

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF MISSOURI
EASTERN DIVISION**

THE STATES OF MISSOURI, ALASKA,
ARIZONA, ARKANSAS, INDIANA,
KANSAS, MONTANA, NEBRASKA,
OHIO, OKLAHOMA, SOUTH
CAROLINA, TENNESSEE, and UTAH,

Plaintiffs,

v.

JOSEPH R. BIDEN, JR., in his official
capacity as President of the United States of
America, et al.,

Defendants.

No. 4:21-CV-00287-AGF

**PLAINTIFFS' COMBINED REPLY IN SUPPORT OF
THEIR MOTION FOR A PRELIMINARY INJUNCTION
AND OPPOSITION TO DEFENDANTS' MOTION TO DISMISS**

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INTRODUCTION

With respect to the Interagency Working Group, Defendants concede that “[n]o statute establishes it, nor delegates it any legislative authority.” Doc. 28, at 41. And Defendants also concede that, pursuant to Executive Order 13990, the Working Group’s Interim Values are *binding* on federal agencies, unless a statute specifically prohibits their use. “To be sure, the Executive Order *requires* agencies to use the Interim Estimates,” Defendants write, unless “the agency faces any conflicting statutory obligation.” Doc. 28, at 23 (emphasis added); *see also id.* (conceding that agencies “will ... rely on the Interim Estimates when they have *discretion* to do so”); *id.* at 38 (conceding that “agencies may, at least in some circumstances, be bound by the Executive Order”). This concession follows the plain language of the Executive Order, which directs that “agencies *shall* use” the Interim Values “when monetizing the value of changes in greenhouse gas emissions resulting from regulations and other relevant agency actions.” Doc. 1-1, at 5 (EO 13990, § 5(b)(ii)(A)) (emphasis added). Thus, under the Interim Values, federal agencies *must* use their delegated authority in a specific way on a critical, substantive policy question—even though “[n]o statute establishes [the Working Group], nor delegates it any legislative authority.” Doc. 28, at 41.

These concessions are fatal to virtually every argument Defendants make, both on standing and on the merits. Defendants liken Executive Order 13990 to prior Executive Orders that imposed *procedural* requirements on the federal agency rulemaking process, such as centralized review and preparing RIAs. Doc. 28, at 2. The analogy breaks down because EO 13990 dictates how agencies must exercise their delegated authority on a specific, *substantive* legislative question—thus exercising quintessentially legislative authority.

Defendants argue that Plaintiffs' claims will be "hypothetical" and "speculative" until another federal agency relies on the Interim Values in a final rulemaking. Doc. 28, at 14. But there is nothing "hypothetical" about how the agencies will use the Interim Values. According to the Executive Order, if agencies *may* consider the "social cost" of greenhouse gases in their exercise of discretion, they *must* do so, and (what is more) they *must* use the specific numerical values calculated by the Interagency Working Group. Doc. 28, at 3; Doc. 28-4, at 13. This requirement permanently tilts the playing field in future agency rulemakings against the Plaintiff States, who would raise substantive arguments *against* the use of such values, and against the Working Group's particular numbers. In future rulemakings, the agencies' adoption on the Interim Values is a foregone conclusion—commanded by the President of the United States—and the Plaintiff States' substantive objections to them will be disregarded. That is a concrete injury in itself. *See, e.g., City of Los Angeles v. Barr*, 929 F.3d 1163, 1173 (9th Cir. 2019) ("[T]his inability to compete on an even playing field constitutes a concrete and particularized injury.").

Indeed, on Defendants' view, the Executive will make a policy decision of great import—the calculation of the "social costs" of greenhouse gases—without any opportunity for input from interested parties or the public, at any point. The Working Group did not accept any public comments, and future agencies are bound by the Working Group's numbers. This flouts the basic requirements of the APA.

Moreover, there is nothing "speculative" about Plaintiffs' allegation that the Interim Values will inevitably be used to justify increased regulatory costs in foundational sectors of the American economy, including energy, agriculture, and manufacturing. That is the whole point of the Interim Values. There is nothing speculative about predicting that the Interim Values will function exactly as designed, and as Defendants say they will. Plaintiff States' injuries are far more concrete and

imminent than the predicted loss of centimeters of coastline over 100 years that the Supreme Court found sufficient to support State standing in *Massachusetts v. EPA*, 549 U.S. 497, 522 (2007). *See also id.* at 520 (holding that States are “entitled to special solicitude in our standing analysis”). And they are far more imminent and less speculative than the injuries predicted by the Plaintiff States in *Department of Commerce v. New York*, 139 S. Ct. 2551, 2565-66 (2019), where it was predicted that unlawful aliens “will likely react in predictable ways.” Here, Plaintiff States merely predict that federal agencies will follow an executive order from the President of the United States.

Defendants argue that it is too early to consider the legality of the Working Group’s actions until they are used by some other federal agency. But the Interim Values present an Executive-Branch-wide, binding determination on a critical policy question *now*. And the Supreme Court recently cast doubt on the notion that a lawsuit challenging a *later* agency’s action is a “proper vehicle[] for attacking” an earlier agency’s action that the later agency relies on. *Dep’t of Homeland Sec. v. Regents of the Univ. of Cal.*, 140 S. Ct. 1891, 1910 (2020). Thus, Defendants seek to place Plaintiffs in a Catch-22—now, they say that it is too early to challenge the Working Group’s actions, but when another agency relies on them, they will say it is too late. *See id.* Article III does not insulate the Executive’s violation of the separation of powers from all judicial review.

Defendants concede that they never afforded Plaintiffs notice or opportunity to comment on the Interim Values, but they contend that this is a supposedly a “bare procedural violation, divorced from any concrete harm.” Doc. 28, at 29. On the contrary, as Plaintiffs allege, the Interim Values impose a wide array of concrete harms on them, including prejudicing their ability to participate in future rulemakings, impacting their operation of cooperative-federalism programs, and inflicting specific pocketbook injuries. On Defendants’ view, the exception would swallow

the rule, and all deprivations of the right to comment would be non-actionable “bare procedural violations.” The States have standing, and the Interim Values must be vacated, on this basis alone.

Citing *Massachusetts v. Mellon*, 262 U.S. 447 (1923), Defendants argue that States cannot assert *parens patriae* standing against the federal government. Doc. 28, at 27. The Supreme Court rejected this very argument in *Massachusetts v. EPA*, 549 U.S. 497, 520 n.17 (2007). Here, the States do not seek to “‘protect [their] citizens from the operation of federal statutes,’ (which is what *Mellon* prohibits).” *Id.* (citing *Mellon*, 262 U.S. at 484-85). Instead, they seek “to assert [their] rights under” a federal statute, *id.*—here, the Administrative Procedure Act—as well as asserting their own sovereign interests. This is squarely permitted by *Massachusetts v. EPA*. *Id.*

Defendants argue that the States’ asserted federalism injuries merely raise “abstract questions” of political power and sovereignty. Doc. 28, at 29. On the contrary, the Interim Values are binding in future agency proceedings, and thus they directly impact the States’ sovereign interests. Among other things, they directly affect the States’ ability to be heard in future agency rulemakings—because the States’ substantive objections to the Interim Values will receive no meaningful consideration in the face of the President’s directive—and they directly impact the States’ administration of cooperative-federalism programs.

Defendants argue that the Working Group is not an “agency” at all because it is supposedly akin to President Reagan’s Task Force on Regulatory Relief, discussed in *Meyer v. Bush*, 981 F.2d 1288 (D.C. Cir. 1993). Doc. 28, at 39. But Defendants correctly describe that Task Force as “oversee[ing] the new regulatory review *process*,” *id.* (emphasis added), not as dictating binding *substantive* numerical values that agencies must use when they have discretion. The Working Group bears no resemblance to the Task Force at issue in *Meyer*.

Defendants argue that there is not a “final agency action” under *Bennett v. Spear*, 520 U.S. at 177-78, but again, their concession that the Interim Values are binding undermines their position. Defendants overlook that finality depends on whether the Interim Values are the “consummation of *the agency’s* decisionmaking process,” *Bennett*, 520 U.S. at 177-78 (emphasis added)—not that of some future agency. They argue that the Interim Values are devoid of “direct and appreciable legal consequences,” Doc. 28, at 38, but that argument cannot be squared with their concession that the Interim Values are binding on federal agencies *now*. The fact that all federal agencies with any leeway to consider such costs will now do so, and will use the Working Group’s specific numbers, is a “direct and appreciable legal consequence[],” *id.*, of enormous practical import. And it directly forecloses the States from meaningful participation in future rulemakings of other agencies.

In light of Defendants’ concessions, these and all Defendants’ other arguments lack merit. And their overarching narrative—that the Interim Values are merely internal and business-as-usual for the Executive Branch—fails even cursory review. Creating a secretive, “super” agency by executive fiat that directs other agencies to use specific valuations of costs in “regulations and other relevant agency actions” is not business-as-usual. E.O. 13990 §5(b)(ii)(a). Breaking with standard APA practice and publishing such rules without notice and comment does not “allow for meaningful and informed comment,” and is not business-as-usual. *Am. Med. Ass’n v. Reno*, 57 F.3d 1129, 1132 (D.C. Cir. 1995). Plaintiff States have suffered and will suffer injury from the Working Group’s increasing the social cost of carbon from roughly \$7 to \$51 (more than 700%) without engaging in rulemaking under the APA. Plaintiff States have already suffered injury from this procedural failure. *California v. Trump*, No. CV 19-960 (RDM), 2020 WL 1643858, at *14 (D.D.C. Apr. 2, 2020). Plaintiff States have also alleged that they will imminently suffer future

injury to their sovereignty and their pocketbooks from future agency actions using the Interim Values that increase the costs of goods that they buy and diminish their tax revenue. *E.g.*, Am. Compl. ¶ 184. Plaintiff States have alleged a “predictable effect of Government action on the decisions of third parties.” *Dep’t of Com.*, 139 S. Ct. at 2566. Plaintiffs have standing, the issues are ripe, and the Executive’s actions are indefensible on the merits.

