ambitious task of estimating the SCC, OMB undertook a conspicuously different approach. OMB tasked its effort to the IWG without any public notification. OMB never published nor took comment on its charge questions to the IWG, or the analytical blueprint or materials it requested the IWG consider. The public only learned of the IWG, its important role within the Federal government, and its SCC estimates when they were referenced in an efficiency standard for microwave ovens.

The SAB also operates in a starkly different manner than the IWG. The SAB provides notice of its meetings, as well as opportunities to observe and participate. The SAB's advisories and consultations with EPA are published, as are EPA's responses to such. The SAB discloses its members, provides detailed biographies of each members' affiliation and expertise, publishes criteria for participation in the SAB, and offers the public an opportunity to nominate members.

The IWG, on the other hand, provides no notice of its meetings (before or after they occur), and the public has no opportunity to observe, participate in, review minutes, communications, or even summaries of such. The IWG's interaction and consultation with OMB is unknown, and no records of charges or instructions are made available. The IWG's members are secret, as are the means by which they are selected. Their expertise are entirely unknown. All that is known about IWG members are the identities of the federal entities on whose behalf they participate. It is not even known whether they are Federal employees, contractors, or third parties.

While EPA and SAB processes are by no means perfect, and the Associations may well disagree with their outcomes, the contrast between the transparency and engagement in EPA's

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<sup>34</sup> 79 Fed. Reg. 6899 (Feb. 5, 2014).

<sup>35</sup> *Id.* at 6900.

“economy-wide modeling effort,” and the opacity of OMB’s “global” modeling effort is both striking and disturbing. OMB has failed to comply with the transparency policies that it promulgated for developing influential policy-relevant information under the IQA and imposes on other agencies and executive offices. The SCC Estimates are the product of an opaque process, riddled with uncertainties. Any claims to their supposed accuracy (and, therefore, usefulness in policymaking) are unsupported. None of these failures in transparency has been remedied by allowing for after-the-fact comment on the SCC Estimates. As noted above, without access to the fundamental information underlying the SCC Estimates necessary to formulate comments and some indication that OMB actually will consider comments, OMB’s solicitation provides only the impression of transparency.

**B. The Modeling Systems (Models With Inputs) And Subsequent Analyses Were Not Subject To Peer Review**

OMB and the IWG masked the inherent flaws and limitations of the SCC Estimates by not exposing the modeling systems, inputs, and results (the SCC Estimates) to peer review. As OMB’s Final Information Quality Bulletin for Peer Review (“Peer Review Bulletin”) states, “[p]eer review is one of the most important procedures to ensure that the quality of published information meets the standards of the scientific and technical community.”<sup>36</sup> Further, President Obama’s 2009 Scientific Integrity Memorandum states that “[w]hen scientific or technical information is considered in policy decisions, the information should be subject to well established scientific processes, including peer review . . . .”

OMB’s IQA Guidelines recognize the critical importance of peer review in government decision-making, and point to the existence of peer review as providing a presumption of objectivity.<sup>37</sup> Similarly, EPA, which already has relied upon the SCC Estimates, recognizes that the hallmark of scientific integrity is a robust and independent peer review process.<sup>38</sup> According to EPA guidance,

[p]eer review is conducted by qualified individuals (or organizations) who are independent of those who performed the work, and who are collectively equivalent in technical expertise (*i.e.*, peers) to those who performed the original work. Peer review is conducted to ensure that activities are technically supportable, competently performed, properly documented, and consistent with established quality criteria.<sup>39</sup>

Further, EPA has recognized in its peer-review guidance that, particularly when reviewing influential findings such as the SCC Estimates, a peer reviewer must be independent to be

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<sup>36</sup> Memorandum for Heads of Departments and Agencies from Josh B. Bolton, Director, OMB “Issuance of OMB’s ‘Final Information Quality Bulletin for Peer Review’” at 2 (Dec. 16, 2004).

<sup>37</sup> 67 Fed. Reg. at 377.

<sup>38</sup> *Peer Review Handbook, 3<sup>rd</sup> Edition, Prepared for the U.S. Environmental Protection Agency by Members of the Peer Review Advisory Group for EPA’s Science Policy Council, EPA/100/B-06/002.*

<sup>39</sup> *Id.* at 12.

credible, defensible, and unbiased.<sup>40</sup> Indeed, peer review and adherence to sound scientific methods are required by EPA's guidelines implementing the IQA.<sup>41</sup>

Despite the fact that OMB's IQA Rule and Guidelines, as well as its Peer Review Bulletin, recognize the critical need for peer review in administrative decision-making, neither OMB nor the IWG subjected the final SCC Estimates, or their key foundations, to peer review. This failure is a critical flaw and undermines the credibility of the SCC Estimates.

That the IWG utilized models that generally may be available to the public does not sufficiently demystify the IWG selection process. There is no evidence, for example, of how the IWG addressed, if at all, the limitations of each of the selected models. The class of models known as IAMs are continuously changing and evolving. While such models attempt to predict the near and far future, they all rely on numerous assumptions – including many that are decades old, and others that simply cannot be calibrated or verified. Yet, one of the models used claims to have the capacity to predict climate impacts through the year 2595. Further, it is not clear if or how modest changes to the inputs to the FUND, DICE, and PAGE models could drastically change the SCC Estimates (*i.e.*, the sensitivity of inputs to model outcomes is not transparent). Without access to information regarding the hundreds of model inputs (or the people or processes that selected them, or developed them, or both), and their sensitivities, expertise, or biases, it is impossible to call the SCC Estimates rational or supportable. Indeed, in an analysis focused on the “damage function” component of the SCC Estimates (a source of substantial uncertainties in the models, as discussed further below), the authors admit that “the range of possible parameters leads to enormous differences in estimated [SCC] values.”<sup>42</sup> The process of selecting these input parameters must be subject to transparency and peer review.

On July 18, 2013, Administrator Howard Shelanski of OMB's Office of Information and Regulatory Affairs (“OIRA”) suggested in testimony before the House Committee on Oversight and Government Reform Subcommittee on Energy Policy, Healthcare, and Entitlements that peer review of the IWG decisions was unnecessary because the FUND, DICE, and PAGE models all were subjected to their own peer review.<sup>43</sup> This suggestion is incorrect, or at least misleading, for several reasons. The SCC Estimates are not just the product of the models (flawed or limited as they may be). Rather, the SCC Estimates are the product of the data, and the policy choices that were inherent in the model input data selection. Other than for a few of

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<sup>40</sup> *Id.* at 13.

<sup>41</sup> *Guidelines for Ensuring and Maximizing the Quality, Objectivity, Utility, and Integrity of Information Disseminated by the Environmental Protection Agency*, EPA/260R-02-008 (Oct. 2002).

<sup>42</sup> NERA Economic Consulting, “A Review of the Damage Functions Used in Estimating the Social Cost of Carbon” at 17 (Jan. 2014) (“*Damage Function Report*”) (attached).

<sup>43</sup> OMB now provides a bit more nuance that the models may not have actually been reviewed by peers, but rather than they were made available for peer review because they “were published in peer reviewed journals.” (OMB IQA Response at 3-4). However, when publishing the IQA Guidelines, OMB found that the effectiveness of “journal peer review” was “overstated,” cited to instances where flawed science was published in respected journals, and ultimately concluded that “[f]or information likely to have an important public policy or private sector impact, OMB believes that additional quality checks beyond peer review are appropriate.” (67 Fed. Reg. at 8455)

the hundreds of variables that comprise the input data set for the three models used, most members of the public, other than those allowed access by the participating executive branch agencies, have no idea of what the inputs underlying the SCC Estimates were or how they were determined. This critical “black box” encompasses not only the deterministic inputs (*i.e.*, assumed values for those inputs held constant), but also, importantly, the stochastic inputs (*i.e.*, those inputs that were selected to be variable) that supported the Monte Carlo analysis.<sup>44</sup> Model inputs, and the judgments, principles, and processes that generated those inputs, are critical to the model output. As the developer of the FUND model prominently and candidly acknowledges on the model’s website:

It is the developer’s firm belief that most researchers should be locked away in an ivory tower. Models are often quite useless in unexperienced hands, and sometimes misleading. No one is smart enough to master in a short period what took someone else years to develop. Not-understood models are irrelevant, half-understood models treacherous, and mis-understood models dangerous.<sup>45</sup>

The SCC Estimates are as much a product of the inputs to the models as they are the product of the models themselves. Stated plainly, if unreliable or questionable data are entered into the models, there is no basis for concluding that reliable estimates would result. The inputs that drive the SCC Estimates (and the input selection criteria) were never peer reviewed – nor are the majority of them even known. Further, the final estimates (*i.e.*, the products of these opaque models and inputs) were never peer reviewed. That is critical, as the output of the models was manipulated further by the IWG through averaging that may be inappropriate and misleading (*see infra* §V.A). That versions of the models were made available for peer review during the model development process, or utilized in papers that were themselves peer reviewed, is necessary and important, but not sufficient. OMB and the IWG must subject the current SCC Estimates, and the decisions that generated those values, to peer review. Nor does accepting comments on the IWG’s conclusions, without providing commenters with the underlying information necessary for credible evaluation, provide a substitute for peer review. OMB’s suggestion to the contrary in the OMB IQA Response<sup>46</sup> is without merit. Indeed, these actions reinforce the need to conduct peer review on all subsequent model changes and inputs, which alter the estimates coming out of the models. After all, ***the May 2013 SCC Estimate is 60 percent higher than the one developed just three years ago and required further amendment within six months.*** Unfortunately, OMB and the IWG have sheltered and insulated the model choice criteria, data inputs, and analyses from outside scrutiny and peer review – and continue to do so in the present “request for comments.”

