
Nos. 14-2147, 14-2159 & 14-2334 (consolidated)

IN THE UNITED STATES COURT OF APPEALS
FOR THE SEVENTH CIRCUIT

ZERO ZONE, INC., *et al.*,
Petitioners,

v.

U.S. DEPARTMENT OF ENERGY, *et al.*,
Respondents,

On Petition for Review of Final
Rules of the Department of Energy

**BRIEF OF THE INSTITUTE FOR POLICY INTEGRITY AT NEW YORK
UNIVERSITY SCHOOL OF LAW AS AMICUS CURIAE IN SUPPORT OF
RESPONDENTS**

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INTEREST OF AMICUS CURIAE

Pursuant to the consent of all of the parties¹ in these consolidated cases, the Institute for Policy Integrity at New York University School of Law² (“Policy Integrity”) files this *amicus curiae* brief in support of Respondents, the Department of Energy (“DOE”), *et al.* In particular, Policy Integrity supports DOE’s use of the social cost of carbon (“SCC”) in conducting its economic analysis of the energy conservation standards at issue.

Policy Integrity is dedicated to improving the quality of government decisionmaking through advocacy and scholarship in administrative law, economics, and public policy. Policy Integrity is a collaborative effort of faculty; a full-time staff of attorneys, economists, and policy experts; law students; and a Board of Advisors comprised of leaders in public policy, law, and government.

Policy Integrity has produced extensive scholarship on the use of economic analysis in regulatory decisionmaking. An area of special concern for Policy Integrity is the development and use of the SCC for analyzing the climate impacts of proposed regulations. Policy Integrity’s economists and legal scholars are among the nation’s leading experts on the economic analysis underlying the SCC and its application in different regulatory contexts, having published numerous papers,

¹ Under Federal Rule of Appellate Procedure 29(c), the Institute for Policy Integrity states that no party’s counsel authored this brief in whole or in part, and no party or party’s counsel contributed money intended to fund the preparation or submission of this brief. No person—other than the *amicus curiae*, its members, or its counsel—contributed money intended to fund the preparation or submission of this brief.

² No part of this brief purports to present New York University School of Law’s views, if any.

reports, and comments on these topics. Petitioners' briefs have questioned DOE's treatment of the SCC, and Policy Integrity has a significant interest in supporting DOE's appropriate use of the SCC in this rulemaking.

SUMMARY OF ARGUMENT

The Department of Energy (“DOE”)’s energy conservation standards for commercial refrigeration equipment (“the Rule”), 79 Fed. Reg. 17,726 (Mar. 28, 2014), will reduce carbon pollution, help mitigate climate change, and so generate billions of dollars in quantifiable benefits to economic welfare, public health, national security, and environmental quality. DOE quantified those benefits by applying the “social cost of carbon” (“SCC”), a framework for estimating the monetized, global damages caused by releasing an additional ton of carbon dioxide anywhere into the atmosphere. DOE relied on the SCC estimates developed by a rigorous interagency process over many years, in which DOE actively participated.

In opposing DOE’s energy conservation standards, Petitioners AHRI and Zero Zone (collectively “AHRI”), take aim at nearly every aspect of the SCC’s development and its application to this Rule. This amicus brief defends the development and application of the SCC as rigorous, rational, and consistent with statutory requirements, regulatory best practices, and case law.

First, AHRI launches a wholesale attack on DOE’s statutory authority to consider any environmental effects of its energy conservation standards. AHRI overlooks the clear statutory instructions in the Energy Policy and Conservation Act (“EPCA”) to weigh “the need for national energy conservation,” which courts and agencies have repeatedly interpreted to include environmental, economic, and national security effects.

Next, AHRI disparages the interagency process that developed the SCC values. That process, in fact, was transparent and open to repeated public comments; it was

rigorously grounded in the best available, peer-reviewed scientific and economic literature; and it properly addressed the uncertainties of climate science without becoming paralyzed by them. Though the SCC should be continually updated with the latest information, DOE properly relied in this Rule on the 2013 estimates from the interagency process. Indeed, ensuring that all regulatory agencies use consistent values derived by a consensus-driven, interagency process is essential to harmonizing climate policy and cost-benefit analysis across the federal executive branch.

Finally, AHRI misleadingly suggests that DOE improperly expanded the geographic and temporal scope of its calculation of climate benefits. AHRI is incorrect. DOE deliberately selected a global perspective for the SCC values because a global perspective directly advances U.S. national interests. A domestic-only view of climate change, by contrast, would prevent DOE from setting conservation standards at economically efficient levels, and would risk impeding international climate actions that directly benefit U.S. welfare. With respect to timespan, DOE assessed both the costs and benefits accruing over time due to refrigerators sold for 30 years following the Rule. DOE properly accounted for the fact that most of the Rule's costs occur sooner than the climate benefits, by using economic techniques to value more highly the effects that occur sooner, and DOE properly considered uncertainty and adaptation to climate change over time. In doing so, DOE acted in accordance with economic and regulatory best practices.