STANDARD OF REVIEW

“A court deciding a motion under Rule 12(b)(1) must distinguish between a ‘facial attack’ and a ‘factual attack’ on jurisdiction.” *Carlsen v. GameStop, Inc.*, 833 F.3d 903, 908 (8th Cir. 2016). Under “a facial attack, ‘the court restricts itself to the face of the pleadings, and the non-moving party receives the same protections as it would defending against a motion brought under Rule 12(b)(6).’” *Id.* Although Defendants failed to include a standard of review and specify what kind of motion they filed, a fair reading indicates that they claim the injuries pleaded on the face of the Amended Complaint are legally insufficient—*i.e.*, a “facial attack.” Plaintiff States reserve the right to respond should any dispute arise.

To avoid dismissal under Rule 12(b)(6), “a complaint must contain sufficient factual matter, accepted as true, to ‘state a claim to relief that is plausible on its face.’” *Ashcroft v. Iqbal*, 556 U.S. 662, 678 (2009) (quoting *Bell Atlantic Corp. v. Twombly*, 550 U.S. 544, 555 (2007)). A complaint that does not raise a plausible claim to relief is legally insufficient. *Couzens v. Donohue*, 854 F.3d 508, 518 (8th Cir. 2017) (dismissing complaint because asserted cause of action unrecognized); *Brown v. Mortg. Elec. Registration Sys., Inc.*, 738 F.3d 926, 935 (8th Cir. 2013). “A claim is plausibly pleaded when its “factual context ... allows the court to draw the reasonable inference that the defendant is liable for the misconduct alleged.” *Kuhns v. Scottrade, Inc.*, 868 F.3d 711, 717 (8th Cir. 2017).

ARGUMENT

I. Plaintiff States have Article III standing.

Plaintiff States have alleged facts showing actual injury and a substantial risk of injury based on the Interim Values increasing the burden of regulations in favor of future benefits and interfering with their proprietary, sovereign, and quasi-sovereign interests. The Amended Complaint alleges both procedural injury and future injuries, and these injuries are traceable back to the Interim Values due to Executive Order 13990 binding agency action.

Article III standing requires an injury that is “concrete, particularized, and actual or imminent; fairly traceable to the challenged action; and redressable by a favorable ruling.” *Clapper v. Amnesty Int’l USA*, 568 U.S. 398, 409 (2013). To satisfy the sufficiently traceable prong, plaintiff may rely “on the predictable effect of Government action on the decisions of third parties.” *Dep’t of Com.*, 139 S. Ct. at 2566. “An allegation of future injury may suffice if the threatened injury is “certainly impending,” or there is a ‘substantial risk’ that the harm will occur.” *Susan B. Anthony List v. Driehaus*, 573 U.S. 149, 158 (2014) (quoting *Clapper*, 568 U.S. at 409). Plaintiff must support each element “with the manner and degree of evidence required at the successive stages of the litigation.” *Susan B. Anthony List*, 573 U.S. 158 (quoting *Lujan v. Defs. of Wildlife*, 504 U.S. 555, 561 (1992)). “[O]ne party with standing is sufficient,” *Rumsfeld v. FAIR*, 547 U.S. 47, 52 n.2 (2006).

Defendants claim that Plaintiff States cannot show any aspect of standing for any of their claims. Doc. 28 at Part I.A. Looking at the claims en masse, Defendants assert that any threatened injury is speculative because any injury can only arise from future regulations issued by different agencies. *Id.* at 15–16. But the *whole point* of the Interim Values is to mandate their usage in federal agency actions to justify increased regulatory costs. The proposition that these burdens

may not come to pass because the agencies are “independent decisionmakers” contradicts Defendants’ concession that the Interim Values are *binding* unless foreclosed by statute, including the many times where the agency claims discretion. *Id.* at 23, 45.

Due to this future-injury issue, Defendants assert that any injury cannot be traced to the Working Group. *Id.* at 21–22. They allege that the Court cannot grant relief as even without Executive Order 13990, agencies would use the Interim Values because they are the “best available science.” *Id.* at 24. Plaintiff States correctly note that no agency could rely on the Interim Values when both their expert affidavit, and the 2021 TSD itself, explain that, in fact, the Interim Values do “not reflect the tremendous increase in the scientific and economic understanding of climate-related damages that has occurred in the past decade.” 2021 TSD at 22. This is exactly the impending harm Plaintiff States pleaded to satisfy standing.

Defendants’ assertions ask the Court to believe that executive departments will disobey an Executive Order requiring them to use the Interim Values in agency actions when monetizing the benefits of reducing greenhouse gas emissions. That is not a plausible prediction.

A. Plaintiffs States have suffered a clear procedural injury.

Plaintiff States have suffered a procedural injury because the Interim Values are effective now as a final rule that did not go through APA procedures, including notice-and-comment and judicial review under 5 U.S.C. § 706. Count III alleges that the Working Group failed to utilize APA procedures in promulgating the Interim Values, Am. Compl. ¶¶ 144–145, 211–218, and that the Interim Values could not be promulgated because they are arbitrary and capricious, unreasonable, contrary to law, and in excess of authority, *id.* ¶¶ 147–151, 219–228.

This injury has already occurred, as members of the interested public, like Plaintiff States, were deprived of the opportunity to meaningfully comment (or comment at all) on the Interim

Values. *Connecticut Light & Power*, 673 F.2d 525, 530 (1982). The comment period should “give affected parties an opportunity to develop evidence in the record to support their objections to the rule and thereby enhance the quality of judicial review.” *Prometheus Radio Project v. FCC*, 652 F.3d 431, 449 (3d Cir. 2011). This, of course, should occur before the rule is finalized. 5 U.S.C. § 553(c). And “post-promulgation comments [are] an inadequate substitute for APA procedures.” *United States v. Johnson*, 632 F.3d 912, 931 (5th Cir. 2011). Plaintiff States have pleaded that this deprived them of the opportunity to comment and submit evidence that they would have commented.¹ Am. Compl. ¶¶ 153, 191, 194; *Pls. States’ Memo*, Doc. 18, at 37.

Defendants assert that this is a “bare procedural violation” insufficient for injury-in-fact because being unable to comment—without more—is not an injury. Doc. 28, at 29 (citing *Summers v. Earth Island Inst.* 555 U.S. 488, 496 (2009)). But *Summers* merely stands for the unremarkable proposition that a plaintiff lacks an injury to challenge procedural regulations after settling the substantive claim causing the injury. Plaintiff was aggrieved by an agency selling timber and sued over the sale and a separate regulation that permitted the agency to take the action without a notice, comment, and appeals process. 555 U.S. at 491. When the parties *settled* over that particular sale, the Court found that the challenges to the underlying regulation could not proceed. *Id.* at 496.

Plaintiff States do not challenge the effect a different regulation has on a dispute that has settled. They challenge the Working Group’s failure to follow Congress’s blueprint in issuing the

¹ In fact, Plaintiff States have continued to comment on the issues raised by the Interim Values when provided a reasonable opportunity to do so. In addition to the FERC comment submitted before their opening brief was filed, they also commented directly on the Interim Values in OMB’s non-rulemaking docket, OMB-2021-0006, on June 21, 2021, after their opening brief was filed. *See* Ex. 1. This comment explains that the Interim Values are arbitrary, outdated, and the process lacks transparency that impedes the ability to comment.

regulation. See *FCC v. Fox Television Stations, Inc.*, 556 U.S. 502, 537 (2009) (Kennedy, J. concurring in part) (Congress passed the APA “to ensure that agencies follow constraints even as they exercise their powers.”). And as in all APA procedural suits, a vacatur and remand for notice-and-comment will redress that issue. Thus, this injury is cognizable and it is directly traceable to the Working Group’s failure to engage in ordinary notice-and-comment.

B. Plaintiffs States have pleaded the Interim Values will cause injuries that are “certainly impending” and present a “substantial risk” of harm.

The Amended Complaint also identifies “certainly impending” injuries and those with a substantial risk to Plaintiff States’ proprietary, sovereign, and quasi-sovereign interests that cannot be considered speculative. Am. Compl. ¶¶ 153–190. Defendants claim that Plaintiff States’ “miscellaneous bases for standing” are insufficient, Doc. 28, at 26, and that any future injury is too speculative because it relies on a future regulation (that may never come to pass) and therefore, it is unknowable in advance when the Interim Values will be outcome determinative, *id.* at 16–21. These flawed assertions fail legally and do not acknowledge the Plaintiff States’ well-pleaded allegations. There is nothing speculative about Plaintiff States’ theory that the Interim Values will be used by federal agencies to justify increased regulatory costs—that is the whole point of the Interim Values.

“There is no difficulty in recognizing a state’s standing to protect proprietary interests or sovereign interests.” *Air All. Houston v. Env’t Prot. Agency*, 906 F.3d 1049, 1059 (D.C. Cir. 2018) (citing 13B Wright & Miller, FED. PRAC. & PROCEDURE § 3531.1, Government Standing – States (3d ed.)). States also may sue as *parentes patriae* to vindicate their “quasi-sovereign interest[s] in the health and well-being—both physical and economic—of its residents in general” and “in not being discriminatorily denied its rightful status within the federal system.” *Alfred L. Snapp & Son, Inc. v. Puerto Rico, ex rel., Barez*, 458 U.S. 592, 607. And states are “entitled to special solicitude

in our standing analysis” even in challenging the federal government’s administrative actions. *Massachusetts v. EPA*, 549 U.S. at 520 (granting petition to force rulemaking).