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<sup>44</sup> Consider, for instance, the selection of discount rates for one of the few model inputs that was disclosed. If a discount rate of 7% were utilized, (as mandated by OMB Circular A-4 (at 12)), the SCC Estimates would be closer to zero and potentially even demonstrate benefits. We raise this issue, not to advocate for a particular discount rate, but to highlight that even a single model input of the hundreds can materially affect the outcomes of the models.

<sup>45</sup> Available at [www.fund-model.org](http://www.fund-model.org) (accessed Jan. 9, 2014).

<sup>46</sup> OMB IQA Response at 4.

The SCC Estimates/TSD are precisely the type of influential scientific information that OMB envisioned in its Final Information Quality Bulletin for Peer Review when it stated “[m]ore rigorous peer review is necessary for information that is based on novel methods or presents complex challenges for interpretation. Furthermore, the need for rigorous peer review is greater when the information contains precedent-setting methods or models, presents conclusions that are likely to change prevailing practices, or is likely to affect policy.”<sup>47</sup> Importantly, the Final Information Quality Bulletin for Peer Review and the IQA under which they were promulgated characterize these as the “*minimum standards* for when peer review is required for scientific information . . .”<sup>48</sup>

**C. Selection Of The Discount Rates Used To Estimate The SCC Violated OMB Requirements And Should Be An Open Process**

The choice of the discount rate arguably is the most significant factor in derivation of the SCC Estimates. Depending on the discount rate selected (as noted above and *infra* §IV.A), there is substantial variation in the amount of damages calculated and, hence, the SCC Estimate that ultimately is derived. In short, the higher the discount rate used, the lower the future predicted damage impacts. The IPCC 4th Assessment report confirms the critical nature of the discount rate used to estimate the SCC:

Notwithstanding the differences in damage sensitivity to temperature..., the effect of the discount rate on estimates of SCC is most striking. The 90th percentile SCC, for instance, is US\$62/tC for a 3% pure rate of time preference, \$165/tC for 1% and \$1,610/tC for 0%. Stern (2007) calculated, on the basis of damage calculations, a mean estimate of the SCC in 2006 of US\$85 per tonne of CO<sub>2</sub> (US\$310 per tonne of carbon)... Other estimates of the SCC run from less than US\$1 per tonne to over US\$1,500 per tonne of carbon. Downing et al. (2005) argued that this range reflects uncertainties in climate and impacts, coverage of sectors and extremes, and choices of decision variables.

The IWG recognized in the 2010 TSD that “the interagency group has been keenly aware of the deeply normative dimensions of both the debate over discounting in the intergenerational context and the consequences of selecting one discount rate over another.”<sup>49</sup> Despite the criticality of the discount rate to the SCC estimation process, OMB has failed to subject the IWG’s selection of the discount rate to peer review.

Moreover, in selecting the discount rates used for the SCC Estimates, OMB disregarded explicit instructions from Congress, embodied in the Regulatory Right to Know Act, intended to guide the cost-benefit analysis of federal regulations. The Regulatory Right to Know Act requires OMB to issue standardized guidelines to federal agencies on the measurement of costs

<sup>47</sup> *Final Information Quality Bulletin for Peer Review* at 12.

<sup>48</sup> *Id.* at 7 (emphasis added).

<sup>49</sup> 2010 TSD at 19.

and benefits. These guidelines are to be subjected to external peer review. Circular A-4 represents the current version of these guidelines and includes a discussion of the best practices to be used for applying discount rates to future benefits and costs:

As a default position, OMB Circular A-94 states that a real discount rate of 7 percent should be used as a base-case for regulatory analysis. 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 whenever the main effect of a regulation is to displace or alter the use of capital in the private sector. 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 assumption.<sup>50</sup>

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.<sup>51</sup>

By selecting discount rates lower than prescribed by current OMB guidelines, and failing to subject the change in discount rates to the external peer review process, OMB has failed to follow the procedures mandated by Congress in the Regulatory Right to Know Act.

These comments do not advocate for use of a particular discount rate. Rather, consistent with the emphasis throughout these comments on process, the Associations similarly urge OMB and the federal government generally to pursue an open process – with full disclosure of information and how various factors and considerations are weighed – regarding the selection of an appropriate discount rate for use in development of the SCC Estimates. As Cass Sunstein, former head of OIRA/OMB, recently remarked:

Reconsideration of existing judgments must be subjected to a demanding and time-consuming process of internal review (and potentially to external review as well). Institutional constraints, including the need to obtain consensus, can

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<sup>50</sup> OMB Circular A-4 at 33 (emphasis added).

<sup>51</sup> *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),” a scenario that is not primarily implicated with respect to the SCC.

impose obstacles to efforts to rethink existing practices, especially in an area like discounting, which is at once technical and highly controversial.<sup>52</sup>

Mr. Sunstein argues for caution in revisiting the discount rates used by the IWG for the SCC Estimates. The need for such caution is appropriate, but also underscores the importance of subjecting departures from existing federal guidelines to proper scrutiny and an open and transparent process. In departing from the discount rates prescribed by Circular A-4, the IWG and OMB process should and must be subjected to public comment and peer review to allow proper vetting of the choice of this “technical and highly controversial” factor.

#### **IV. THE BROAD RANGE OF SCC ESTIMATES GENERATED BY THE COMPUTER MODELING SYSTEMS MAKES THEM UNSUITABLE FOR USE IN RULEMAKING AND POLICY DECISIONS**

Predicting the future in terms of impacts stemming from the emission of GHGs, as one might expect, is a massively imprecise exercise reliant on assumptions, hypotheses, and judgments about future technological advances, principles, and decisions that directly impact emissions scenarios, mitigation, and adaptation. While the undersigned Associations support the use of economic modeling, there are limits to the effectiveness of certain modeling techniques. For 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, OMB and the IWG cannot push prognostications so far beyond the capabilities of current science and economic modeling that the estimates become little more than guesswork. 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 unusable. Even the Intergovernmental Panel on Climate Change (“IPCC”) limits its future climate predictions and presents a range of possible scenarios (*see infra* §IV.B).

In the OMB IQA Response, OMB seems to acknowledge 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.”<sup>53</sup> OMB further stated that, “[i]t is not clear to us, however, how the SCC estimates would be near such a threshold.”<sup>54</sup> While the Associations welcome OMB’s acknowledgement that a threshold exists where quantitative estimates become unworkable, we do not share OMB’s view that impacts predicted in 2300 are not yet “near such a threshold.”

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<sup>52</sup> Sunstein, Cass, “On Not Revisiting Official Discount Rates: Institutional Inertia and the Social Cost of Carbon” (2014) (draft) (forthcoming in *American Economic Review: Papers and Proceedings*).

<sup>53</sup> OMB IQA Response at 4.

<sup>54</sup> *Id.*



Significantly, the 2010 TSD appears to be somewhat in agreement with the Associations on this point. After noting extensively the “uncertainty, speculation, and lack of information” on key inputs necessary to estimate the SCC, the TSD disclaims that “[t]he purpose of the SCC estimates presented here is to make it possible for agencies to incorporate the social benefits from reducing carbon dioxide emissions into cost-benefit analysis of regulatory actions that have small, or ‘marginal,’ impacts on cumulative global emissions.”<sup>55</sup> Again, the Associations do not endorse the notion that the SCC Estimates are useful for even “marginal” regulatory actions, but we concur with the 2010 TSD’s apparent conclusion that the SCC Estimates have limited utility in rulemaking. To the extent that the OMB IQA response is articulating OMB’s new position that these highly uncertain SCC Estimates have broad utility in all types of regulatory decisions, the Associations urge OMB to either reconsider, or provide some support in the record, for this new conclusion.

Further, that the 2013 SCC Estimates increased by 60 percent from the previous estimate developed only a few years prior (and, once again, within six months of publication) using the same set of models demonstrates that this exercise is massively uncertain and not sufficiently robust for policymaking. That degree of variability over the short term (2010-2013) should give OMB and the IWG pause and a heightened concern that estimating the SCC with a level of accuracy suitable for policymaking is perhaps beyond the capabilities of the model systems utilized.

Importantly, a subset of the Associations made a similar point in their IQA petition (before the SCC Estimate changed for the second time in 2013), to which OMB responded that this variability was a “reflection of the rapid pace of ongoing research on a topic of profound interest to the scientific community . . . and that rapidly evolving scientific understanding makes it more important, not less, to review and update the estimates on a periodic basis.”<sup>56</sup> The Associations believe that OMB misinterpreted the nature of our concern over the degree of “variability over the short term.” We fully agree that scientific understanding of these issues is “rapidly evolving” and changing based on “the rapid pace of ongoing research,” but we do not understand why OMB fails to view these frequent and fundamental changes in scientific understanding as evidence that the estimates are highly uncertain. If the scientific understanding is in flux, then the conclusions derived from that scientific understanding are *per se* uncertain.