ARGUMENT

I. The Energy Policy and Conservation Act Allows DOE to Consider Climate Change in Setting and Justifying Energy Conservation Standards

AHRI alleges that DOE lacks “environmental regulatory power” under the Energy Policy and Conservation Act (“EPCA”), and therefore attacks DOE’s consideration of the Rule’s billions of dollars of climate benefits. AHRI Br. 23. AHRI both misinterprets EPCA’s grant of regulatory authority and overlooks climate change’s serious economic and national security dimensions. While Respondents explain that the Rule’s stringency ultimately did not turn on climate considerations, Resp’ts Br. 33-34, DOE has clear statutory authority to weigh climate effects in calibrating the Rule’s stringency and detailing its economic justification.

This Rule’s large social benefits from mitigating carbon emissions and other pollution were evaluated by DOE under the sixth of EPCA’s seven factors for determining the economic justification of appliance efficiency standards: specifically, “the need for national energy . . . conservation,” 42 U.S.C. § 6295(o)(2)(B)(vi). *See* 79 Fed. Reg. at 17,738 (labeling the factor as “the need of the nation to conserve energy,” and listing environmental benefits along with energy security and reliability). The key statutory term “need” is not defined, *see* 42 U.S.C. § 6291, and DOE generally deserves deference in interpreting such ambiguous language. *See Chevron U.S.A. Inc. v. Natural Res. Def. Council, Inc.*, 467 U.S. 837, 842-45 (1984). As courts and agencies have repeatedly determined, environmental, economic, health, and foreign policy effects can be important aspects of “the need for national energy conservation,” and EPCA certainly does not bar their consideration.

For example, EPCA gives the Department of Transportation nearly identical instructions to weigh “the need of the United States to conserve energy” in setting motor vehicle efficiency standards. 49 U.S.C. § 32,902(f). In defining that language, DOT has explained:

As courts of appeal have noted in three decisions stretching over the last 20 years, [DOT] defined the “need of the Nation to conserve energy” in the late 1970s as including “. . . environmental, and foreign policy implications” In 1988, [DOT] included climate change concepts in its [vehicle efficiency standards] Since then, [DOT] has considered the benefits of reducing tailpipe carbon dioxide emissions . . . pursuant to the statutory requirement to consider the nation’s need to conserve energy by reducing fuel consumption.

77 Fed. Reg. 62,624, 62,669-70 (Oct. 15, 2012). In 1988, the D.C. Circuit highlighted that DOT interprets the language as “*requir[ing]* consideration of . . . environmental . . . implications.” *See Pub. Citizen v. Nat’l Highway Traffic Safety Admin.*, 848 F.2d 256, 263 n.27 (D.C. Cir. 1988) (R.B. Ginsburg, J.) (quoting 42 Fed. Reg. 63,184, 63,188 (Dec. 15, 1977), adding emphasis to the word *requires*, and explaining that EPCA contains no statutory command prohibiting environmental considerations). More recently, in 2008, the Ninth Circuit indicated that, due to advancements in “scientific knowledge of climate change and its causes,” “[t]he need of the nation to conserve energy is even more pressing today than it was at the time of EPCA’s enactment.” *Ctr. for Biological Diversity v. Nat’l Highway Traffic Safety Admin.*, 538 F.3d 1172, 1197-98 (9th Cir. 2008). The court held that DOT’s failure to monetize climate benefits explicitly in its economic assessment of vehicle efficiency standards was arbitrary and capricious. *Id.* at 1203. Here, DOE rationally recognized climate change as an important aspect of “the need for national energy

conservation,” and monetized the economic, health, security, and environmental effects to the extent possible. 79 Fed. Reg. at 17,803-05.

From among the earliest energy conservation standards that DOE issued following EPCA’s 1987 amendments—and consistently since then, under administrations of both political parties—DOE has considered the economic and other effects of avoided carbon emissions when assessing the national need for energy conservation. Under President George H.W. Bush’s administration in 1989, DOE agreed with public commenters that “environmental effects,” including the “national security” implications of “mitigating global warming and pollution,” counted toward the “economic justification” for efficiency standards, under the “need of the nation to conserve energy” prong. 54 Fed. Reg. 47,916, 47,924, 47,937, 47,940 (Nov. 17, 1989). Less than two years later, again at the behest of commenters, DOE not only “quantified”—“to the extent DOE had data”—the “social benefits” of environmental effects like “global warming” to help justify the selected standards, but further noted that environmental effects “have also been considered in the development of the selected standard levels.” 56 Fed. Reg. 22,250, 22,259 (May 14, 1991).

These practices—particularly, quantifying climate effects to the extent possible—continued through subsequent presidential administrations. Under President Clinton’s administration, DOE elaborated that the “need of the nation to save energy” included “improv[ing] the Nation’s energy security, strengthen[ing] the economy, and reduc[ing] the environmental impacts of energy production.” 62 Fed.

Reg. 50,122, 50,143 (Sept. 24, 1997). And starting in 2008, under President George W. Bush, DOE began estimating a range of monetary benefits for carbon reductions. 73 Fed. Reg. 58,772, 58,814 (Oct. 7, 2008).

Longstanding agency interpretations and court rulings thus support DOE's statutory authority to consider climate change in setting and justifying energy conservation standards. In fact, as recently as 2010, commenting on this very rulemaking's framework document, AHRI agreed: "This is not the first time the Department has considered the benefits to the nation of potential CO₂ emissions reductions in an appliance efficiency standards rulemaking, *and we agree that it is an important factor to consider.*" AHRI 2010 Comments, No. 15 at 6 (emphasis added).