The Plaintiff States have diverse, energy-rich economies, and the Interim Values threaten specific tax revenues generated from royalties on fossil fuels that States will need to be replaced. *Wyoming v. Oklahoma*, 502 U.S. 437, 447–48 (1992). Plaintiff Utah, for example, received \$58.6 million in revenues from federal mineral leases that help fund the State Board of Education, the Utah Geological Survey, and the Wildland Fire Suppression Fund. Utah Code §§59-21-1, 35A-8-303, 59-21-2.; State of Utah Comprehensive Annual Financial Report (June 30, 2020) at 42, available at <https://bit.ly/3cXJQTs>. It also collected \$3.7 million in oil and gas conservation fees. Utah Tax Commission FY2020 Annual Report at 67-68, available at <https://bit.ly/3d1V7Sw>. The oil, gas, and mining industries pay hundreds of millions of dollars in direct production taxes, mineral royalties, and property taxes to Utah. Plaintiff Alaska distributes “an annual dividend that is paid to Alaska residents from investment earnings of mineral royalties.” Alaska Dept. of Rev. Permanent Fund Dividend Division, *About Us*, available at <https://pfd.alaska.gov/Division-Info/About-Us>. Plaintiff States receive royalty and other payments based on fossil fuel productions that are threatened by increasing energy costs to reduce demand. U.S. Dept. of Interior, Natural Resources Revenue Data, <https://revenue.data.doi.gov/query-data/?dataType=Disbursements>. These are a “direct financial stake” like the one that permitted California to sue the Secretary of the Interior to enjoin future leases for the Secretary’s failure “to experiment with bidding systems” that increased royalties. *Watt v. Energy Action Educ. Found.*, 454 U.S. 151, 158–59 (1981).

Plaintiff States have also alleged injuries to regulatory encroachment in traditional areas of state regulation and programs that are administered cooperatively by state agencies. Am. Compl.

¶¶162–176. These include areas of cooperative federalism and coopting state actors. The Amended Complaint includes allegations that future regulations will increase the costs on all manner of products Plaintiff States use to provide services and carry out their sovereign functions. *E.g., id.* ¶¶ 160-61. Plaintiff States have also identified that their energy needs rely on fossil fuels, and those needs drive their economies. Doc. 18, at 48–52. Their economies use energy to build cars, heat and cool homes, produce steel and raw materials, and grow food for the world. *Id.* Regulations that require offsetting potential benefits from greenhouse gas emissions will harm these economies, and as a result Plaintiff States’ tax coffers suffer in the short term without much hope of avoiding future harm. These implicate both pocketbook injuries and sovereign interests to vindicate their rightful place in the federal system not to be subject to rulemakings that are not authorized by federal statutes.

Defendants’ claim that because “a *parens patriae* theory is off the table, all of Plaintiffs’ standing allegations can be ignored,” is incorrect. The United States stands in *parens patriae* when it comes to protecting the people ““from the operation of [federal] statutes.” *Massachusetts v. Mellon*, 262 U.S. 447, 485–86 (1923). The sole Eighth Circuit precedent Defendants cite involves Iowa seeking an injunction to compel the Secretary to implement discretionary federal disaster programs. *Iowa ex rel. Miller v. Block*, 771 F.2d 347, 349 (8th Cir. 1985). But the Working Group and the Interim Values do not operate pursuant to a federal statute, as the Defendants expressly concede. States may enforce federal statutes so that their residents “will have the full benefit of federal laws designed to address this problem.” *Snapp*, 458 U.S. at 609–10. Plaintiff States are merely enforcing that agency action must be taken pursuant to the APA. *See Massachusetts v. EPA*, 549 U.S. at 520. And the Court’s “special solicitude,” *id.*, is especially crucial where, as here, unilateral Executive action vitiates the States’ key protection in the federal constitutional

structure—representation in Congress. *See Garcia v. San Antonio Metro. Transit Auth.*, 469 U.S. 528, 556 (1985).

Defendants wrongly claim that Missouri suffers a self-inflicted harm by having to enforce any new, and more stringent, EPA standards as a result of Missouri’s “no stricter than” requirement. Doc. 28, at 28–29. An injury is not self-inflicted when a state makes no change to their law, only when a state changes their law to get the harmful result. *Compare Wyoming v. Oklahoma*, 502 U.S. 437, 447–50 (1992) (standing when Wyoming did nothing to tie its severance tax to Oklahoma law), *with Pennsylvania v. New Jersey*, 426 U.S. 660(1976) (per curiam) (no standing when Pennsylvania chose to base their tax credits on other states’ tax policies). As the “no stricter than” requirement is the status quo, Missouri is injured when the EPA changes standards based on the alleged social benefits accruing to more expensive “green” technologies.

Although Defendants ask the Court to “imagine” that the Interim Values were never issued, Doc. 28, at 18, Plaintiff States ask that the Court look at an actual proposed rule referencing the Interim Values. For this particular rule, Congress mandated that EPA reduce hydrofluorocarbon emissions by 85% in 15 years. EPA, *Proposed Rule – Phasedown of Hydrofluorocarbons: Establishing the Allowance Allocation and Trading under the AIM Act*, <https://bit.ly/2UO1F1H>. By altering the Interim Values to account for hydrofluorocarbons, EPA found that in one year, “the annual net benefits are \$2.6 billion, reflecting compliance costs of \$200 million and social benefits of \$2.8 billion.” Proposed Rule, 86 F.R. 27150, 27157 (May 19, 2021). Those benefits reflect only the social cost of hydrofluorocarbons. *Id.* Instead of imagining a new world, Plaintiff States allege the imminent prospect of an agency using the Interim Values to pass on those \$200 million in compliance costs because the \$2.8 billion in alleged social benefits makes the regulation economically viable. *See id.*

Plaintiff States may also rely on commonsense reactions to agency action. *Block v. Meese*, 793 F.2d 1303, 1308 (D.C. Cir. 1986) (Scalia, J.). Nor does a substantial risk of injury become “speculative” or “require guesswork” solely because a future agency regulation has not been finalized—otherwise it would be a present injury. *Clapper* does not apply here because instead of merely authorizing the injury, 568 U.S. at 412, the Executive Order mandates the Interim Values. Similarly, *Johnson v. State of Missouri* merely states that there is no immediate injury when a plaintiff’s injury is based on the discretionary acts of two separate third-party decision makers: a court rejecting a prisoner’s complaint as frivolous, and then a prison imposing sanctions. 142 F.3d 1087, 1089 (8th Cir. 1998). Here, the chain is more direct—an agency promulgates a rule using the Interim Values because the President ordered it.

Finally, to allege a future injury does not require proving that, but for the Executive Order, agencies will not adopt the Interim Values. *California v. Trump*, No. CV 19-960 (RDM), 2020 WL 1643858, at *9 (D.D.C. Apr. 2, 2020). Still, Plaintiff States satisfy but-for causation with allegations that the Interim Values are arbitrary and capricious and otherwise violate the APA’s substantive requirements, so it would be unlawful for *any* agency—including the Working Group—to adopt them. Plaintiff States allege and will prove that the Interim Values do not have a reasonable basis for the factual inputs and modeling assumptions. *Sierra Club v. Costle*, 657 F.2d 298, 333 (D.C. Cir. 1981). This is largely based on the Working Group’s use of the three IAMs, as described by Dr. Dayaratna. These show that the “descriptions of the impact of climate change are completely ad hoc, with no theoretical or empirical foundation.” Robert S. Pindyck, *Climate Change Policy: What do the Models Tell Us?*, National Bureau of Economic Research Working Paper 19244, at 16 (2013) (emphasis added), available at https://www.nber.org/system/files/working_papers/w19244/w19244.pdf. Moreover, the

Working Group’s acknowledgment that its methodology does “not reflect the tremendous increase in the scientific and economic understanding of climate-related damages that has occurred in the past decade,” 2021 TSD at 22, is similarly fatal. This shows that the Working Group promulgated a rule on information that it knew to be outdated and failed to consider more recent science. That is arbitrary and capricious.

Defendants’ assertions that the Plaintiff States’ injuries are speculative and hypothetical ask the Court to “exhibit a naiveté from which ordinary citizens are free.” *Dep’t of Com.*, 139 S. Ct. at 2575. Executive Order 13990 presupposes that regulations are on the way and orders agencies to use the Interim Values. § 5(b)(ii)(A) (“agencies shall use when monetizing the value of changes in greenhouse gas emissions resulting from regulations and other relevant agency actions”). The President has pledged to “organize and deploy the full capacity of [federal] agencies to combat the climate crisis to implement a Government-wide approach that reduces climate pollution in every sector of the economy.” Exec. Order 14008, 86 Fed. Reg. 7619, 7622 (Jan. 27, 2021). Past rulemakings clearly demonstrate that these regulations come with a hefty price tag. *See, e.g., James Broughel, Comment: The Interagency Working Group on the Social Cost of Greenhouse Gases should be transparent about the value judgments behind its estimates and acknowledge their cost*, at 2 (June 11, 2021) (“The total cost of these 83 regulatory actions [using social costs] is estimated to be between \$447 billion and \$561 billion (in 2020 dollars.)” (Ex. 2).

C. Plaintiff States’ injury is fairly traceable to Defendants’ unlawful conduct.

Defendants appear to argue that traceability cannot be satisfied when plaintiffs plead a “risk of substantial harm” because only a future agency action can cause the alleged injury. *See* Doc. 28, at 22 (“any such hypothetical injury would still stem only from future agency action. ... [N]ot to the Executive Order or the Interim Estimates.”). Defendants’ traceability argument improperly

requires that the harm flow from the Working Group without any “middle men,” but that gives no weight to the President’s mandate and fails to afford the predictable effects of Government action. And, as noted above, Plaintiff States are not required to prove but-for causation that agencies will not adopt the Interim Values. *California v. Trump*, 2020 WL 1643858, at *9.