#### **A. Model(s) Structure And Damage Functions**

OMB and the IWG rely on three models which purport to predict the ultimate costs of a long chain of impacts stemming from the emission of GHGs (*i.e.*, the impact of temperature on sea-level rise, the impact of sea-level rise on waterside cities, the monetization of the impacts on waterside cities, *etc.*). These models have a similar “stacked” structure, shown in the figure below.<sup>57</sup> These models do not provide a detailed representation of the impact that climate

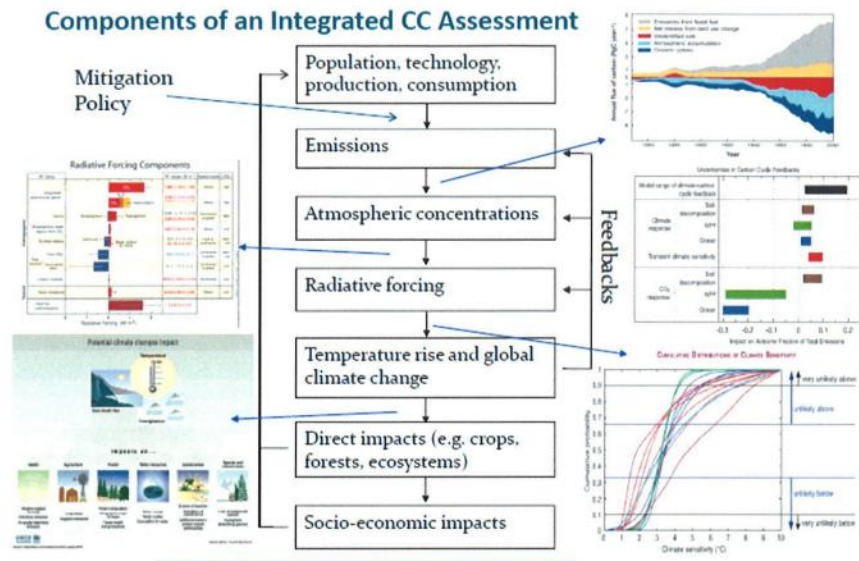
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<sup>55</sup> 2010 TSD at 4-5.

<sup>56</sup> OMB IQA Response at 5.

<sup>57</sup> Taken from a presentation by Traeger, C., *The Economics of Climate Change*.

change may have on health, the environment, or the (global or domestic) economy, particularly at the regional or local levels.



The models on which the IWG relied utilize simplifying assumptions and judgments reflecting the modeler’s attempts to aggregate the available scientific and economic research characterizing these relationships. In particular, the “damage functions” used in these models simply reflect a guess about the relationship between changes in temperature and GDP. The record does not reflect an adequate scientific or factual basis for the “damage function” in any of the models upon which the government relies. As a result, the SCC Estimates are plagued by a high level of uncertainty that spans several orders of magnitude. The final socioeconomic impact prediction at the end relies on the cascading series of uncertain inputs in the prior steps. Model uncertainty, at any stage, is affected and magnified by all of the uncertainties in the prior steps (including model input and structure uncertainties, as well as the uncertainties of climate science), and the uncertainties associated with that particular step. This is especially true if socioeconomic outputs are predicted over very long time periods, as with the SCC Estimates.

Based in part on these compounded uncertainties, for the 2010 Estimates the authors noted that the IWG offered the new SCC values “with all due humility” about the uncertainties embedded in them and with a “sincere promise to continue work to improve them.”<sup>58</sup> In contrast, the 2013 SCC Estimates have done seemingly nothing to alleviate the uncertainty, but have nevertheless downplayed any discussion of that uncertainty. Only a small paragraph on “research gaps” is provided on the last page of the TSD for the 2013 SCC Estimates.

Other than a brief reference back to the 2010 SCC Estimates, the “humility” with which the estimates were originally provided has been lost. To our knowledge, modeling science has not made any quantum leaps in the intervening three years to merit this loss of humility. The

<sup>58</sup> 2010 Estimate at 29.

meager discussion of uncertainty in the most recent SCC Estimates promotes the unsupported and misleading idea that the updated SCC values are highly accurate figures.

The OMB IQA Response suggests that each subsequent iteration of the TSD (May 2013 and November 2013) should be viewed as having been appropriately discussed, uncertainty because those versions reference back to the 2010 TSD, which contained a more substantive discussion.<sup>59</sup> The Associations disagree. We believe it is important that wherever OMB presents changes to its SCC Estimates and the changes that lead to the amended estimate, it should provide a full discussion of the context for those estimates – including disclosing sources of uncertainty. Incorporating by reference a discussion of uncertainty buried 30 pages into a TSD issued multiple years and multiple versions previous makes it unnecessarily difficult for rule writers and regulators to view the SCC Estimates in the context of their profound uncertainty. Indeed, each of the subsequently issued TSDs utilize the same exact text as the 2010 TSD (except for those portions referencing the change in the estimate). The discussion of uncertainty, however, is uniquely shorthanded down to a reference to the 2010 TSD, in what seems like a calculated effort to split off the TSD’s discussions of the SCC estimates from the TSD’s discussions of uncertainty. While the easiest approach would be to leave the text in place when updating the TSD, it required an affirmative step to remove the uncertainty discussion and replace it with a shorthanded reference.

That there are key and substantial differences in the IAMs is not in dispute. The range of uncertainty across and within the two IAMs generating the lowest and highest average SCC estimate used by the IWG are demonstrated in Table 1 of the attached *NERA Damage Function Report*, reproduced here:

**Table 1. Average SCC Estimates by Individual IAMs in IWG’s Analysis<sup>(\*)</sup>**  
 (\$/ton for emissions in 2020)

Discount Rate	Lowest Average SCC Estimate (from FUND)	Highest Average SCC Estimate (from PAGE)	Ratio of Highest to Lowest Average SCC
5%	\$3	\$22	8.3
3.0%	\$19	\$71	3.7
2.5%	\$33	\$101	3.1

<sup>(\*)</sup> The average dollar values were calculated by taking each model’s average SCC value across the IWG probability distribution of climate sensitivity values for each of the five IWG socioeconomic scenarios, and taking a simple average of those five values. They have been rounded to the nearest dollar. The ratios are based on the unrounded averages. The underlying data to compute these averages are in Appendix A of IWG (2013b), Tables A2-A4. In each case, the DICE estimate is the middle value, hence not affecting the range; DICE’s average values are \$12, \$38 and \$57 for the 5%, 3% and 2.5% discount rates, respectively.

This range of values reflects the average model estimates across five baseline input assumptions (and the probability distribution for climate sensitivity), and is presented for the three discount rates used in the IWG report. These results indicate a wide range of SCC values across the two models. Holding constant the other variables that the IWG standardized across the three models,

<sup>59</sup> OMB IQA Response at 5-6.

the average SCC estimates from the two models differ by a factor of 3 to 8, depending on the discount rate.

Given the degree of standardization already applied to the model input assumptions, these variations are substantial. The reasons for these variations are numerous. A considerable source of uncertainty and variability with the IAMs, not addressed by the IWG, is the “damage function” component of the models.<sup>60</sup> In fact, the NERA report suggests that the range of potential SCC values based upon uncertainties in the damage function is even larger than the structural variations across the DICE, FUND and PAGE models. This variability is because the formulation and utilization of the damage function in the three models are *ad hoc* and arbitrary, lack any theoretical or empirical foundation, and depend crucially on the views of the individual model builders.

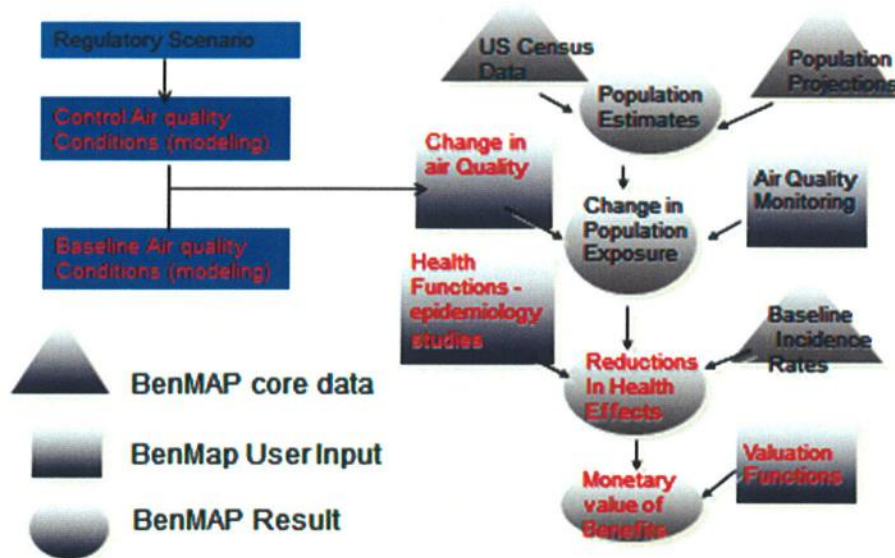
The damage function is the point in the flow of computation within an IAM where the focus shifts from scientific relationships to economic relationships. Damage functions translate variables, such as projected sea level rise, to estimated economic damages. The simplified “damage function” approach used for the IAMs contrasts significantly with the traditional approach, used by EPA and others, to estimate the economic impact of pollutant emissions. Under the traditional approach, the available scientific evidence is evaluated to identify health and environmental effects deemed to be caused by the emitted pollutants. Concentration response functions are developed to define the frequency of the effects expected to result from exposure to the pollutant at varying concentrations. Finally, the estimated health and environmental effects are monetized using a valuation methodology. The following figure is adapted from EPA’s regulatory analysis for the final revisions to the National Ambient Air Quality Standards for Particulate Matter.<sup>61</sup>

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<sup>60</sup> For a detailed analysis of the critical role of “damage functions” in the development of the SCC Estimates, and how treatment of the damage function in the IAMs contrasts with traditional regulatory impact analysis, see the attached *Damage Function Report*.