II. DOE Reasonably Applied the Interagency Working Group's Social Cost of Carbon Values to Evaluate Climate Effects

In this Rule, DOE reasonably used the social cost of carbon ("SCC") to evaluate the monetary benefits of reducing carbon dioxide ("CO₂") emissions. *See* 79 Fed. Reg. at 17,777. The SCC was developed by an Interagency Working Group ("IWG") comprised of economic and scientific experts from the White House and multiple federal agencies—including DOE—that regularly met to review technical literature, consider public comments, and discuss relevant inputs and assumptions. *Id.* Contrary to Petitioners' claims, AHRI Br. 25-27, the SCC values were developed through open and transparent processes, with significant public input, and using the best peer-reviewed science and economic methods available.

The IWG was convened by the White House to develop a single range of SCC estimates for all federal agencies to use consistently in their regulatory impact analyses. Final Technical Supporting Document [hereinafter “Final TSD”], No. 102 at 14A-4 (appending the IWG’s 2010 Technical Support Document [hereinafter “2010 IWG”]). Courts have long recognized “the basic need of the President and his White House staff to monitor the consistency of executive agency regulations with Administration policy. . . . The authority of the President to control and supervise executive policymaking is derived from the Constitution; the desirability of such control is demonstrable from the practical realities of administrative rulemaking.” *Sierra Club v. Costle*, 657 F.2d 298, 405-06 (D.C. Cir. 1981). Before the 2009 interagency process, different agencies used different SCC estimates in their regulatory analyses—if they estimated the SCC at all. *See* 2010 IWG, No. 102, at 14A-4. Such inconsistency risked sending mixed signals to the American public, American industry, and foreign countries about the U.S. administration’s policy on climate change, and led to inconsistent cost-benefit analyses across agencies and regulatory proceedings. By convening a consensus-driven interagency process, the White House ensured that all agencies would account for climate benefits in a rational and consistent manner. *See* Richard L. Revesz, *Quantifying Regulatory Benefits*, 102 Cal. L. Rev. 1423, 1439-41, 1454-55 (2014).

DOE acted reasonably and in accordance with longstanding executive orders, agency guidance, and case law in using the SCC to estimate this Rule’s economic benefits. Executive Orders instruct agencies to “use the best available techniques to

quantify anticipated present and future benefits and costs as accurately as possible.” Exec. Order No. 13,563 § 1(c), 76 Fed. Reg. 3821, 3821 (Jan. 18, 2011); accord Exec. Order No. 12,866 § 6(a)(3)(C), 58 Fed. Reg. 51,735, 51,741 (Oct. 4, 1993) (requiring economic analysis). The Office of Management and Budget (“OMB”) under President George W. Bush issued Circular A-4, which instructs agencies in the use of best practices for cost-benefit analysis. Office of Mgmt. & Budget, *Circular A-4* at 1 (2003) [hereinafter “Circular A-4”]. And courts have held that agencies cannot assign a zero dollar value to the social costs of climate change, even if those impacts are difficult to quantify. *See Ctr. for Biological Diversity*, 538 F.3d at 1200. Moreover, it is well-established that DOE can rely on interagency economic values; for example, federal agencies have long relied on discount rates developed by OMB in conducting regulatory impact analyses. *See, e.g.*, Office of Mgmt. & Budget, *Circular A-94* at 8-11 (1992) (recommending discount rates for regulatory impact analyses); Circular A-4 at 31–37; *see also Ohio v. Dept. of Interior*, 880 F.2d 432, 465 (D.C. Cir. 1989) (holding that the agency did not act unreasonably when it followed OMB guidance for discount rates).

A. The Social Cost of Carbon Values Were Derived Through a Transparent and Open Interagency Process

The IWG’s analytical process in developing the SCC was transparent and open, designed to solicit public comment and incorporate the most recent scientific analysis.

First, the process was transparent. Beginning in 2009, OMB and the Council of Economic Advisers established the IWG, composed of scientific and economic

experts from the White House, Environmental Protection Agency, and Departments of Agriculture, Commerce, Energy, Transportation, and Treasury, to develop a rigorous method of valuing CO₂ reductions resulting from federal regulations. 2010 IWG, No. 102 at 14A-3. In February 2010, the IWG released estimated SCC values, developed using the three most widely cited climate economic impact models (known as integrated assessment models). These models were each developed by outside experts, and published and extensively discussed in peer-reviewed literature. *See* 79 Fed. Reg. at 17,779. An accompanying Technical Support Document released by the IWG discussed the models, their inputs, and the assumptions used in generating the SCC estimates. 2010 IWG, No. 102 at 14A-1 to 14A-52. In May 2013, after all three underlying models had been updated and used in peer-reviewed literature, the IWG released revised SCC values, with an accompanying Technical Support Document. Final TSD, No. 102 at 14-B-i to 14-B-18 (appending the IWG's 2013 Technical Support Document with minor modifications [hereinafter "2013 IWG"]).

Both the 2010 and 2013 Technical Support Documents are comprehensive and rigorous in explaining the IWG's sources of data, assumptions, and analytic methods. The Government Accountability Office recently examined the IWG's process, and found that it was consensus-based, relied on academic literature and modeling, disclosed relevant limitations, and was designed to incorporate new information via public comments and updated research. Gov't Accountability Office, *Regulatory Impact Analysis: Development of Social Cost of Carbon Estimates* (2014).