“[F]or purposes of traceability, the relevant inquiry is whether the plaintiffs’ injury can be traced to ‘allegedly unlawful conduct’ of the defendant, not to the provision of law that is challenged alleged injury need only be fairly traceable, not directly traceable.” *Collins v. Yellen*, No. 19-422, 594 U.S. ___, slip op. at 19 (June 23, 2021) (quoting *Allen v. Wright*, 468 U.S. 737, 751 (1984)). Standing only requires that Plaintiff States allege a “predictable effect of Government action on the decisions of third parties.” *Dep’t of Com. v. New York*, 139 S. Ct. at 2566. New actions described in the pleadings that use the Interim Values will certainly injure Plaintiff States, and that injury stems from Executive Order 13990.

Plaintiff States allege that the Interim Values’ effects, mandated by Executive Order 13990, are unlawful and their injuries flow from using the Interim Values. In Count I, the Executive Order and issuance of a legislative rule without Congressional approval were unlawful. Am. Compl. ¶ 200 (“Section 5 of the EO 13990 and the Working Group’s publication of the Interim Values unconstitutionally and unlawfully seeks to exercise a quintessentially legislative power that the Constitution vests exclusively in Congress under Article I, Section 1.”). For Count II, the Executive Order and “the Working Group’s Interim Values are illegal because they purport to exercise authority that federal statutes specifically confer on identified federal agencies and officials.” *Id.* ¶ 209. In Counts III and IV, Plaintiff States are injured by the unlawful action of promulgating binding legislative rules without following APA procedures, *id.* ¶¶ 213, 215, 218, and that could not have been issued under the APA for substantive defects, *id.* ¶¶ 224–25.

Defendants claim that the Executive Order’s text and the newly issued OIRA Guidance mean that the Interim Values will only ever be used when agencies have discretion to do so. Doc. 28, at 23.² That is not what the Executive Order says in section 5, and Defendants agree that “shall” means “shall.” *Id.* It is true that the Executive Order has a standard savings clause in section 8 stating that the order should not be construed to impair or otherwise affect “the authority granted by law to an executive department” and that it will be implemented “consistent with applicable law and subject to the availability of appropriations.” Exec. Order 13990 § 8. But Defendants cannot immunize the Order with a savings clause which, if operational, would nullify the clear and specific substantive provisions of the Order. *Hias, Inc. v. Trump*, No. 20-1160, 2021 WL 69994 (4th Cir. Jan. 8, 2021). Courts apply standard tools of interpretation, construing the text “consistently with the Order’s ‘object and policy.’” *City & Cty. of San Francisco v. Trump*, 897 F.3d 1225, 1238 (9th Cir. 2018). The Executive Order states it shall be implemented “consistent with applicable law” thirteen other times, including instructions to the Working Group, but does not do the same for agencies. Exec. Order 13990 § 5(b). The existence of the OIRA Guidance shows that the Executive Order’s plain text does not tell the now-bound agencies merely to follow applicable law.

D. The Court can provide Plaintiff States relief.

Plaintiff States do not seek sweeping relief—it is limited to these Interim Values and would not prohibit agencies from trying again under statutes enacted by Congress. Am. Compl. at 42–43. Ultimately, the Court may decide to remand for the Interim Values to proceed through notice-and-comment or invalidate them as arbitrary and capricious. Contrary to Defendants’ assertion,

² Plaintiff States do not concede that any organic statutes for these agencies permit agencies to account for costs or benefits using the Interim Values.

Plaintiff States’ harm does not flow from other agencies, but from the Working Group and the Executive Order.

Defendants argue no relief can issue because “even without any binding directive,” “agencies will consider these costs when regulating, including by relying on the Interim Estimates.” Doc. 28, at 14. They cite to a few cases where courts have required agencies to monetize the benefit of carbon emissions or consider greenhouse gas emissions. *Id.* at 32 (citing *Ctr. for Biological Diversity*, 538 F.3d 1172, 1203 (9th Cir. 2008), *WildEarth Guardians v. Bernhardt*, 2021 WL 363955, at *10 (D. Mont. Feb. 3, 2021), *California v. Bernhardt*, 472 F. Supp. 3d 573, 611 (N.D. Cal. 2020) ; *High Country Conservation Advocs. v. U.S. Forest Serv.*, 52 F. Supp. 3d 1174, 1193 (D. Colo. 2014)). But Plaintiff States do not seek an order in this case declaring that agencies cannot monetize benefits of reducing greenhouse gases, only that they cannot treat as binding the Working Group’s highly flawed Interim Values—which were not at issue in any of those cases.

Defendants also assert that without a uniform system “Plaintiffs could face higher social-cost estimates.” *Id.* at 18. That is irrelevant to claims that it is unlawful to bind all federal agencies with these Interim Values. Congress designed administrative procedures for agencies to take action and issue rules according to their authorizing statutes—which should lead to different results and outcomes based on legislative intent. Plaintiff States have standing even if the agency “might reach the same result exercising its discretionary powers lawfully.” *FEC v. Akins*, 524 U.S. 11, 25 (1998). They need not prove but for causation to be entitled to an order vacating the Interim Rule and requiring the appropriate agency to go through notice-and-comment. *California v. Trump*, No. CV 19-960 (RDM), 2020 WL 1643858, at *9 (D.D.C. Apr. 2, 2020). Defendants’ harmless error arguments fail for the same reasons.

Plaintiff States agree that an injunction may not issue against the President and have not sought one against him. *See Franklin v. Massachusetts*, 505 U.S. 788, 802–03 (1992) (plurality op.). But *Franklin* contemplated declaratory relief against the Executive noting that “it is substantially likely that the President and other executive and congressional officials would abide by an authoritative interpretation of the census statute and constitutional provision by the District Court, even though they would not be directly bound by such a determination.” *Id.* at 803.

Defendants cite *Newdow v. Roberts*, as stating that declaratory relief does not lie against the President, but unlike here, those plaintiffs had not “actually named the President in their suit.” 603 F.3d 1002, 1012 (D.C. Cir. 2010). As *Newdow* points out, the Supreme Court granted declaratory relief that “nullified the statutory power of the President to wield a line item veto pen.” *Id.* (citing *Clinton v. Jones*, 547 U.S. 417, 448–49 & n.6 (1998) (noting that “traceability and redressability are easily satisfied ... [injury] can be redressed by a declaratory judgment.”)). Plaintiff States allege that the President has unlawfully assumed legislative power, and a declaration that the President’s constitutional powers do not permit an agency to sidestep the APA when exercising delegated power is permissible.

Although the President cannot be compelled, courts “have power to compel subordinate executive officials to disobey illegal Presidential commands.” *Chamber of Com. of U.S. v. Reich*, 74 F.3d 1322, 1328 (D.C. Cir. 1996). Plaintiff States identified those subordinates who are directly involved with the Working Group—since not all members are known without discovery—and are necessary to afford relief to Plaintiff States. As a result, the court should reject Defendants’ requests to dismiss them. Doc. 28, at 36, 50.

E. Plaintiff States' claims are ripe.

Defendants' claim that this suit "involves 'contingent future events that may not occur as anticipated, or indeed may not occur at all,'" Doc. 28, at 31, misses the mark. The Supreme Court has explained that a claim is ripe when plaintiff alleges "many intrusive activities, such as opening trails to motorcycles or using heavy machinery, which will go forward without any additional consideration of their impact on wilderness recreation." *Ohio Forestry Ass'n, Inc. v. Sierra Club*, 523 U.S. 726, 738 (1998). A claim is ripe when a self-executing regulation will have an immediate and substantial impact on the plaintiff. *See Gardner v. Toilet Goods Ass'n*, 387 U.S. 167, 171 (1967).

The Interim Values, effective now, are a self-executing regulation. Plaintiff States have similarly alleged that they are a final rule that did not go through notice-and-comment. Am. Compl. ¶¶ 215–218. Plaintiff States also allege intrusive and immediate injuries that will result from the rule: federal regulations using the Interim Values that will encroach on Plaintiff States' authority in areas subject to traditional state regulation. Am. Compl. ¶ 155. These regulations are not a distant fear, as the U.S. Government averages roughly 4,000 rules a year. Clyde Wayne Crews, Jr., Competitive Enterprise Institute, *Ten Thousand Commandments*, 33, 78, 96 (2019). Nor is it over-reading Executive Order 13990 to give "agency action" its definition in 5 U.S.C. § 551. All this makes for "adverse effects of a strictly legal kind." *Nat'l Park Hosp. Ass'n v. Dep't of Interior*, 538 U.S. 803, 809 (2003).