<sup>61</sup> EPA-452/R-12-005 (Dec. 2012). Importantly, the Associations do not herein suggest that EPA’s analysis for PM NAAQS was accurate or appropriate. Instead, we are merely pointing out that EPA’s approach to assessing and monetizing damage from pollutants provides far more detail and a more tangible and supported connection between the pollutant at issue and the damage presumed therefrom.

## The EPA Benefits Mapping and Analysis Program (BenMap) <http://www.epa.gov/air/benmap>



In contrast to this traditional approach to damage functions, the “damage function” of the IAMs utilized by the IWG neglects each of the traditional elements of a true damage function approach. To develop the SCC Estimates, the determination of the health, environmental, and physical damages attributed to GHG emissions is left to the authors of the IAMs, who translate these effects into an estimate of economic damage using a simple overall damage function of GDP versus temperature change. In doing so, the IWG defers to the model authors’ critical evaluations of the causal framework between GHG emissions and climate change impacts; the concentration-response function for various climate effects; and the monetization of those effects. Consequently, the subjective assumptions of the three model authors about the future can have great consequence to U.S. policy decisions.

The modelers recognize and readily concede the limitations of their models. Richard Tol, developer of the FUND model, admits that the result is not “a climate change impact model that is adequate. The accompanying static impact assessment is far from perfect, with many pieces missing and a lot of questionable assumptions.”<sup>62</sup> William Nordhaus, developer of the DICE model, similarly states that “the damage functions continue to be a major source of modeling uncertainty.”<sup>63</sup> According to a well-known economist, “developers of IAMs can do little more than make up functional forms and corresponding parameter values. And that is pretty much

<sup>62</sup> Tol, R. S., “Estimates of Damage Costs of Climate Change – Part 2: Dynamic Estimates,” *Environmental and Resource Economics*, 21:135-160, at 136 (2002).

<sup>63</sup> Nordhaus, W., *A Question of Balance*, New Haven: Yale University Press, at 51 (2008).

what they have done. . . . The bottom line here is that the damage function used in most IAMs are completely made up, with no theoretical or empirical foundation.”<sup>64</sup> Nordhaus similarly stated that the damage function analysis “involves the economic impacts of climate change, which is the thorniest issue in climate-change economics. These estimates are indispensable for making sensible decisions about the appropriate balance between costly emissions reductions and climate damages. However, providing reliable estimates of the damages from climate change over the long run has proven extremely difficult.”<sup>65</sup>

There are numerous examples of the arbitrary outcomes created by the subjective judgment-based damage functions in the IAMs. For example, one of the key differences in the IAMs is the degree to which adaptation is considered to occur. FUND considers a significantly higher degree of adaptation to occur than DICE or PAGE. Similarly, each of the models considers the impact of catastrophic events in sharply dissimilar ways.

The variability and arbitrariness of the parameters that define the judgment-based damage functions can lead to profoundly different GDP impacts. For example, the *Damage Function Report* finds that the estimates of global damages due to a given temperature change can differ substantially depending upon the parameters of the presumed damage function.<sup>66</sup> The quantitative importance of the choice of damage function parameters is illustrated by considering the estimate of global damages when just two damage function parameters are varied from the lowest to the highest values for each that are discussed in the IAM literature. The figure below graphs the values that these four different damage functions would project at temperature changes up to 15°C. The sensitivity of results over this wide range of temperature change is shown because temperature changes up to 13°C may have been projected in some of the IWG’s IAM runs by the later end of the modeling period, the year 2300.

The sensitivity analyses show that the magnitude of the difference depends upon the level of temperature change, with the sensitivity greater at higher temperature changes. Although the large temperature changes are not important in the near term years of the projections, these temperature changes can be relevant in the later years of the projections.

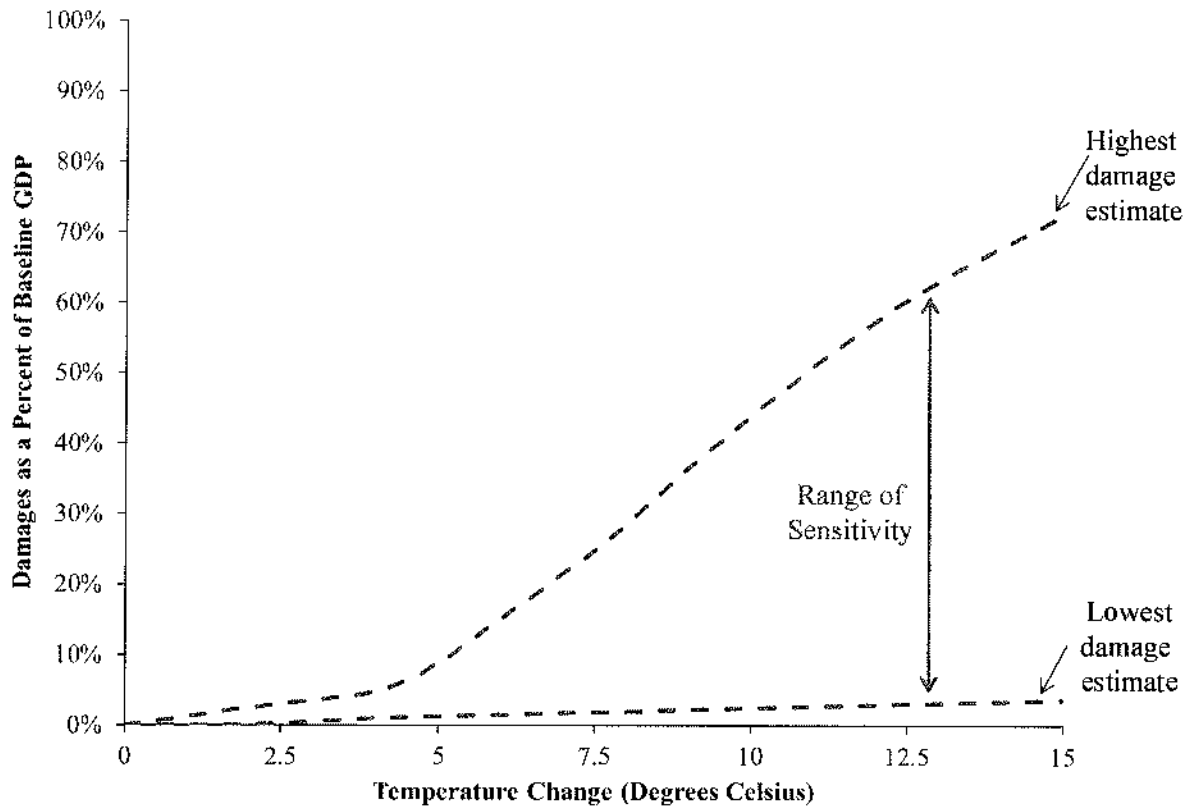
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<sup>64</sup> Pindyck, R.S., “Climate Change Policy: What Do the Models Tell Us?,” NBER Working Paper Series, WP 19244, at 11, 13 (July 2013) (Attachment 4).

<sup>65</sup> Nordhaus, W, *et. al.*, “DICE 2013: Introduction and User’s Manual,” at 10 (May 2013).

<sup>66</sup> *Damage Function Report* at 3-4.

**Range of Damage Estimates with Variations in Two Damage Function Input Assumptions**



According to the 2013 TSD, the larger SCC values reflect only changes made to the underlying IAMs. Directionally, all of the changes appear to be towards higher impacts. For the DICE model, the primary changes relate to the explicit representation of sea level rise (“SLR”) and associated damages and an updated calibration of the carbon cycle. The primary changes in the FUND model are updated damage functions for space heating, SLR agricultural impacts, changes to transient response of temperature buildup of GHG concentrations, and inclusion of indirect climate effects of methane. For PAGE, the key changes mentioned were explicit representation of SLR damages, revisions to damage functions to ensure damages do not exceed 100% of GDP, changes to regional scaling of damages, revised treatment of potentially abrupt damages, and some updated assumptions on adaptation.

Importantly, nothing in the IWG’s TSD effectively captures the arbitrary nature of how the updated IAMs have repeatedly changed the SCC estimates. For example, the authors of the DICE model claim the key damage function they used was based on a study by Tol (2009).<sup>67</sup> However, the Tol (2009) study indicates that up to a temperature rise of 2° C, climate change results in an *increase* in GDP.<sup>68</sup> In contrast, the damage function used in DICE presents a

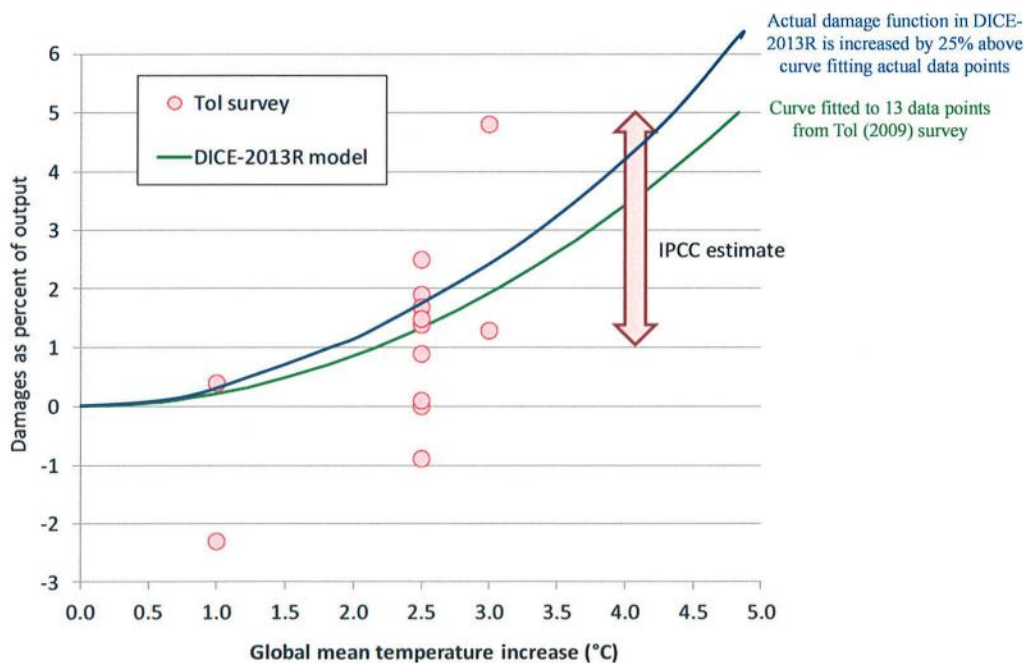
<sup>67</sup> This study is cited because it was used in or cited by models utilized for the TSD. The Associations are not endorsing this study or data to the exclusion of other information.