Petitioners complain that the IWG did not name specific personnel who worked on the SCC estimates. *See* AHRI Br. 25. But neither Circular A-4 nor federal standards for internal control mandate personnel lists. *See generally* Circular A-4; Gov't Accountability Office, *Standards for Internal Control in the Federal Government*, (2014). Further, Petitioners' argument that the IWG failed to disclose the role of outside consultants is misleading. *See* AHRI Br. 25-26. For example, the IWG described consultation "with several lead authors" of the Fourth Assessment Report of the U.N. Intergovernmental Panel on Climate Change. 2010 IWG, No. 102 at 14A-13 to 14A-14.³

Second, the IWG's process was and continues to be open, soliciting public comments at multiple stages. Before it even released the 2010 SCC values, the IWG considered public comments on prior federal agency efforts to monetize climate effects. *See* 79 Fed. Reg. at 17,777; 2010 IWG, No. 102 at 14A-3. Next, in 2013, OMB requested public comments on all aspects of the SCC and its updated Technical Support Document. *See* 79 Fed. Reg. at 17,779 (citing 78 Fed. Reg. 70,586 (Nov. 26, 2013)). Over the 90-day comment period, OMB received at least 140 unique comments and thousands of form letters covering a range of topics; and OMB, through the IWG, responded to these comments. *See* 2015 Response to Comments 4-6.

³ In addition, the IWG responded to public comments in July 2015, and explained that for the 2013 IWG—i.e., the SCC estimates used by DOE for this Rule—the IWG staff ran all models themselves and did not use a consultant. Interagency Working Grp. on Social Cost of Carbon, U.S. Gov't, *Response to Comments: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866* at 37 (2015) [hereinafter "2015 Response to Comments"].

In addition, between February 2010 and May 2013, numerous federal agencies proposed rules that used the SCC and provided opportunities for public comment on all aspects of the SCC values and their development, including comment periods on several DOE energy conservation standards.⁴ These comments informed the IWG's revised SCC values released in May 2013. *See* 2013 IWG, No. 102 at 14-B-1. And as the comments cited in AHRI's brief demonstrate, AHRI Br. 28-29, interested parties continued to submit comments to DOE on the SCC during this very rulemaking.

In short, the IWG worked transparently and openly to develop and update the SCC values, and DOE's use of these values has been similarly transparent and open.

B. The Social Cost of Carbon Values Are Based on Peer-Reviewed Science and Economics

The SCC was developed with robust academic rigor, including peer review of both the integrated assessment models and the inputs used by the IWG. Petitioners' arguments to the contrary have no merit and fall far short of demonstrating that DOE was arbitrary and capricious in using the SCC to estimate the economic benefits from its energy conservation standards. *See* AHRI Br. 26-27.

The SCC values were developed using the three most widely cited climate economic impact models that link physical impacts to the economic damages of CO₂ emissions. Each of these integrated assessment models—known as DICE, FUND,

⁴ *See, e.g.*, 77 Fed. Reg. 32,381 (May 31, 2012); 77 Fed. Reg. 18,478 (Mar. 27, 2012); 76 Fed. Reg. 74,854 (Dec. 1, 2011); 75 Fed. Reg. 74,152 (Nov. 30, 2010); 75 Fed. Reg. 59,470 (Sept. 27, 2010).

and PAGE⁵—has been extensively peer reviewed in the economic literature. *See* 79 Fed. Reg. at 17,779; 2010 IWG, No. 102 at 14A-4. The newest versions of the models—updated in 2013—were also published in peer-reviewed literature. *See* Final TSD, No. 102 at 14-3; 2013 IWG, No. 102 at 14-B-1; *see also* William Nordhaus, *Estimates of the Social Cost of Carbon: Concepts and Results from the DICE-2013R Model and Alternative Approaches*, 1 J. Ass’n Env’tl. & Resource Economists 273 (2014). Each model translates emissions into changes in atmospheric carbon concentrations, atmospheric concentrations into temperature changes, and temperature changes into economic damages. 2010 IWG, No. 102 at 14A-6. The IWG gives each model equal weight in developing the SCC values. *Id.* at 14A-5.

The IWG also used peer-reviewed inputs to run these models. *Id.* at 14A-5 to 14A-29. The IWG conducted an “extensive review of the literature . . . to select three sets of input parameters for these models: climate sensitivity, socio-economic and emissions trajectories, and discount rates.” *Id.* at 14A-6. For example, to derive socioeconomic and emissions pathways, the IWG used results from the Stanford Energy Modeling Forum, all of which were peer-reviewed, published, and publicly available. *Id.* at 14A-16; *see also* Symposium, *International, U.S. and E.U. Climate Change Control Scenarios: Results from EMF 22*, 31 Energy Econ. S63 (2009). For

⁵ More specifically: DICE (Dynamic Integrated Climate and Economy), developed by William Nordhaus; PAGE (Policy Analysis of the Greenhouse Effect), developed by Chris Hope; and FUND (Climate Framework for Uncertainty, Negotiation, and Distribution), developed by Richard Tol. *See* 2010 IWG, No. 102 at 14A-5 n.b.

each parameter, the IWG documented its inputs, all of which are based on peer-reviewed literature. *See* 2010 IWG, No. 102 at 14A-13 to 14A-24.