Defendants deride "Plaintiffs' assumptions about how the Executive Order will interact with the NEPA process, or with cooperative federalism programs, or in any context other than the issuance of federal regulations," as dependent on future actions and clarification by the Executive Branch. Doc. 28, at 33. They claim these assumptions arise from Plaintiff States misinterpreting

the Executive Order. *Id.* at 32. Yet, Secretary Haaland issued Order No. 3399 that confirms the scope of the Executive Order and its effect on NEPA processes. *Id.* at 33 n.17. Citing Executive Order 13990, Order No. 3399 discusses preparing “NEPA documents” explains that “Bureaus/Offices should use appropriate tools, methodologies, and resources available to quantify GHG emissions and compare GHG quantities across alternatives.” Dep’t of the Interior, Sec’y of the Interior Order No. 3399, at 1, 4 (April 16, 2021), *available at* https://www.doi.gov/sites/doi.gov/files/elips/documents/so-3399-508_0.pdf. The order notes that the Interim Values are a “useful measure” “for Federal proposed actions, in addition to rulemakings.” *Id.* The order then states that the “SC-GHG protocol [Interim Values] is an essential tool to quantify the costs and benefits associated with a proposed action’s GHG emissions and relevant to the choice among different alternatives being considered.” *Id.*

This evidences that Plaintiff States correctly interpreted the plain text of the Executive Order as reaching “agency actions” that are more than just rulemakings now, before any further action by the Working Group or subordinate officers. It further confirms what is obvious: the Executive Order purports to bind agencies to use the Interim Values engaging in NEPA processes. Although Defendants do not dispute the law and current regulations showing that state actors often prepare NEPA analyses, they still claim that state actors will not be coopted into using the Interim Values or face disapproval. But Order No. 3399 confirms that federal agencies are required to use the Interim Values, and as a result, so will state actors.

Defendants cite unrelated litigation between Missouri and federal defendants over section 9901 of the American Rescue Plan Act of 2021 to contend that this litigation is premature. Doc. 28, at 33–34 (citing *Missouri v. Yellen*, No. 4:21-cv-376 (HEA), ---- F. Supp. 3d ----, 2021 WL 1889867, at *1 (E.D. Mo. May 11, 2021)). That dispute is irrelevant here, and Missouri will save

arguments why that opinion is mistaken for the proper venue, but it does highlight two issues. First, the Court asserted it was “premature for the Court to interfere before Treasury can even promulgate regulations, much less have those regulation affect Missouri ‘in a concrete way.’” *Yellen*, 2021 WL 1889867, at *5. As the Interim Values have issued and effectively bind other agencies now, this fitness issue decidedly weighs in the Plaintiff States’ favor here. Second, in both cases, federal defendants rely on conveniently timed and attorney-prepared documents in litigation. Here, federal defendants point to recently issued OIRA guidance on how to interpret Executive Order 13990. Of course, it states what Plaintiff States have been saying here: “statutory requirements must dictate whether and how the agency monetizes changes in greenhouse gas emissions.” Doc. 28,-4 at 2. This new document issued June 3—one day before Defendants response was due here. This untimely document, that purports to guide agencies, issued 134 days after the Executive Order and 97 days after the binding Interim Values issued.

II. Plaintiff States’ Claims Are Likely to Succeed on the Merits.

A. Plaintiff States have shown a likelihood of success on Count I.

In new OIRA Guidance and before this Court, Defendants agree that “statutory requirements must dictate whether and how the agency monetizes changes in greenhouse gas emissions.” Doc. 28, at 44 (quoting OIRA Guidance). Of course, this is what Plaintiff States pleaded, Am. Compl. Prayer at (b), and argued in their motion for a preliminary injunction, Doc. 18, at 19. Defendants also agree that no statute authorizes the President to order an agency to use the Interim Estimates “where a statute *prohibits* the use of the Interim Estimates, or where

Congress has not otherwise authorized the agency to act.” Doc. 28, at 45 (emphasis in original). They also claim that nothing in Executive Order says otherwise. *Id.*

Defendants mistakenly assert that Plaintiff States misread the Executive Order. Doc. 28, at 45. The Executive Order’s plain terms are broader than “general administrative control” and “operationaliz[ing]” the President’s control over agencies. *Id.* at 45, 47. According to the Order, the Interim Values “shall” be used “when monetizing the value of changes in greenhouse gas emissions resulting from regulations and *other relevant agency actions*” and “cost-benefit analyses of regulatory *and other actions*.” Exec. Order 13990 § 5. Under the APA, agency action “includes the whole or a part of an agency rule, order, license, sanction, relief, or the equivalent or denial thereof, or failure to act.” 5 U.S.C. § 551.

Further, the Executive Order does not reference Executive Order 12866 requiring Regulatory Impact Analyses (RIAs), or the previous Working Group that formulated the “Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866.” 2010 TSD, cover (Feb. 2010). And every TSD from the Obama Administration notes they are for RIAs. Obama White House Archives, *Social Cost of Greenhouse Gases*, available at <https://obamawhitehouse.archives.gov/omb/oira/social-cost-of-carbon>. The Interim Values, however, do not limit their use to RIAs. 2021 TSD, cover (Feb. 26, 2021) (Ex. 6-2). Although the President directs the Working Group to be consistent with applicable law, that command is not directed at agencies. Exec. Order 13990 § 5. Additionally, the presidential requirement that agencies “take global damages into account” is generally inconsistent with the presumption against extra-territoriality. *RJR Nabisco, Inc. v. Eur. Cmty.*, 136 S. Ct. 2090, 2100 (2016) (“Congress generally legislates with domestic concerns in mind.”). Clearly, the Executive Branch required clarification on whether the Executive Order mandates that agencies must violate the law. OIRA

Guidance at 2 (“When an agency conducts benefit-cost analysis pursuant to specific statutory authorities, those authorities must control the agency’s development and use of the analysis in taking an agency action.”).

Plaintiff States have sufficiently alleged a cause of action that the President and the Working Group unlawfully usurped legislative authority and exceeded any power granted to them by statute or Article II. Am. Compl. ¶¶ 195–202. The Supreme Court has recognized a non-statutory cause of action “when ‘an official violates the law to the injury of an individual the courts generally have jurisdiction to grant relief.’” *Ctr. for Biological Diversity*, 453 F. Supp. 3d at 47 (quoting *Am. Sch. of Magnetic Healing v. McAnnulty*, 187 U.S. 94, 108, (1902)); *Chamber of Com. of U.S. v. Reich*, 74 F.3d at 1328 (“When an executive acts *ultra vires*, courts are normally available to reestablish the limits on his authority.”).³

Defendants claim that either the Take Care Clause or the Opinions Clause suffices, citing *Bldg. & Const. Trades Dep’t, AFL-CIO v. Allbaugh*, 295 F.3d 28, 32 (D.C. Cir. 2002). Doc. 28, at 46. *Allbaugh* rests on the proposition that the President was directing Executive Branch officials in their implementation of statutory authority. 295 F.3d at 33. Defendants here, like those in *Youngstown*, expressly disclaim any statutory authority and Plaintiff States allege Defendants are engaging in acts of legislative power—so the Take Care Clause does not apply. The Opinions Clause similarly does not cover requiring subordinates to apply standardized costs to statutes without looking to legislative intent.

³ Defendants’ citations to *Armstrong v. Exceptional Child Center, Inc.*, 575 U.S. 320, 327 (2015) and *Michigan Corrections Organization v. Michigan Department of Corrections*, 774 F.3d 895, 907 (6th Cir. 2014) are inapposite. *Armstrong* holds that this equitable cause of action does not abrogate 11th Amendment immunity for states, and *Michigan Corrections* that a private right of action derived from a *statute* should not be so easily inferred.

Defendants argue that the Interim Values, merely because they are numbers and subject to scientific, mathematical, and policy judgments, do not create a conflict between the Executive and Congress. Doc. 28, at 47. But they say nothing more than to cite *Yakus* for the proposition that an agency can fill in the details once they receive a legislative directive. *Id.* But the Working Group has no such delegated authority. Plaintiff States conclusively showed that the Interim Values determine policy outcomes, with nothing left to fill, and that social costs are a common object of state legislation. Doc. 18, at 18–27.

B. Plaintiff States have alleged a plausible claim for Count II.

As in Count I, Count II is a non-statutory claim that the Working Group does not have statutory authority to bind other executive officers’ discretion in their statutory duties. Am. Compl. ¶ 206. In essence, the Working Group is acting *ultra vires*. *Ctr. for Biological Diversity*, 453 F. Supp. 3d at 47 (D.D.C. 2020). Plaintiff States assert that, among other obligations, the Transportation Secretary must consider costs when deciding maximum feasible average fuel economy for cars, ¶ 164, and the EPA Administrator must consider costs for new motor vehicle emissions, ¶ 163. They claim the Interim Values are “illegal because they purport to exercise authority that federal statutes specifically confer on identified agencies.” Am. Compl. ¶ 209.

C. Plaintiff States have shown a likelihood of success on Count III and have alleged a plausible claim for Count IV.

Counts III and IV allege a procedural and substantive violation of the APA. Am. Compl. ¶¶ 210–228. For purposes of these motions, the parties only dispute whether the Interim Values are final agency action and whether the Working Group is an agency. As Plaintiff States explained in their motion, the Interim Values are the final 2021 values and the Working Group wields substantial authority independently from the President.

Defendants offer no convincing response to whether the Interim Values are final agency actions. They do not dispute that Working Group has set the 2021 values and those values will not be revisited. Instead they mistakenly claim that Plaintiff States have failed to argue that they “face any ‘legal consequences’ from the Executive Order or the Interim Estimates.” Doc. 28, at 51. Plaintiff States argued that the second *Bennett* factor was satisfied by the “direct and appreciable legal consequence that these values will govern other final, regulatory actions.” Doc. 18, at 33. This is not a heavy lift. In *Bennett*, the Court found that “alter[ing] the legal regime to which the action agency is subject,” satisfied this prong. 520 U.S. 154, 178 (1997). Plaintiff States alleged that the 2021 legal regime has changed, will continue to change, and that “[n]o one will escape the burden of these regulatory costs.” Am. Compl. ¶ 187. They have also alleged changes to NEPA practices, confirmed by Order No. 3399, and that any EPA actions will automatically be implemented through Missouri’s “no stricter than” law. Am. Compl. ¶¶ 173, 178. Although Defendants object to allegations of harm from impending changes, the harm still flows from the changed legal regime, and Plaintiff States need only plead these allegations at this stage.