<sup>68</sup> See figure on page 18 in Tol (2009).

negative GDP change across all temperature changes considered. It is not clear how the authors of DICE altered the damage function presented in Tol (2009) or what the scientific basis was for this significant change.

Furthermore, the 25% increase in monetary value coming out of the updated 2013 DICE model was not produced by the IAM itself. Rather, the lead author, William Nordhaus, added an adjustment of 25% to the monetary damages to adjust for certain factors, including biodiversity, ocean acidification, and sea level rise.<sup>69</sup> See the figure below for the results of the survey conducted by Tol (2009), the DICE model's summary of that survey and the impact of the 25% adjustment. As the figure shows, for an assumed 4° C increase in global mean temperature rise, DICE predicts "damage" at the very high-end of the range that the IPCC projects. While the factors considered by Norhaus are certainly worthy of potential consideration to include in an evaluation of the SCC, the arbitrary nature by which the 25% increase in monetary value was assigned is troubling – estimates of economic damages should be scientifically derived, not assigned by one individual because those adjustments can have significant impacts on the output from the models.

**Figure: DICE-2013R Damage Function (Before And After Adjustment)**



Source: Nordhaus and Sztorc, "DICE-2013R: Introduction and User's Manual," Oct 2013. (Blue curve added to Nordhaus' figure by NERA to show damage function with the 25% adder assumed by Nordhaus to reflect non-monetized effects.)

<sup>69</sup> See Attachment 3



Similarly, the increase in the SCC in the PAGE model is based largely on the opinions of the authors as described in Hope (2011). In the updated PAGE2009 model used to derive the 2013 SCC figures, the authors assume far less adaptation will occur in response to climate change than they previously assumed. However, the authors cite no references to support this change. Nonetheless, this single change in assumption results in a 1.3-fold increase in the SCC versus the projections from PAGE2002. Another key change was how transient climate response (“TCR”), one of several components of climate sensitivity, was considered. To illustrate the importance of this one factor, a change in one standard deviation of the TCR can increase the SCC by 67%. In PAGE2009, a different triangular distribution of the TCR function was used than in PAGE2002. This resulted in a 1.5-fold increase in the SCC.<sup>70</sup> Further, in PAGE2009, the possibility for a catastrophic outcome or “discontinuity” above a fixed temperature threshold due to climate change was increased to 10% from the 1% used in PAGE2002. No documentation was provided to support these changes.

Subjective and arbitrary “adjustments” are troubling because those adjustments can have significant impacts on the output from the models. For example, compare the DICE damage function with that estimated by the IPCC, as shown in the figure above. For an assumed 4° C increase in global mean temperature rise, as the figure shows, DICE predicts “damage” at the very high-end of the range that the IPCC projects. Therefore, the inputs from DICE into the predicted SCC Estimates are biased extremely high relative to the IPCC estimated range of damages.

Ultimately, the authors of the *Damage Function Report* concluded:

[A]lthough the mathematical form of the damage function is relatively simple, plausible parameters for this mathematical formulation lead to very different estimates of global damages. We find, for example, that possible damage estimates at a given point in time can differ by up to a factor of 20 within the range of parameters and range of temperature changes found in the IAM literature. . .

The large degree of uncertainty regarding the damage function has implications for the uncertainty in the SCC values developed by the IWG. A comprehensive representation of damage function uncertainties – analyzed in combination with the other IAM input uncertainties – is needed to characterize how much more uncertain the IWG’s SCC estimates would be as a result of that damage function uncertainty. The IWG did not conduct such an analysis. Since the damage estimate is a central input to the ultimate SCC estimate, the large uncertainty in the damage function translates into uncertainty in the estimates of the social cost of carbon that may be correspondingly large.<sup>71</sup>

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<sup>70</sup> We note that use of a crude triangular distribution for this key climate sensitivity factor itself is a reflection of the high degree of guesswork involved in the estimation of this factor.

<sup>71</sup> *Damage Function Report* at 36-37.

Indeed, the SCC calculations in the DICE, FUND and PAGE models are the product of a highly simplified and aggregated formulation of the detailed calculations of climate science that goes directly from projected change in temperature to economic loss stated as change in GDP.<sup>72</sup> The IWG acknowledges the consequences of the use of such models:

These models are useful because they combine climate processes, economic growth, and feedbacks between the climate and the global economy into a single modeling framework. At the same time, they gain this advantage at the expense of a more detailed representation of the underlying climatic and economic systems. DICE, PAGE, and FUND all take stylized, reduced form approaches. Other IAMs may better reflect the complexity of the science in their modeling frameworks but do not link physical impacts to economic damages.<sup>73</sup>

As one expert noted to William Nordhaus (developer of the DICE model): “I marvel that they can translate a single number, an extremely poor surrogate for a description of the climatic conditions, into quantitative estimates of impacts of global economic conditions.”<sup>74</sup>

## **B. Model Time Horizons**

The 2010 and 2013 SCC Estimates are ambitiously projected for very long time horizons – specifically, until 2300.<sup>75</sup> The 2013 TSDs note that the DICE model, for example, can be run for an even longer time horizon (until 2595). The ability of any of these models (and their input assumptions) to hold for three centuries or more is not clear and certainly not verifiable. That the SCC Estimates increased 60 percent and changed three times in three years provides sufficient evidence to question the viability and usefulness of modeling that purports to render predictions nearly 300 years into the future. Incorporation of climate-affecting inputs – such as population changes, economic development, consumption patterns (regional and global), and technological advancements for mitigation (including the role of innovation and disruptive technologies) – as well as material stochastic variables, such as volcanic eruptions that can affect the underlying climate-forcing functions of GHG concentrations and temperature rise, over such time frames rely on identifying empirical relationships imbued with significant uncertainties. If we were to consider back to the year 1713, who could have predicted where the world is today?

Based on these key variables and uncertainties, IPCC does not attempt predictions beyond the year 2100.<sup>76</sup> Among other reasons, this constraint is due to the widely predicted

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<sup>72</sup> See NERA *Damage Function Report* at 10-14. The NERA report discusses in detail how the “damage function” component of the IAM models is a highly simplified approach to the traditional “damages function method” in which economic assessments are narrowly confined to valuing a specific set of projected adverse effects.

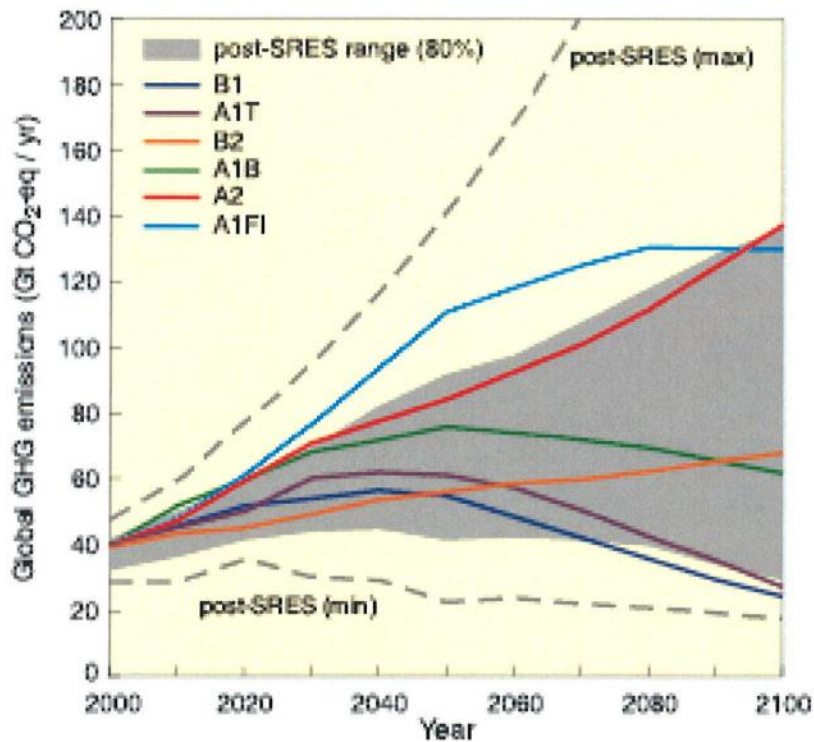
<sup>73</sup> 2010 TSD at 5.