Further, the analytical methods that the IWG applied to its inputs, such as Monte Carlo analysis and the Roe Baker distribution to address climate sensitivity, were also peer reviewed. *See id.* at 14A-14 (citing Roe and Baker studies). Monte Carlo analysis is a powerful statistical technique used for decades in social science to account for uncertainty, which has been extensively applied to the SCC models.⁶ Moreover, although there is no legal requirement that an agency's analysis itself be subject to peer review, the IWG's methods have been extensively discussed, often approvingly, in academic journals. *See, e.g.,* Michael Greenstone et al., *Developing a Social Cost of Carbon for US Regulatory Analysis: A Methodology and Interpretation*, 7 *Rev. Env'tl. Econ. & Pol'y* 23 (2013); Frank Ackerman & Elizabeth Stanton, *Climate Risks and Carbon Prices: Revising the Social Cost of Carbon*, *Econ.: The Open-Access, Open-Assessment E-Journal*, Apr. 2012, at 6 (reviewing the IWG's methods and stating, "[T]he Working Group analysis is impressively thorough.").

C. The Interagency Working Group Properly Addressed Uncertainty in the Damage Functions Used to Calculate the Social Cost of Carbon

The damage functions used by the IWG are based on the best available information and transparently address uncertainty in a way that yields a

⁶ *See, e.g.,* Simon Dietz & Nicholas Stern, *Why Economic Analysis Supports Strong Action on Climate Change: A Response to the Stern Review's Critics*, 2 *Rev. Env'tl. Econ. & Pol'y* 94, 103 (2008) (stating that integrated assessment models, including PAGE, use Monte Carlo procedures to estimate probabilities).

conservative assessment of the SCC. To argue that accounting for uncertainty makes the damage functions invalid, as Petitioners do, is wrong as a matter of both law and of economics. *See* AHRI Br. 27-28. Science by its nature is uncertain, and economists have developed tools to deal with uncertainty in climate damages. The question is not whether uncertainty exists, but whether the IWG used proper methods to account for uncertainty. The answer is resoundingly “yes.”

The IWG comprehensively accounted for and disclosed uncertainty. First, recognizing different ways of modeling climate science and damages, the IWG used three different integrated assessment models. 79 Fed. Reg. at 17,779; 2010 IWG, No. 102 at 14A-4. Second, the IWG used sensitivity analysis over these models, applying three different discount rates and five different socio-economic scenarios. *See id.* at 14A-26. Third, the IWG conducted Monte Carlo analysis, producing a range of estimates based upon different outcomes that climate and social science research indicate are possible.⁷ *Id.* at 14A-13 to 14A-18, 14A-28; *see also* Circular A-4 at 41-42 (describing the use of Monte Carlo simulations). Fourth, the IWG updated its damage estimates in 2013 to incorporate the most recent peer-reviewed versions of the integrated assessment models. 2013 IWG, No. 102 at 14-B-1. The scientific method requires continual examination of new evidence to improve the resulting analysis; the SCC was developed with the understanding that the IWG

⁷ A Monte Carlo simulation will run an integrated assessment model thousands of times, each time randomly picking the value of uncertain parameters from a probability distribution function. The IWG ran 10,000 Monte Carlo simulations for each of the three models and five socio-economic scenarios, randomizing the value of climate sensitivity and all other uncertain parameters.

would regularly revisit the estimates to reflect the “growing body of scientific and economic knowledge.” *Id.*

Petitioners cite work by Robert Pindyck, which discusses uncertainties inherent in SCC values. *See* AHRI Br. 27-28. Pindyck’s central criticism, however, is that the models fail to adequately capture very high damages and catastrophic risks, and thus likely *underestimate* future damages. *See* Robert S. Pindyck, *Climate Change Policy: What Do the Models Tell Us?*, 51 J. Econ. Literature 860, 869-70 (2013) (“[E]ven if a large temperature outcome has low probability, if the economic impact of that change is very large, it can push up the SCC considerably.”). Further, Pindyck explicitly endorses use of the 2013 SCC estimates as at least a minimum starting value. *Id.* at 870 (“My criticism of IAMs should *not* be taken to imply that, because we know so little, nothing should be done about climate change right now. . . . [E]ven though we don’t have a good estimate of the SCC, it would make sense to take the Interagency Working Group’s [current] number as a rough and politically acceptable starting point and impose a carbon tax (or equivalent policy) of that amount.”). Other economists have endorsed the utility of the SCC in peer-reviewed publications. *See, e.g.*, John Weyant, *Integrated Assessment of Climate Change: State of the Literature*, 5 J. Benefit-Cost Analysis 377, 401 (2014) (“The models have provided important insights into many aspects of climate-change policy.”); Richard L. Revesz et al., *Improve Economic Models of Climate Change*, 508 Nature 173, 174 (2014) (“[T]he current estimate for the social cost of carbon is useful for policy-making, notwithstanding the significant uncertainties.”) (co-

authored with Kenneth Arrow, among others). Moreover, recent work that was not taken into account in the IWG's analysis indicates that uncertainties with respect to the damage function suggest *higher* climate damages than currently captured in the models, not lower damages. *Id.* at 174 (“[C]limate-economic models need to be extended to include a wider range of social and economic impacts. . . . The future costs of climate change could be even higher . . .”). The current damage functions are likely conservative estimates because they omit many climate damages, including ocean acidification, wildfires, and effects of climate change on economic growth, to name only a few. *See id.*; Peter Howard, *Omitted Damages: What’s Missing From the Social Cost of Carbon* 2-45 (2014) (chronicling a host of impacts omitted from the damage functions, which contribute to “a downward bias to the federal SCC estimates”); *see also* Policy Integrity et al. Comments, No. 83 at 5.