Defendants also claim that the Working Group is not an agency because it lacks “substantial independent authority” from the President largely because it lacks a dedicated staff beyond its members. Doc. 28, at 41. But that is just one of many fact based considerations. “[T]he APA . . . confers agency status on any administrative unit with substantial independent authority in the exercise of specific functions,” *Soucie v. David*, 448 F.2d 1067, 1073 (D.C. Cir. 1971), *i.e.*, it can act on its own and with the blessing of the federal government. Looking at its charter document, Executive Order 13990, the Working Group has authority to publish the Interim Values, and the final values that bind all federal agencies. § 5(b)(ii). The Working Group is also tasked with an investigative role to review “areas of decision-making, budgeting, and procurement . . .

where the SCC, SCN, and SCM should be applied” and provide recommendations to the President. Exec. Order 13990, § 5(b)(ii)(C)–(E), (b)(iii). This all favors finding it is an agency.

Despite Defendants’ contentions, President Reagan’s Task Force is not analogous to the Working Group for purposes of this case. The key distinction between that Task Force and this Working Group is that “[w]hen the Task Force wished directions given to the executive branch, it found it necessary to advise the President to put such instructions in another Executive Order,” Meyer, 981 F.2d at 1294, and the Working Group is vested with authority to set the Interim Values as it pleases and bind agencies directly. Although there is no congressionally “delegated regulatory authority to supervise agencies,” Meyer, 981 F.2d at 1293, the Executive Order and the TSD show that the Working Group is not merely “passing on the President’s wishes,” *id.* at 1293–94.

Although Defendants have successfully opposed discovery on the operations of the Working Group, it is clear that the Working Group does have non-member staff. First, the request for comment was published by a member of OIRA’s staff, not one of the co-chairs. 86 F.R. 24669 (May 7, 2021) (signed by Deputy Administrator Mancini). Second, the Interim Values themselves list the agencies, and not members, that participated in producing them. Doc. 6-2. Notably, the Working Group does not claim to be within the Executive Office of the President, as the TSD cover page only states it is of the “United States Government.” *Id.* There is no record that the Interim Values required the President’s approval or show the White House participating. Defendants have not pointed to another group that has the authority to *bind* other agencies.

Defendants’ citation of *Main St. Legal Servs., Inc. v. Nat’l Sec. Council*, 962 F. Supp. 2d 472, 478 (E.D.N.Y. 2013), is unavailing because the issue was not decided on appeal. *Main St. Legal Servs., Inc. v. Nat’l Sec. Council*, 811 F.3d 542, 558 (2d Cir. 2016) (“We need not here decide when, if ever, a presidential—rather than statutory—grant of authority might allow an

executive entity to exercise power independent of the President so as to render it an agency subject to the FOIA.”).

Moreover, Defendants’ reliance on the supposed inner workings of the Working Group is unavailing because Defendants have successfully opposed discovery on this very issue. The Working Group is a secretive agency that lacks transparency in its operations. The exact members of the Working Group are unknown, and its public documents are signed by agency organizations. *See* Doc. 6-2, at 2. The Court in *Meyer* relied on facts such as how the Task Force was staffed, whether it worked out of the Vice President’s office, whether the Task Force members reported to the President, and whether the Task Force could give directions to the Executive Branch independently of the President to determine the status of the Task Force. Plaintiff States are entitled to get this discoverable information.

III. Plaintiff States’ Preliminary Injunction should be granted because they suffer irreparable harm and the public interest favors the injunction.

A preliminary injunction should issue because Plaintiff States have made a strong showing on all four equitable factors. Despite Defendants’ claims, Plaintiff States showed proprietary harms to their energy economies and tax base, and direct practical burdens to the administration of cooperative federalism programs. Doc. 18, at 47–53. Plaintiff States also pleaded an irreparable injury that will inevitably occur while the Interim Values exist: “Federal regulations promulgated employing the Interim Values will preempt conflicting state regulations” or laws limiting States “scope of authority in areas subject to traditional state regulation.” Am. Compl. ¶ 155. “[A]ny time a State is enjoined by a court from effectuating statutes enacted by representatives of its people, it suffers a form of irreparable injury.” *Maryland v. King*, 567 U.S. 1301, 1303 (2012).

Defendants claim that the public interest favors them because it would pull the rug out from under the Working Group and federal agencies and harm the international stature of the United

States. Both claims have been rejected. “[W]hile the President has broad authority in foreign affairs, that authority does not extend to the refusal to execute domestic laws.” *Massachusetts v. EPA*, 549 U.S. 497, 534 (2007). Justice Jackson, during the Korean War, a President should not “vastly enlarge his mastery over the internal affairs of the country by his own” acts on the international stage.” *Youngstown Sheet & Tube Co. v. Sawyer*, 343 U.S. 579, 642 (1952) (Jackson, J., concurring). So should this Court.

CONCLUSION

Plaintiffs respectfully request that the Court deny Defendants’ motion to dismiss in its entirety and preliminarily enjoin all defendants, except for the President, from using the social cost of greenhouse gases promulgated in the February 26, 2021 Technical Support Document as binding values in any agency action.

July 2, 2021

Respectfully submitted,

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**Admission application forthcoming*

CERTIFICATE OF SERVICE

I hereby certify that, on July 2, 2021, a true and correct copy of the foregoing and any attachments were filed electronically through the Court's CM/ECF system, to be served on counsel for all parties by operation of the Court's electronic filing system and to be served on those parties that have not appeared who will be served in accordance with the Federal Rules of Civil Procedure by mail or other means agreed to by the party.

/s/ Jeff P. Johnson

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF MISSOURI
EASTERN DIVISION**

THE STATE OF MISSOURI, *et al.*,

Plaintiffs,

v.

JOSEPH R. BIDEN, JR., *et al.*,

Defendants.

No. 4:21-cv-00287-AGF

DECLARATION OF JEFF P. JOHNSON

I, Jeff P. Johnson, having personal knowledge attest that:

1. Attached to this declaration, as Exhibit 1, is a true and accurate copy of a comment letter submitted by Missouri and 17 other states responding to OMB Docket Number OMB-2021-0006, Notice of Availability and Request for Comment on “Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates Under Executive Order 13990.”

2. Attached to this declaration, as Exhibit 2, is a true and accurate copy of a comment letter submitted by James Broughel for OMB Docket Number OMB-2021-0006, Notice of Availability and Request for Comment on “Technical Support

Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates Under Executive Order 13990.”

Under 28 U.S.C. § 1746, I declare under penalty of perjury that the foregoing is true and accurate.

Executed: July 2, 2021



Jeff P. Johnson

Exhibit 1



ATTORNEY GENERAL OF MISSOURI

ERIC SCHMITT

June 21, 2021

Acting Director Shalanda Young
Office of Management and Budget
Chair Cecilia Rouse
Council of Economic Advisors
Director Eric Lander
Office of Science and Technology Policy
Co-Chairs, Interagency Working Group on
the Social Cost of Greenhouse Gases

Re: *OMB Docket Number OMB-2021-0006, Notice of Availability and Request for Comment on "Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates Under Executive Order 13990"*

Dear Director Young, Chair Rouse, and Director Lander,

We, the undersigned Attorneys General of 18 States, write to express our concerns and comment on the Technical Support Document of February 2021 (2021 TSD). As a threshold issue, we note that the Interagency Working Group's (IWG's) actions violate the separation of powers by exercising quintessentially legislative authority without a valid delegation of authority from Congress, and they violate the Administrative Procedure Act by failing to engage in ordinary rulemaking procedures. They also violate federal statutes that delegate rulemaking authority to specific agencies, not the IWG. The principle of separation of powers is the most critical safeguard of individual liberty, and the APA is Congress's blueprint for ensuring reasoned decision making by the Executive Branch. The IWG's failure to comply with these basic principles constitutes fundamentally lawless action that threatens the freedom of all Americans.

The request for comment on OMB's nonrulemaking docket violates these principles. The Constitution provides that Congress may "make all Laws which shall be necessary and proper for carrying into Execution the foregoing Powers, and all other Powers vested ... in any Department or Officer thereof." U.S. Const. art. I, § 8. Substantive, legislative rules that the Executive Branch imposes irrespective of any delegated authority in the APA and agencies' organic statutes are unlawful. They exceed the agencies' statutory authority, and they violate the principle of separation of powers. "It is the proud

boast of our democracy that we

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have ‘a government of laws, and not of men.’” *Morrison v. Olson*, 487 U.S. 654, 697 (1988) (Scalia, J., dissenting). “The Framers of the Federal Constitution . . . viewed the principle of separation of powers as the absolutely central guarantee of a just Government.” *Id.* “Without a secure structure of separated powers, our Bill of Rights would be worthless, as are the bills of rights of many nations of the world that have adopted, or even improved upon, the mere words of ours.” *Id.* “The purpose of the separation and equilibration of powers in general . . . was not merely to assure effective government but to preserve individual freedom.” *Id.* at 727. “While the separation of powers may prevent us from righting every wrong, it does so in order to ensure that we do not lose liberty.” *Id.* at 710.