<sup>74</sup> Nordhaus, W., “Expert Opinion on Climatic Change,” *American Scientist*, 82:45-51 (1994).

<sup>75</sup> 2013 Estimate at 7.

<sup>76</sup> See [www.ipcc.ch/publications\\_and\\_data/ar4/syr/en/mains3.html](http://www.ipcc.ch/publications_and_data/ar4/syr/en/mains3.html). This reference should not be viewed as an endorsement of the IPCC’s conclusions, but rather as a reference point from which to compare the three models used in the SCC Estimates. The Fish and Wildlife Service & National Marine Fisheries Service often limit their modeling of potential climate impacts on species to even shorter time horizons.

variances in critical inputs, such as predicted model emissions. For example, the figure below, taken from the most recent IPCC work, shows how wide the emission predictions from various scenarios are, through just the year 2100.



As the authors of the *Damage Function Report* state:

[I]n the case of climate change, many of the impacts are very far in the future (up to 300 years hence, in the case of the IWG analyses), and also highly variable in terms of the region affected. Thus [condensing projections of economic damages across many years and regions into a single present-value global measure of welfare] raises issues regarding inter-generational and inter-regional equity that seem largely ethical rather than economic.<sup>77</sup>

Clearly, attempting to extrapolate SCC Estimates to 2300 is simply too speculative and uncertain for use in policymaking.

## V. CONCERNS WITH THE PRESENTATION OF THE SCC ESTIMATES

In addition to the Associations' concerns with opacity and accuracy of the modeling and SCC estimation process, we are further concerned that OMB and the IWG present the SCC Estimates in a confusing and potentially misleading manner. Failure to present this information

<sup>77</sup> *Damage Function Report* at 12.

in a way that appropriately identifies (and quantifies) uncertainty, neglects to explain the use and impact of averaging, and focuses on the global, rather than domestic, SCC, diminishes the utility of the SCC Estimates and increases the likelihood that they will be misused or misinterpreted by risk managers.<sup>78</sup>

**A. Uncertainty Is Not Addressed Appropriately**

While there is no requirement that the SCC Estimates be absolutely precise and accurate, OMB's Circular A-4 requires key uncertainties to be disclosed and quantified to the extent possible "to inform decision makers and the public about the effects and uncertainties of alternative regulatory actions."<sup>79</sup> Circular A-4 requires uncertainties to be analyzed qualitatively and quantitatively, delineated, and disclaimed.<sup>80</sup> Further, OMB's Circular A-4 admonishes that:

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 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.<sup>81</sup>

Rather than appropriately quantifying and disclaiming the profoundly speculative nature of the SCC Estimates, the IWG downplays the wide variability in the three models' outputs through averaging. Similar to the 2010 Estimates, the 2013 Estimates are based on the average outputs of the three models. Individual model predictions, however, vary significantly. 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.<sup>82</sup>

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<sup>78</sup> As detailed in the attached comments submitted by many of the undersigned Associations, problems with the implementation of the SCC Estimates by federal agencies in rulemakings already have been identified with regard to several proposed rulemakings, including DOE's proposed energy efficiency standards for metal halide lamps, walk-in coolers and freezers, and commercial refrigeration equipment. *See, e.g.*, Comments submitted October 12, 2013 by the Associations on DOE's Proposed *Energy Conservation Standards for Metal Halide Lamp Fixtures* (77 Fed. Reg. 51,563 (Aug. 20, 2013)); Comments submitted November 12, 2013 by the Associations on DOE's Proposed *Energy Conservation Standards for Walk-In Coolers and Freezers* (78 Fed. Reg. 55,782 (Sept. 11, 2013)); Comments submitted October 12, 2013 by the Associations on DOE's Proposed *Energy Conservation Standards for Commercial Refrigeration Equipment* (78 Fed. Reg. 55,890 (Sept. 11, 2013)); Comments submitted January 23, 2014 by Associations on Notice of Proposed Rulemaking for Energy Conservation Standards for Residential Furnace Fans 78 Fed. Reg. 64,067 (Oct. 25, 2014)); and Petition for Reconsideration filed by Associations on September 16, 2013 of Standards for Standby Mode and Off Mode for Microwave Ovens (78 FR 36316 (June 17, 2013)). These comments are attached (Attachment 5) and hereby incorporated by reference.

<sup>79</sup> OMB Circular A-4 at 38.

<sup>80</sup> *Id.* at 40.

<sup>81</sup> *Id.* at 40.

<sup>82</sup> November 2013 TSD at 21, Table A5.

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 predicted model variances are even more striking, as shown in the table above. For example, it is simply meaningless to predict a “mean” of \$21/ton based on FUND, when the corresponding variance is predicted to be \$22,487. The same is true for each of the other predictions.

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 50<sup>th</sup> percentiles for all three models, but are particularly higher than the 50<sup>th</sup> percentile figure in the case of the PAGE model.

Using the 3% discount rate as an example, the average values per ton versus the 50<sup>th</sup> percentile values per ton for the PAGE, DICE, and FUND models are \$71/\$27, \$38/\$34, and \$21/\$17, respectively. Therefore, for the PAGE, DICE, and FUND models, the value used to derive the final SCC figure of \$43/ton at the 3% discount rate is the 75<sup>th</sup> percentile value for the PAGE model and the overall SCC value of \$43.1 per ton corresponds to the 68<sup>th</sup> percentile. Thus, 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 be viewed as central figures, but rather as skewed toward the upper tail of the distribution of SCC values. Indeed, there is 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 make an effort to determine which of the three models provides the best estimates, the government instead combines all of the estimates and divides to obtain a simple average.

OMB must adhere to the directives it imposes on other agencies and executive offices with respect to providing accurate information. It has not done so with the SCC Estimates. The IWG and OMB have failed to disclose and quantify key uncertainties and to inform fully decision makers and the public of those uncertainties as required by OMB. Consistent with OMB Guidelines for Economic Analysis, the 2013 TSD must be withdrawn and amended to include a separate section that identifies the key sources of uncertainty in the derivation of the SCC. This section should include a qualitative assessment of the impact of key factors on the final SCC values and, to the extent feasible, a quantitative assessment of these factors.

**B. By Presenting Only Global SCC Estimates, The IWG Severely Limits The Utility Of The Estimates For Use In Cost-Benefit Analysis And Policymaking**

OMB's IQA Guidelines require that information disseminated by agencies meet the standard of utility. This part of the IQA requires agencies to assess the usefulness of the information to its intended users, including the public. For the 2013 Estimates, by presenting only global SCC estimates, and excluding domestic SCC estimates altogether, the IWG severely limits the utility of the SCC Estimates for use in cost-benefit analysis.

Further, OMB Circular A-4 mandates calculation of a domestic cost-benefit estimate in federal rulemakings, with non-U.S. estimates considered as *optional* – the reverse of the presentation published by IWG/OMB. Moreover, neither the May 2013 TSD, nor the November 2013 TSD mention the global nature of the values or note that the domestic SCC is a small fraction (7-23%) of the global SCC. Thus, policymakers who apply the SCC values from this table and have not read the previous 2010 TSD may be unaware that a large percentage of the economic benefits they are estimating from their rule will occur outside the United States.<sup>83</sup>

The IWG's recommendation that rule writers and policymakers use only the global SCC in cost-benefit analysis results in a significant misalignment of costs and benefits. For this reason, we strongly recommend presenting both the domestic and global SCC figures in RIAs, with a preference for use of the domestic values. This approach would allow risk managers to more readily align the costs with the benefits. Consistent with OMB guidance, the costs of a rule for entities in the United States should be presented in comparison with the benefits occurring in the United States. The benefits using the global SCC should be presented separately. Along with the global SCC benefits, federal agencies proposing a rule should be encouraged to present at least a qualitative accounting of similar regulatory efforts underway or proposed in other countries for the specific type of problem their rule is proposed to address. This approach would meet the goal of Executive Order 13609 that federal agencies evaluate how rules they are proposing differ from requirements for key United States trading partners.

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<sup>83</sup> For example, the 2010 TSD states:

As an empirical matter, the development of a domestic SCC is greatly complicated by the relatively few region- or country-specific estimates of the SCC in the literature. One potential source of estimates comes from the FUND model. The resulting estimates suggest that the ratio of domestic to global benefits of emission reductions varies with key parameter assumptions. For example, with a 2.5 or 3 percent discount rate, the U.S. benefit is about 7-10 percent of the global benefit, on average, across the scenarios analyzed. Alternatively, if the fraction of GDP lost due to climate change is assumed to be similar across countries, the domestic benefit would be proportional to the U.S. share of global GDP, which is currently about 23 percent.

On the basis of this evidence, the interagency workgroup determined that a range of values from 7 to 23 percent should be used to adjust the global SCC to calculate domestic effects. Reported domestic values should use this range.

We note that the approach of presenting only a global benefit value while comparing it to a domestic cost value is inconsistent with policies used in the United States to perform cost-benefit analysis for rules intended to address other significant environmental issues that are global in scope. For example, ground level ozone is now recognized by many as a health and environmental issue that is global in nature. Recent studies clearly demonstrate that emissions from the Asia Pacific region affect compliance with the United States NAAQS for ozone.<sup>84</sup> However, the current approach of performing cost-benefit analysis of air rules for NAAQS compliance purposes does not consider the global nature of the issue. Rather, the costs to comply with the NAAQS are borne entirely by entities in the United States and the damages of ozone are estimated without any recognition of the impact of the emissions from outside the continental United States.