Finally, uncertainty in benefits estimates does not mean that such benefits should be excluded from regulatory impact analyses. Courts have explicitly rejected this argument with respect to the SCC, and executive orders direct agencies to consider benefits even despite uncertainty. *See, e.g., Ctr. for Biological Diversity*, 538 F.3d at 1200 (holding that “while the record shows that there is a range of values, the value of carbon emissions reduction is certainly not zero,” despite agency protestations about uncertainty); Exec. Order No. 13,563 §§ 1(a)-(c), 76 Fed. Reg. at 3821 (instructing agencies to “use the best available techniques to quantify anticipated present and future benefits and costs as accurately as possible”). Notably, Congress’s conference report on EPCA explained that, in assessing the

statutory factors for “economic justification” of energy conservation standards, “where quantification is possible, it is expected that the Secretary will perform such quantification of individual factors *to the greatest extent practicable*.” S. Rep. No. 95-1294, at 116 (1978) (emphasis added).

In all, the SCC values were developed through an open and transparent process, with significant public input, using the best science and economic methods available. It is reasonable for federal agencies to use a single SCC, determined by expert consensus. Petitioners point to no alternative SCC more widely accepted or developed through a more rigorous process. DOE reasonably used the SCC to estimate the total benefits of this Rule.

III. DOE’s Use of the Social Cost of Carbon in Its Economic Analysis Was Proper

A. The Energy Policy and Conservation Act Allows DOE to Take a Global Perspective on Climate Benefits, Especially Because a Global Perspective Directly Advances National Interests

AHRI accuses DOE of violating EPCA by considering the global benefits of reduced carbon emissions, because AHRI argues that EPCA’s purpose is to guarantee only U.S., not international, welfare. AHRI Br. 28-29. AHRI gets the argument backwards: it is precisely to advance U.S. welfare that DOE must consider the global dimensions of climate change. The United States will surely experience within its own borders its share of climate change’s direct economic, health, security, and environmental damages. Yet a domestic-only view of climate change would prevent DOE from setting conservation standards at economically

efficient levels, and would impede international climate actions that directly benefit U.S. welfare.

DOE assesses this Rule's climate benefits by using the IWG's SCC framework. Following the IWG's recommendations, 2010 IWG, No. 102 at 14A-11 to -12, DOE gives three reasons for using a global SCC value. First, climate change "involves a global externality." 79 Fed. Reg. at 17,779. Second, climate change is "a problem that the United States alone cannot solve." *Id.* Third, "[t]here is no *a priori* reason why domestic benefits should be a constant fraction of net global damages over time." *Id.* at 17,778 n.66. AHRI dismisses the first two reasons as "*non sequiturs*" and ignores the third. AHRI Br. 29. Yet DOE's three reasons precisely explain why EPCA necessarily permits evaluation of the full societal costs of climate pollution.

To avoid a global "tragedy of the commons" that could irreparably damage all countries, including the United States, every nation should set policy according to a global SCC value. *See* Policy Integrity et al. Comments, No. 83 at 10; Garrett Hardin, *The Tragedy of the Commons*, 162 *Science* 1243, 1244 (1968) ("[E]ach pursuing [only its] own best interest . . . in a commons brings ruin to all."). Climate and clean air are global common resources, meaning they are freely available to all countries, but any one country's use—i.e., pollution—imposes harms on the polluting country as well as the rest of the world. Because carbon pollution does not stay within geographic borders but rather mixes in the atmosphere and affects climate worldwide, each ton of carbon emitted by the United States not only creates domestic harms, but also imposes large externalities on the rest of the world.

Conversely, each ton of carbon abated in another country benefits the United States along with the rest of the world. *See* 79 Fed. Reg. at 17,779 (discussing carbon’s “global externality”).

If all countries set their carbon emission levels based on only domestic costs and benefits, ignoring the large global externalities, the aggregate result would be substantially sub-optimal climate protections and significantly increased risks of severe harms to all nations, including the United States. Thus, basic economic principles demonstrate that the United States stands to benefit greatly if all countries apply a global SCC value in their regulatory decisions. A rational tactical option in the effort to secure that economically efficient outcome is for the United States to continue using a global SCC value itself. *See* Robert Axelrod, *The Evolution of Cooperation* 10-11 (1st ed. 1984) (on repeated prisoner’s dilemma games). The United States is engaged in a repeated strategic game of international negotiations and regulatory coordination, in which several significant players—including the United States, England, and France—have already adopted a global SCC framework. *See* Policy Integrity et al. Comments, No. 83 at 10-11. For example, Canada and Mexico have explicitly borrowed the U.S. estimates of a global SCC to set their own fuel efficiency standards.⁸ For the United States to now depart from