The vesting clauses of Article I and Article II reflect the Founders’ insights that “the legislative, executive, and judiciary departments ought to be separate and distinct,” and that this separation is an “essential precaution in favor of liberty.” THE FEDERALIST No. 47 (Madison) (C. Rossiter ed. 1961), p. 301. As Madison stated, “[n]o political truth is certainly of greater intrinsic value, or is stamped with the authority of more enlightened patrons of liberty.” *Id.* “The accumulation of all powers, legislative, executive, and judiciary, in the same hands, whether of one, a few, or many, and whether hereditary, selfappointed, or elective, may justly be pronounced the very definition of tyranny.” *Id.*

Any action of the Executive Branch must come from one of two sources of authority: (1) a valid delegation of authority by statute enacted by Congress, or (2) a direct exercise of one of the President’s enumerated powers in Article II. “The President’s power, if any, to issue [an] order must stem either from an act of Congress or from the Constitution itself.” *Youngstown Sheet & Tube Co. v. Sawyer*, 343 U.S. 579, 585 (1952). Where “[t]here is no statute that expressly authorizes the President to take” an action, “[n]or is there any act of Congress . . . from which such a power can fairly be implied,” the action is not authorized by an act of Congress. *Id.* In the absence of such an express or implied authorization by act of Congress, “if the President had authority to issue the order he did, it must be found in some provisions of the Constitution.” *Id.* at 587.

The actions of the Interagency Working Group violate these fundamental principles. The adoption of specific, binding, numerical values for “social costs” of greenhouse gases is an inherently legislative function. Thus, the IWG purports to exercise quintessentially legislative authority without citing any delegation of authority—whether valid or purported—from Congress. Thus, the IWG reflects the Executive Branch’s naked arrogation of legislative power to itself. “Frequently,” a threat to the separation of powers “will come . . . clad, so to speak, in sheep’s clothing.... But this wolf comes as a wolf.” *Morrison v. Olson*, 487 U.S. 654, 699 (1988) (Scalia, J., dissenting).

Moreover, the Interagency Working Group’s “request for comment” invokes the label for APA procedures while purporting to deny Americans a critical benefit of notice and comment procedures: access to the judicial review to ensure that the Executive Branch meaningfully considers and addresses these concerns. We object

to the Interagency Working Group dressing up substantive executive edicts in the parlance of good government.

On May 6, 2021, Deputy OIRA Administrator Mancini submitted a notice that the Co-Chairs requested comment on five issues impacting the 2021 TSD. In addition to the legal and constitutional deficiencies in the IWG’s formulation and process, this letter responds to bullet points about “general advances in science and economics included in” the 2021 TSD, approaches to implementing the recommendations of the National Academies of Science, Engineering, and Medicine (NASEM) published in its 2017 Valuing Climate Damages report, and using discount rates for intergenerational analysis. We agree with NASEM that the Interagency Working Group’s current approach to potential climate-related damages is deeply and irretrievably flawed, but yet more baseless modeling, speculative assumptions, and artificially manufactured numbers are not the solution.

I. Promulgating the Social Costs of Greenhouse Gases Violates the Separation of Powers and the APA, and Exceeds the Executive’s Statutory Authority.

Congress, not the President, controls the substance and sets the procedure for writing substantive rules. 5 U.S.C. § 553. The Interagency Working Group has violated those principles by issuing the 2021 TSD establishing the Social Costs of Greenhouse Gases (SCGHG) without publishing a notice of proposed rulemaking. *Id.* at § 553(b). This is backwards, as agencies are supposed to consider what the American people have to say *before* acting. Instead, the Interagency Working Group now wants to know how they could have done better.

No matter how OMB labels its docket, the 2021 TSD sets forth a substantive, legislative rule¹ because it is a final agency action imposing new rights or duties. *Iowa League of Cities v. EPA*, 711 F.3d 844, 873 (8th Cir. 2013); *see* 5 U.S.C. § 551(4). “Expanding the footprint of a regulation by imposing new requirements . . . is the hallmark of legislative rules.” *Id.* As Judge Friendly recognized, “when an agency wants to state a principle ‘in numerical terms,’ terms that cannot be derived from a particular record, the agency is legislating and should act through rulemaking.” *Catholic Health Initiatives v. Sebelius*, 617 F.3d 490, 495 (D.C. Cir. 2010) (quoting Henry J. Friendly, *Watchman, What of the Night?*, in *BENCHMARKS* 144–45 (1967)). “[A]n agency performs a legislative function” when it promulgates “a rule that turns

¹ A “rule” is “the whole or part of an agency statement of general or particular applicability and future effect designed to implement, interpret, or prescribe law or policy” “includ[ing] the approval or prescription . . . of valuations, costs, or accounting, or practices bearing on any of the foregoing.” 5 U.S.C. § 551(4). In its executive summary, the 2021 TSD makes clear that the “SC-GHG is the monetary value of the net harm to society associated with adding a small amount of that GHG to the atmosphere in a given year.” Whether it is used in a cost-benefit analysis or for any other purpose, the 2021 TSD sets forth a value to be used in agency statements designed to implement law or policy, and as a result it is a rule.

on a number.” *Id.* In other words, rules that promulgate specific numerical values for policy problems are quintessentially legislative in character. The task of promulgating specific numerical values for “social costs” of gases is “a legislative function.” *Id.* It can be exercised only by Congress, or through a valid delegation of authority from Congress (if a delegation of such enormous authority is even permissible, which is doubtful at best).

The IWG’s promulgation of such rules for the “social costs” of gases raises several problems. First, “[i]t is axiomatic that an administrative agency’s power to promulgate legislative regulations is limited to the authority delegated by Congress.” *Bowen v. Georgetown Univ. Hosp.*, 488 U.S. 204, 208 (1988). So when “there is no statute conferring authority, a federal agency has none.” *Michigan v. EPA*, 268 F.3d 1075, 1081 (D.C. Cir. 2001). Neither the 2021 TSD nor the vehicle that created the Interagency Working Group, Executive Order 13990, cites any statutory authority authorizing them to promulgate such rules, and none exists. As a result, the Interagency Working Group lacks authority to issue rules in this area at all, and its attempts to do so violate both the separation of powers and the statutes that properly delegate such authority. *See supra*.

Second, the instant notice for comment cannot cure the IWG’s procedural violation of the APA because it fails to provide a meaningful opportunity to comment. “Notice of a proposed rule must include sufficient detail on its content and basis in law and evidence to allow for meaningful and informed comment.” *Am. Med. Ass’n v. Reno*, 57 F.3d 1129, 1132 (D.C. Cir. 1995). “The purpose of the comment period is to allow interested members of the public to communicate information, concerns, and criticisms to the agency during the rule-making process.” *Connecticut Light & Power Co. v. Nuclear Regul. Comm’n*, 673 F.2d 525, 530 (D.C. Cir. 1982). Here, the Interagency Working Group is not seeking comment to re-issue the 2021 SCGHG estimates. Instead, it is formulating different SCGHG estimates for future use—preventing the public from commenting on the 2021 SCGHG estimates.

Third, this notice for comment is also insufficient to provide meaningful comment on the *future* SCGHG because it limits the public’s ability to comment and it does not identify what changes it plans to make. One purpose of notice and comment is “to give affected parties an opportunity to develop evidence in the record to support their objections to the rule and thereby enhance the quality of judicial review.” *Prometheus Radio Project v. F.C.C.*, 652 F.3d 431, 449 (3d Cir. 2011) (quoting *Int’l Union, United Mine Workers of Am. v. Mine Safety & Health Admin.*, 407 F.3d 1250, 1259 (D.C. Cir. 2005)). Here, the comments are limited to five inquiries, but none of them addresses the legality of the rulemaking or the Interagency Working Group. These are critical points of inquiry that have not been previously addressed in notice-and-comment procedures. Additionally, “[i]n order to allow for useful criticism, it is especially important for the agency to identify and make available technical studies and data that it has employed in reaching the decisions to propose particular rules.” *Connecticut Light & Power*, 673 F.2d at 530. Although the notice identifies the 281-page 2017 NASEM report, it also asks for “[o]ther recent advances in science and economics, beyond those presented in the interim TSD, that could be

incorporated into the pending update....” This kind of crowd-sourcing is not allowed in a proper notice-and-comment procedure because it prevents citizens from commenting on important analysis and data before adding that information to the final rule. “An agency commits serious procedural error when it fails to reveal portions of the technical basis for a proposed rule in time to allow for meaningful commentary.” *Id.* at 530–31.

These administrative procedures reflect important fairness principles and sound decision-making—and that is why Congress requires them. The Interagency Working Group is effectively denying the American public the opportunity to meaningfully contribute to its decisionmaking process.

II. The Current Social Costs of Greenhouse Gases Are Deeply Flawed and Cannot Be Fixed by Making More Wild Guesses.

Beyond the fatal constitutional and legal deficiencies in these procedures, the IWG’s approach to calculating “social costs” of various gases is deeply flawed. The notice for comment expressly requests ways to implement the 2017 NASEM report’s recommendations, recent advances in science and economics, and how to reflect the best understanding of discount rates for intergenerational analysis. The 2017 NASEM report, in turn, touches on every element of the Interagency Working Group’s process for developing a TSD, from the accounting of global versus domestic damages, the selection of the discount rate, and moving away from the incomplete and flawed averaging of the Integrated Assessment Models (IAMs). Though we agree with the 2017 NASEM report’s general findings that the 2016 TSD² and Addendum are highly deficient, we disagree with the report’s recommendations for more speculative modeling and more speculative probability distributions. NASEM’s findings confirm what MIT economist Robert Pindyck has found: “*an IAM-based analysis suggests a level of knowledge and precision that is nonexistent, and allows the modeler to obtain almost any desired result because key inputs can be chosen arbitrarily.*” Robert S. Pindyck, *Climate Change Policy: What do the Models Tell Us?*, National Bureau of Economic Research Working Paper 19244, at 16 (2013) (emphasis added).³

The 2021 TSD provides SCGHG estimates that are completely arbitrary for the reasons discussed below. As the Interagency Working Group’s IAM-based estimates fail to show a reasonable basis for the factual inputs and modeling assumptions, the estimates cannot survive arbitrary and capricious review. *Sierra Club v. Costle*, 657 F.2d 298, 333 (D.C. Cir. 1981).