The IQA Petition filed with OMB raised substantially similar concerns on the TSD's presentation of global impacts, to which the OMB IQA Response simply quoted from the 2010 TSD the justification for its presentation of global impacts.<sup>85</sup> OMB's recital of its earlier justification for its presentation of global impacts was not altogether responsive. The Associations are aware of the justification provided in the 2010 TSD, but disagree with it, find it inconsistent with OMB Circular A-4 and analogous regulatory actions with potential global impacts, and misleading to risk managers. We are herein requesting that OMB change this presentation.

## **VI. ADMINISTRATIVE PROCEDURE ACT**

The Administrative Procedure Act's ("APA") broad definition of a "rule" includes "an agency statement of general or particular applicability and future effect designed to implement, interpret, or prescribe law or policy," such as "the approval or prescription of . . . valuations, costs, or accounting."<sup>86</sup> When promulgating a substantive rule, an agency must comply with the APA's procedural requirements by providing notice of proposed action describing its substance and the legal authority under which it is proposed, by allowing for public comment, and by including in the rule a description of its basis and purpose.<sup>87</sup> Agency rules are subject to judicial review and may be set aside if they are "arbitrary, capricious, an abuse of discretion, or otherwise not in accordance with law."<sup>88</sup>

At the outset, we note that OMB identifies no authority under which it can adopt the SCC Estimates as a rule, or the statutory or regulatory basis for this proceeding. OMB's exercise of regulatory discretion without identifying explicit direction from Congress therefore raises serious

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<sup>84</sup> Cooper O.R., et al. (2010). Increasing springtime ozone mixing ratios in the free troposphere over western North America. *Nature* 463(21): 344-348.

<sup>85</sup> OMB IQA Response at 6-7.

<sup>86</sup> 5 U.S.C. § 551(4); *see also Avoyelles Sportsmen's League, Inc. v. Marsh*, 715 F.2d 897, 908 (5th Cir. 1983) ("rule" includes "virtually every statement an agency can make").

<sup>87</sup> 5 U.S.C. § 553; *see id.* § 553(b) (only certain non-substantive rules exempted from procedural requirements).

<sup>88</sup> 5 U.S.C. § 706(2)(A).

constitutional concerns, including concerns about breaching the separation of powers between the legislative and executive branches and violating the non-delegation doctrine. If OMB nonetheless adopts the SCC Estimates presented in the TSD absent identification of clear statutory authority to do so, its action will be subject to challenge as unlawful rulemaking. In this regard, according to statements made by OMB, the SCC Estimates are intended to “prescribe law or policy” by specifying “valuations, costs, or accounting” to govern federal agencies’ analyses of the costs and benefits of their regulatory actions.<sup>89</sup> Indeed, many federal programs require that agencies consider the direct and indirect costs of proposed actions. For example, Exec. Order No. 12,866 states that agencies must “propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs.” And prior SCC estimates adopted by OMB have already influenced agencies’ consideration of regulatory costs, as was the case with the microwave oven efficiency standards and other rules. Because the SCC Estimates in this TSD are designed to constrain agency decision-making regarding how carbon costs are to be evaluated in future agency proceedings and because, once finalized, they are to be imposed across the federal government as a common cost valuation for carbon, this proceeding represents unlawful rulemaking. For these reasons and those discussed below, the proposed TSD fails to comply with the APA’s procedural and substantive requirements.

Additionally, use of the SCC Estimates in subsequent rulemakings will result in agency violations of the APA. Under the APA, a court will look to ensure that the information collection and analysis process is lawful and reasonably coherent, and that the ultimate agency action which results from use of that information is not arbitrary and capricious.<sup>90</sup>

From a substantive perspective, an agency engaged in rulemaking must examine the relevant data and articulate a satisfactory explanation for its action, including a “rational connection between the facts found and the choice made.”<sup>91</sup> Agency action is arbitrary and capricious “if the agency has relied on factors which Congress has not intended it to consider, entirely failed to consider an important aspect of the problem, offered an explanation for its decision that runs counter to the evidence before the agency, or is so implausible that it could not be ascribed to a difference in view or the product of agency expertise.”<sup>92</sup>

Use of the SCC Estimates in rulemaking will violate the APA. For instance, the record does not show what roles each of the IWG participating agencies actually played in developing the estimates. The record does not show which staff from the participating agencies participated in the process. The record does not show how the three models that underlie these estimates were selected (from the universe of similar available models). The record does not show who ran the models (agency staff? contractors?) or their qualifications or level of expertise. The

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<sup>89</sup> See, e.g., 78 Fed. Reg. at 70,586 (Through the SCC, OMB will “ensure that agencies are appropriately measuring the social cost of carbon emissions as they evaluate the costs and benefits of rules.”); OMB IQA Response (OMB seeks “public comment on the SCC through the formal public comment process that applies to all Federal rulemakings.”).

<sup>90</sup> See *Citizens to Preserve Overton Park, Inc. v. Volpe*, 401 U.S. 402 (1971).

<sup>91</sup> *Motor Vehicle Mfrs. Ass’n of U.S., Inc. v. State Farm Mut. Auto. Ins. Co.*, 463 U.S. 29, 43 (1983).

<sup>92</sup> *Id.*



record does not show who developed the inputs for the model runs, including both policy as well as technical choices, and it is not clear how such inputs were developed. The record does not show how the various statistical Monte Carlo analyses actually were implemented (which inputs were held constant and why, which inputs were selected to be variable and why, and the assumptions regarding the assumed distribution functions for the latter variable inputs, *etc.*). These are but a few of the flaws, uncertainties, and unknowns that should preclude the use of the SCC Estimates/TSD.

Each of these failures violates fundamental precepts of administrative procedure and the scientific method – and none credibly can be stated to be the result of a difference of opinion, interpretation, or Agency expertise. To the contrary, these are examples where the Administration drove its conclusions far beyond the capacity of sound science and modeling. Even if the three models themselves were entirely sound, the non-public inputs into those models most certainly render the model output (*i.e.*, the SCC Estimates) arbitrary and capricious.

APA's decision-making standards also demand compliance with the IQA, including requirements for complete, unbiased analysis grounded in accepted methods. "Determination of whether the agency complied with prescribed procedures requires a plenary review of the record and consideration of applicable law."<sup>93</sup> More specifically, the APA requires that agencies relying on SCC Estimates in rulemaking review all credible relevant information, utilize unbiased peer review, and make Agency assumptions, methods, and models transparent and reasonably reproducible and understandable in response to an appropriate request for information. If OMB allows or directs other agencies to use the SCC Estimates, any agency that bases a rule on these estimates would violate the IQA and the APA, and the legality of such regulation would be called into question. The ultimate rationality of subsequent agency action depends in part on whether it has thoroughly complied with applicable procedural requirements, including those set forth in the IQA.<sup>94</sup>

## **VII. CONCLUSION**

The Associations appreciate the opportunity to comment on the SCC Estimates. However, without the benefit of any of the information underpinning the SCC Estimates or any indication that OMB intends to actually consider comments, this process does little more than suggest, incorrectly, the appearance of transparency and collaboration. Given the significant process shortcomings, lack of peer review, and weaknesses and uncertainties in the modeling systems highlighted in these comments and related IQA Petition, the undersigned Associations

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<sup>93</sup> See *Olenhouse v. Commodity Credit Corp.*, 42 F.3d 1560, 1574 (10th Cir. 1994).

<sup>94</sup> Even if a particular statute, such as the IQA, does not provide for judicial review, "the agency's decision may still be overturned because of an analysis so defective as to render its final decisions unenforceable, or, in the absence of any analysis, because of a failure to respond to public comment concerning" the legal infirmities identified pursuant to that statute. *Michigan v. Thomas*, 805 F.2d 176, 188 (6<sup>th</sup> Circuit 1986); *Thompson v. Clark*, 741 F.2d 401, 405 (D.C. Circuit 1984.) (The flawed rule "is set aside, ... not because the regulatory flexibility analysis [not subject to direct judicial review] was defective, but because the mistaken premise reflected in the regulatory flexibility analysis deprives the rule of its required rational support ....").

urge OMB and the IWG to withdraw the 2010 and 2013 Technical Support Documents, pending correction through an informed, transparent, and public process. OMB's November 26, 2013 solicitation of comments certainly is not such an informed, transparent, and public process. As such, we further ask OMB to refrain from using the SCC Estimates and to direct publicly other executive branch agencies not to utilize the SCC Estimates as part of any regulatory action or policymaking. Finally, as per the February 24, 2014 Request for Reconsideration of the OMB IQA Response filed by many of the Associations, and for the reasons noted throughout these comments, the Associations request that OMB reconsider its denial of the September 4, 2013 Petition calling on OMB to ensure that the SCC Estimates and TSD comply with IQA guidelines.

We appreciate the opportunity to submit the foregoing comments. If you have any questions or need any further information about these comments, please contact our counsel Wayne D'Angelo at 202.342.8525 or [WDAngelo@Kelleydrye.com](mailto:WDAngelo@Kelleydrye.com).