⁸ *See* Heavy-duty Vehicle and Engine Greenhouse Gas Emission Regulations, 147 C. Gaz. pt. II, 450, 544 (Can.), *available at* <http://canadagazette.gc.ca/rp-pr/p2/2013/2013-03-13/html/sor-dors24-eng.html> (“The values used by Environment Canada are based on the extensive work of the U.S. Interagency Working Group on the Social Cost of Carbon.”); Instituto Nacional de Ecología, Mexico, Regulatory Impact Analysis on *PROY-NOM-163-SEMARNAT-ENER-SCFI-2012, Emisiones de bióxido de carbono (CO₂) provenientes del escape y su equivalencia en términos de rendimiento de combustible, aplicable a vehículos*

this collaborative dynamic by reverting to a domestic-only SCC estimate could undermine the country's long-term interests in climate negotiations and could jeopardize emissions reductions underway in other countries, which are already benefiting the United States.

Negotiation is key to the President's constitutional foreign affairs powers, and the Supreme Court has "recognized the special importance of our nation speaking with one voice." See *Made in the USA Found. v. United States*, 242 F.3d 1300, 1317-18 (11th Cir. 2001) (explaining the Supreme Court's holding in *Baker v. Carr*, 369 U.S. 186, 211 (1962)). The development and analysis of U.S. regulations are essential parts of the dialogue between the United States and foreign countries about climate change. Through the IWG, the President has instructed all federal agencies to use a global SCC value as one important step in negotiations to encourage other countries to take reciprocal actions that also account for global externalities. As the IWG explained, "Emphasizing the need for a global solution to a global problem, the United States has been actively involved in seeking international agreements to reduce emissions. . . . When these considerations are taken as a whole, the interagency group concluded that a global measure of the benefits from reducing U.S. emissions is preferable." 2010 IWG, No. 102 at 14A-11 to -12; see also 79 Fed. Reg. at 17,779 (climate change is "a problem that the United States alone cannot solve"). If different agencies used different SCC values in setting regulatory policies, it would risk sending mixed signals to the international

automotores nuevos de peso bruto vehicular de hasta 3857 kilogramos (July 5, 2012), available at <http://207.248.177.30/mir/formatos/defaultView.aspx?SubmitID=273026>.

community. The President's constitutional powers to negotiate international agreements would be seriously impaired if federal agencies were forced to stop relying on a single, harmonized, global SCC value.

Finally, a global SCC value is in the national interest because harms experienced by other countries could significantly affect the United States. Climate damages in one country could generate large spillover effects to which the United States is especially vulnerable. Policy Integrity et al. Comments, No. 83 at 11 n.36. As seen historically, economic disruptions in one country can cause financial crises that reverberate globally at a breakneck pace. Similarly, "national security analysts . . . increasingly emphasize that the geopolitical instability associated with climatic disruptions abroad poses a serious threat to the United States." *Id.* at 12 & n.37. A global SCC framework properly recognizes that climate change will threaten the United States with significant and shifting international spillover effects.

In short, even if AHRI were correct that EPCA focuses exclusively on national welfare, a global perspective on climate change *promotes* national welfare. EPCA instructs DOE to set "economically justified" standards after weighing the "need for national energy conservation," which, as explored above, includes economic, security, environmental considerations generally, and climate change particularly. To advance our own national interests, numerous strategic factors support the continued use a global SCC value in setting and evaluating energy conservation standards.

B. DOE Properly Assessed All Significant Costs and Benefits Likely to Result from the Rule over Time

In accordance with economic and regulatory best practices, DOE accounted for all significant benefits and costs likely to result from the Rule over time. Petitioners argue that DOE inappropriately analyzed the full stream of climate benefits but only part of the stream of costs, AHRI Br. 36-43, but DOE employed proper cost-benefit analysis techniques in assessing the rule's effects over time. Circular A-4 instructs that the timeframe for agencies' analyses "should cover a period long enough to encompass all the important benefits and costs likely to result from the rule." Circular A-4 at 15. DOE followed this approach.

Circular A-4 further explains that "[b]enefits and costs do not always take place in the same time period." *Id.* at 31. When "benefits or costs are delayed or otherwise separated in time from each other, the difference in timing should be reflected" in the agency's analysis. *Id.* Importantly, the "ending point" for economic analysis should be set "far enough in the future to encompass all the significant benefits and costs likely to result from the rule." *Id.* After identifying all significant regulatory benefits and costs likely to occur, the agency must then account for any differences in timing of costs and benefits by using a "discount rate." The discount rate accounts for the fact that "[b]enefits or costs that occur sooner are generally more valuable." *Id.* at 32. The further in the future the effects are, the "more they should be discounted" before considering them in the cost-benefit analysis. *Id.*

DOE followed these regulatory best practices in assessing this Rule. DOE first considered all significant benefits and costs stemming from all equipment projected

to be sold under the standard between 2017 and 2046.⁹ 79 Fed. Reg. at 17,728, 17,773, 17,779, 17,811. Then, DOE correctly employed discounting to account for the timing of each effect. *Id.* For costs, DOE conducted a discounted cash-flow analysis. *See, e.g., id.* at 17,773 (pertaining to manufacturers' costs). Because costs occur early in the analytical time period, they were discounted far less—and therefore weighted proportionately more heavily in the analysis—than the climate benefits occurring later.

With respect to climate benefits, DOE considered only those carbon reductions occurring as a result of this Rule between 2017 and 2046. 79 Fed. Reg. at 17,779; Final TSD, No. 102 at 13-4 to 13-5. However, because carbon persists in the atmosphere for centuries, the climate benefits from reduced emissions over those 30 years will continue to accrue into the future. To account correctly for the timing of future climate benefits, the agency: (1) converted the SCC values into 2013 U.S. dollars to account for inflation, (2) multiplied emission reductions in Year X by the corresponding SCC in Year X, (3) applied the discount rate to calculate the present value of future emission benefits from reductions in Year X, and then (4) summed up the present value of emission benefits across all relevant years. 79 Fed. Reg. at 17,779; Final TSD, No. 102 at 14-2. As even Petitioners acknowledge, the climate benefits that DOE analyzes arise from reductions in carbon emissions that will

⁹ In addition, DOE accounts for extra years of manufacturer costs toward the beginning of the Rule's operation, covering years 2013 to 2017, after announcement of the Rule but before the compliance date. Final TSD, No. 102 at 12-22.

occur in the first 30 years of the Rule's operation, the same time frame used for the analysis of the Rule's costs. *See* AHRI Br. 37-38.

Petitioners argue that DOE improperly failed to count future indirect costs, while counting hypothetical future climate benefits. *See* AHRI Br. 42. Contrary to Petitioners' claims, DOE did consider the potential future effects of increased manufacturing costs; the analysis accounts directly for the cash value of increased manufacturing costs when they are accrued. 79 Fed. Reg. at 17,773; Final TSD, No. 102 at 12-22. Petitioners argue that these increased manufacturing costs will lead to lower R&D spending and reduced future innovation, but they fail to account for how the discounting process works. Discounting incorporates these foregone investment opportunities. The discount rate accounts for the fact that "[r]esources that are invested will normally earn a positive return," by valuing "current consumption" as "more expensive than future consumption," because society is "giving up that expected return on investment" when it "consume[s] today." Circular A-4 at 32. Because the manufacturer costs are accrued toward the beginning of the analysis period, they are valued more highly when using a discount rate than future climate effects, which reflects the higher opportunity cost of losing access to resources in the short-term. Petitioners also argue that DOE failed to properly consider future effects of employment loss, but DOE did conduct an employment analysis and found the employment effects of the rule to be negligible on balance. *See* Final TSD, No. 102 at 12-26 to 12-27, 16-3 to 16-4.

Petitioners also take issue with the timespan of benefits reflected in the analysis, arguing that intervening factors may change climate outcomes. AHRI Br. 37, 39. However, the SCC models already account for potential adaptation to climate change, as well as uncertainty, and still find strong evidence that carbon emitted today will affect the climate for centuries. *See* Peter Howard, *Omitted Damages: What's Missing From the Social Cost of Carbon* 42-43 (2014); Sections II(B)-(C), *supra*.

Petitioners cite the proposed Clean Power Plan as an example of an intervening factor that may affect climate outcomes in a way not explored in the analysis. However, the Clean Power Plan had not even been proposed when this Rule was finalized on March 28, 2014. *See* 79 Fed. Reg. 34,830 (proposed June 18, 2014). DOE followed standard procedure by considering all *existing* federal and state regulations in developing the emissions baseline used in its analysis. *See* Final TSD, No. 102 at 13-1 (“The analysis of power sector emissions uses . . . DOE’s NEMS-BT model, [which] . . . incorporates the projected impacts of . . . current Federal and State legislation and final implementation regulations in place as of the end of December 2012.”); *see also* Circular A-4 at 15 (noting that the baseline used for comparison purposes in regulatory impact analysis “should reflect the future effect of current government programs and policies”). If and when the Clean Power Plan is finalized, it will be incorporated into the DOE baseline model for future rulemakings, like all other air emissions regulations. Before a rule is finalized (or even proposed, as in

this case), its content may change significantly; DOE's decision to not include the Clean Power Plan in its emissions baseline was eminently reasonable.

In short, DOE conducted a comprehensive cost-benefit analysis that directly compared the present value of all significant benefits and costs resulting from 30 years of this Rule's operation, in accordance with regulatory best practices.

CONCLUSION

For the foregoing reasons, the Court should deny the petitions for review with respect to DOE's use of the social cost of carbon.

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Respectfully submitted,

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CERTIFICATE OF COMPLIANCE WITH WORD LIMITATION

I hereby certify that this brief complies with the requirements of Fed. R. App. P. 32(a)(5) and (6) and Circuit Rule 32(b) because it has been prepared in 12-point Century Schoolbook, a proportionally spaced font. I further certify that, in accordance with Federal Rule of Appellate Procedure 32(a)(7)(C), the foregoing Brief of the Institute for Policy Integrity at New York University School of Law as Amicus Curiae In Support of Respondents contains 6,987 words, as counted by counsel's word processing system, and this complies with the applicable word limit established by the Court.

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CERTIFICATE OF SERVICE

I hereby certify that on July 29, 2015, I filed the foregoing Brief of the Institute for Policy Integrity at New York University School of Law as Amicus Curiae In Support of Respondents through the Court's CM/ECF system, which will send a notice of filing to all parties, because all parties are registered CM/ECF users.

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