Respectfully submitted,

**American Chemistry Council**

**American Coalition for Clean Coal Electricity**

**American Exploration &  
Production Council**

**American Forest & Paper Association**

**American Fuel & Petrochemical  
Manufacturers**

**American Iron and Steel Institute**

**American Petroleum Institute**

**America's Natural Gas Alliance**

**Brick Industry Association**

**Council of Industrial Boiler Owners**

**The Fertilizer Institute**

**Independent Petroleum Association of America**

**National Association of Home Builders**

**National Association of Manufacturers**

**Natural Gas Supply Association**

**National Mining Association**

**National Oilseed Processors Association**

**Portland Cement Association**

**U.S. Chamber of Commerce**

**Cc: Mabel Echols**

## **Attachment 1 Statements of Interest**

**The American Chemistry Council:** The American Chemistry Council (“ACC”) represents the leading companies engaged in the business of chemistry. ACC members apply the science of chemistry to make innovative products and services that make people's lives better, healthier and safer. ACC is committed to improved environmental, health and safety performance through Responsible Care®, common sense advocacy designed to address major public policy issues, and health and environmental research and product testing. The business of chemistry is a \$770 billion enterprise and a key element of the nation's economy. It is one of the nation’s largest exporters, accounting for twelve percent of all U.S. exports. Chemistry companies are among the largest investors in research and development. Safety and security have always been primary concerns of ACC members, and they have intensified their efforts, working closely with government agencies to improve security and to defend against any threat to the nation’s critical infrastructure.

**The American Coalition for Clean Coal Electricity:** The American Coalition for Clean Coal Electricity (“ACCCE”) is a trade association of more than 30 companies associated with the production of electricity from coal. ACCCE’s members span the production, transportation, and consumption of coal that has provided nearly half of the reliable electricity Americans depend upon each and every day over the past decade. ACCCE supports policies that will ensure affordable, reliable, domestically produced energy, while supporting the development and deployment of advanced technologies to further reduce the environmental footprint of coal-fueled electricity generation.

**The American Exploration & Production Council:** American Exploration & Production Council (“AXPC”) is a national trade association representing 32 of America's largest and most active independent oil and natural gas exploration and production companies. AXPC members are "independent" in that their operations are limited to exploration for and production of oil and natural gas. Moreover, our members operate autonomously, unlike their fully integrated counterparts, which operate in additional segments of the energy business, such as downstream refining and marketing. AXPC members are leaders in developing and applying the innovative and advanced technologies necessary to explore for and produce oil and natural gas, both offshore and onshore, from unconventional sources.

**The American Forest & Paper Association:** The American Forest & Paper Association (“AF&PA”) serves to advance a sustainable U.S. pulp, paper, packaging, and wood products manufacturing industry through fact-based public policy and marketplace advocacy. AF&PA member companies make products essential for everyday life from renewable and recyclable resources and are committed to continuous improvement through the industry’s sustainability initiative - Better Practices, Better Planet 2020. The forest products industry accounts for approximately 4.5 percent of the total U.S. manufacturing GDP, manufactures approximately \$200 billion in products annually, and employs nearly 900,000 men and women. The industry

meets a payroll of approximately \$50 billion annually and is among the top 10 manufacturing sector employers in 47 states.

**The American Fuel & Petrochemical Manufacturers:** The American Fuel & Petrochemical Manufacturers (“AFPM”) is a national trade association of more than 400 companies, including virtually all U.S. refiners and petrochemical manufacturers. AFPM members operate 122 U.S. refineries comprising approximately 98% of U.S. refining capacity. AFPM petrochemical members make the chemical building blocks which go into products ranging from medical devices, cosmetics, furniture, appliances, TVs and radios, computers, parts used in every mode of transportation, solar power panels and wind turbines. As an energy intensive industry, AFPM members are directly impacted by the government’s calculation of the social cost of carbon.

**The American Iron and Steel Institute:** The American Iron and Steel Institute (“AISI”) is a non-profit, national trade association headquartered in the District of Columbia. AISI serves as the voice of the North American steel industry in the public policy arena and advances the case for steel in the marketplace as the preferred material of choice. AISI represents member companies accounting for more than three quarters of U.S. steelmaking capacity.

**The American Petroleum Institute:** The American Petroleum Institute (“API”) is a national trade association representing over 500 member companies involved in all aspects of the oil and natural gas industry. API’s members include producers, refiners, suppliers, pipeline operators, and marine transporters, as well as service and supply companies that support all segments of the industry. API and its members are dedicated to meeting environmental requirements, while economically developing and supplying energy resources for consumers.

**America’s Natural Gas Alliance:** Representing North America’s largest independent natural gas exploration and production companies, America’s Natural Gas Alliance (ANGA) works with industry, government and customer stakeholders to promote increased demand for our nation’s abundant natural gas resource for a cleaner and more secure energy future and to ensure its continued availability.

**The Brick Industry Association :** Founded in 1934, the Brick Industry Association represents the U.S. clay brick industry, which includes 270 manufacturers, distributors, and suppliers that provide employment for nearly 200,000 Americans in 44 states and historically generate approximately \$9 billion to the U.S. economy annually. Our members and our industry could potentially be needlessly harmed by this rulemaking. Given the large number of small businesses affected by this rule, including in the brick industry, additional time is justified.

**The Council of Industrial Boiler Owners:** The Council of Industrial Boiler Owners (“CIBO”) is a broad-based association of industrial boiler owners, architect-engineers, related equipment manufacturers, and University affiliates with members representing 20 major industrial sectors. CIBO members have facilities in every region of the country and a representative distribution of almost every type of boiler and fuel combination currently in operation. CIBO was formed in 1978 to promote the exchange of information within the industry and between industry and

government relating to energy and environmental equipment, technology, operations, policies, law and regulations affecting industrial boilers. Since its formation, CIBO has been active in the development of technically sound, reasonable, cost-effective energy and environmental regulations for industrial boilers. CIBO supports regulatory programs that provide industry with enough flexibility to modernize -- effectively and without penalty - the nation's aging energy infrastructure, as modernization is the key to cost-effective environmental protection.

**The Fertilizer Institute:** The Fertilizer Institute (“TFI”) represents the nation’s fertilizer industry including producers, importers, retailers, wholesalers and companies that provide services to the fertilizer industry. TFI members provide nutrients that nourish the nation’s crops, helping to ensure a stable and reliable food supply. TFI’s full-time staff, based in Washington, D.C., serves its members through legislative, educational, technical, economic information and public communication programs.

**The Independent Petroleum Association of America:** The Independent Petroleum Association of America (IPAA) is the national trade organization representing thousands of American oil and natural gas explorers and producers, as well as the service and supply industries that support their efforts. These businesses will be significantly affected by the proposed actions in this regulatory framework. IPAA member companies drill about 95 percent of American oil and natural gas wells, produce about 54 percent of American oil, and more than 85 percent of American natural gas.

**The National Association of Home Builders:** The National Association of Home Builders (“NAHB”) is a nationwide federation of more than 850 state and local home builder associations representing more than 140,000 members including individuals and firms engaged in land development, single and multifamily construction, multifamily ownership, building material trades, and commercial and industrial projects. More than 80 percent of NAHB members are classified as “small businesses” and meet the federal definition of a “small entity,” as defined by the U.S. Small Business Administration. The use of the Social Cost of Carbon report as a basis for future rulemakings will have a profound impact on the way homes and communities of the future will be built.

**The National Association of Manufacturers:** The National Association of Manufacturers (“the NAM”) is the largest industrial trade association in the United States, representing over 12,000 small, medium and large manufacturers in all 50 states. NAM is the leading voice in Washington, D.C., for the manufacturing economy, which provides millions of high wage jobs in the U.S. and generates more than \$1.6 trillion in GDP. In addition, two-thirds of NAM members are small businesses, which serve as the engine for job growth. NAM’s mission is to enhance the competitiveness of manufacturers and improve American living standards by shaping a legislative and regulatory environment conducive to U.S. economic growth.

**The National Mining Association:** The National Mining Association (“NMA”) is a national trade association whose members produce most of America’s coal, metals, and industrial and agricultural minerals. Its membership also includes manufacturers of mining and mineral

processing machinery and supplies, transporters, financial and engineering firms, and other businesses involved in the nation's mining industries. NMA works with Congress and federal and state regulatory officials to provide information and analyses on public policies of concern to its membership, and to promote policies and practices that foster the efficient and environmentally sound development and use of the country's mineral resources.

**The National Oilseed Processors Association:** The National Oilseed Processors Association ("NOPA") is a national trade association that represents 13 companies engaged in the production of vegetable meals and vegetable oils from oilseeds, including soybeans. NOPA's member companies process more than 1.6 billion bushels of oilseeds annually at 63 plants located in 19 states, including 57 plants that process soybeans.

**The Natural Gas Supply Association:** The Natural Gas Supply Association ("NGSA"), established in 1965, represents integrated and independent companies that produce and market approximately 40 percent of the natural gas consumed in the United States. NGSA encourages the use of natural gas within a balanced national energy policy and promotes the benefits of competitive markets to ensure reliable and efficient transportation and delivery of natural gas and to increase the supply of natural gas to U.S. customers.

**The Portland Cement Association:** The Portland Cement Association ("PCA") is the national trade association for the United States cement manufacturing industry. PCA's 26 member companies operate 79 manufacturing plants in 34 states, accounting for almost 80 percent of domestic cement manufacturing capacity. In 2011, the cement manufacturing and related industries generated nearly \$44 billion in annual revenues and supported more than 150,000 high quality manufacturing jobs in the United States.

**The U.S. Chamber of Commerce:** The U.S. Chamber of Commerce ("the Chamber") is the world's largest business federation representing the interests of more than 3 million businesses of all sizes, sectors, and regions, as well as state and local chambers and industry associations. The Chamber is dedicated to promoting, protecting, and defending America's free enterprise system.