2017 NASEM Report. NASEM’s recommendations touch on every aspect of the IAM-driven estimates promulgated by the Interagency Working Group. The

² The 2017 NASEM report’s recommendations to the 2016 TSD and Addendum apply equally to the 2021 TSD was created by the Interagency Working Group adjusting the 2016 SCGHG estimates for inflation.

³ https://www.nber.org/system/files/working_papers/w19244/w19244.pdf.

NASEM report repeatedly criticizes the lack of transparency and consistency in the modeling processes, as well as the Interagency Working Group failing to use more recent science. For example, in discussing the climate module, NASEM recommended that any “module should strive for transparency and simplicity so that the central tendency and range of uncertainty in its behavior are readily understood, reproducible, and amenable to improvement over time.” Recommendation 4-1 at 13.

NASEM concluded that a common module to estimate damages, instead of averaging three IAMs, “can improve transparency and consistency of key assumptions with the peer reviewed science and can improve the uncertainty representations, including structural uncertainty.” 2017 NASEM Report at 46 (Conclusion 2-1). It also found that an “integrated modular framework for SC-CO2 estimation can provide a transparent identification of the inputs, outputs, uncertainties, and linkages among the different steps of the SC-CO2 estimation process.” *Id.* (Conclusion 2-2). As a result, NASEM recommended “the creation of an integrated modular SC-CO2 framework” it described. *Id.* (Recommendation 2-1).

NASEM also determined that estimated damages to the “United States alone, beyond approximations done by the IWG, is feasible in principle; however it is limited in practice by the existing SC-IAM methodologies.” *Id.* at 9 (Conclusion 2-4). The report noted that the first Interagency Working Group made “rough estimates of the proportion of global damages attributable to impacts within U.S. borders” even though it had departed from past agency practices by focusing on global damages. *Id.* In various recommendations, NASEM stated that any new model should provide for more transparent reporting of individual sectors. *E.g.*, Recommendations 3-2 at 11 (“Develop projections of sectoral and regional GDP and regional population”), 3-3 at 12 (socioeconomic module with “probabilistic regional and sectoral projections”), and 5-1 at 17 (damage functions). Of course, this more specific reporting of regional and sectoral effects would permit more accurate estimations of domestic impacts.

The report and its recommendations identify other issues involving the time horizon, climate effects (ocean acidification, ice-sheet warming), the lack of reliable projections for population and GDP, the variability and non-comparability of the three different IAMs used by the Interagency Working Group, the need to account for feedback and adaptation, and the selection of discount rates. In nearly all cases, NASEM recommends more explicit modeling, more projections through expert elicitation and probability distributions, and improving the data sets for the modeling. And even NASEM doubts the viability of any socioeconomic module past the year 2100—an understatement to say the least. 2017 NASEM Report at 74–77. These significant issues and uncertainty counsel against relying on modeling to take government actions that impose pocketbook costs on the American people today.

IAM-based damages analyses are arbitrary. The IAM-based analyses provide a scientific veneer for the modeler’s own policy preferences, instead of applying high quality data to measurable and reproducible phenomena. Because the DICE, PAGE, and FUND Models are all IAMs and the sole inputs for every estimate of social costs, averaging the results does nothing to make up for the lack of theoretical and empirical bases for the SCGHGs. *See* NERA, *A Review of the Damage*

Functions Used in Estimating the Social Cost of Carbon (Feb. 20, 2014) (attached as Exhibit A).⁴ No matter how many times one guesses, the mean of three wild guesses is still a wild guess.

The IAMs “have crucial flaws that make them close to useless as tools for policy analysis” and their “descriptions of the impact of climate change are completely *ad hoc*, with no theoretical or empirical foundation.” Pindyck, *Climate Change Policy* (abstract). As one colleague put it, “I can make a model tie my shoe laces.” *Id.* at 5 n.7. A 2014 NERA report, submitted to an earlier iteration of the Interagency Working Group, found the same thing. *A Review of the Damage Functions*, at 1. Specifically, it explained “that possible damage estimates at a given point in time can differ by a factor of 20 or more within the range of parameters and range of temperature changes found in the IAM literature.” *Id.*

The NERA report explains that the IAMs’ damages function predicts economic loss to show the change in GDP directly as a function of the projected change in temperature. *Id.* at 13. The FUND model projects monetary loss directly from the temperature change, the rate of temperature change, or carbon dioxide concentration. *Id.* at 14. This direct function from temperature change means that for all IAMs “global GDP is always reduced as global temperature increases.” *Id.* at 15. Additionally, because of this relationship, all of the IAMs also have built in ad hoc “safety rails” that prevent damages from exceeding 100% GDP. *Id.* at 16. In evaluating the theoretical basis for this damage function, the NERA team reviewed Weitzman’s articles and ultimately credited his assessment that while he preferred one functional form over another, he could not “prove that my favored choice is the more reasonable of the two.” *Id.* at 24.

The NERA report found that the IAMs had no empirical basis either. The team explained that the IAMs suffered from a lack of high quality data to properly calibrate their damage functions. *Id.* at 27–28. It also noted that these IAMs are set to one benchmark point that is a judgment each modeler makes, resulting in “damage functions [that] can differ dramatically from model to model, but each is ad hoc and with no well-defined empirical standards to resolve which might be more reliable than another.” *Id.* at 26. As a result of these two issues, the report notes that the “modelers clearly recognize and readily concede the limitation in the empirical evidence” with the creator of FUND noting that the lack of evidence “does not result in a climate change impact model that is adequate.” *Id.* at 30.

All of this leads to the inevitable conclusion that the “model is unreliable and should not be used by lawmakers or regulators.” Declaration of Kevin Dayaratna ¶ 55 (Dayaratna Decl.) (attached as Exhibit B). As one economist noted, “[t]he bottom line here is that the damage functions used in most IAMs are completely made up.” Pindyck, *Climate Change Policy*, at 13.

⁴ This report was first filed in the request for comment published in November 2013. The 2016 TSD notes that it uses the same versions of the IAMs as those in use since May 2013, except it corrected two methodological errors not relevant here. 2016 TSD, at 7 and App. B (Aug. 2016).

Calculating Global Damages Is Inappropriate. The SCGHGs allegedly monetize predicted global damages from the emission of an additional ton of carbon dioxide. The Interagency Working Group cited a number of reasons why it believes global damages are appropriate: “GHG emissions contribute to damages around the world regardless of where they are emitted”; global impacts “will have a direct impact on [overseas] U.S. citizens and the investment returns on those assets owned by U.S. citizens and residents”; global issues “impact the welfare of individuals and firms that reside in the United States through their effect on international markets, trade, tourism, and other activities”; and “allow[ing] the U.S. to continue to actively encourage other nations, including emerging major economies, to take significant steps to reduce emissions.” 2021 TSD, at 15–16. But these reasons have nothing to do with statutes that require cost-benefit analyses and whether Congress intended that costs include damages supposedly incurred in other countries.

Courts generally limit the application of statutes to domestic applications under the presumption against extra-territoriality. *RJR Nabisco, Inc. v. Eur. Cmty.*, 136 S. Ct. 2090, 2100 (2016). This presumption recognizes “the more prosaic commonsense notion that Congress generally legislates with domestic concerns in mind.” *Id.* (quotations omitted). And Congress, when it enacted the NGA, NEPA, EPCA, OCSLA, the MLA, and other statutory schemes to develop domestic energy, certainly was aware of international trade, tourism, and the existence of U.S. citizens and assets abroad, which the Interagency Working Group cites now. Although a statute could require accounting for global damages in a cost-benefit analysis or some other action, the Interagency Working Group does not even give lip service to Congress’s policy choices.

Including global damages means that the SCGHGs count alleged damages from outside the U.S. when increasing greenhouse gas emissions, while not taking into account greenhouse gas emissions occurring outside the United States and beyond the government’s regulatory reach. So the IAMs’ damages functions include speculative projections of human health impacts in other countries from supposed increased dengue fever, malaria, diarrhea, and cardiovascular and respiratory mortality, and the costs of hypothetical sea-level rise such as the value of lost land, the cost of protection (*e.g.*, sea walls), and resettling human populations. 2010 TSD 5–9; *see also* 2017 NASEM Report Tables 5-1 and 5-2 at 131–136. They also include entirely speculative predictions about future human migration, international conflicts, and technological changes for hundreds of years into the future. *Id.* These global SCGHGs interpret Congress’s requirements to consider costs or economic feasibility to include the monetary value of economic units lost to potential health effects allegedly caused by climate change around the world in the year 2290.

The focus on global impacts makes an enormous difference on the SCGHGs. Recently, the domestic value for the social cost of carbon was roughly \$7—seven times

less than the interim social cost of carbon. Similarly, the domestic social cost of methane was roughly \$55—27 times less than the interim social cost of methane.⁵

Using an Improper Time Horizon. The Interagency Working Group’s centuries-long time horizon further dilutes any perceptible causal chain and reflects an arbitrary decision that has an outsize impact on the SCGHGs. Purporting to predict global impacts 300 years into the future is an inherently speculative task—akin to an observer in the year 1721 predicting the invention of nuclear weapons and smart phones. And if the project had any non-speculative basis, the IAMs’ time horizon was chosen arbitrarily and the Working Group injected their own assumptions into the models beyond their design.

The choice to run the IAMs to year 2300 originated in the first TSD and occurred because “[m]any consider 2200 too short a time horizon because it *could miss* a significant fraction of damages under certain assumptions about the growth of marginal damages and discounting.” 2010 TSD at 25 (emphasis added). In other words, without going to the year 2300, the Working Group reasoned, there was a risk costs would be lower. Notably, the Working Group made this decision even though one IAM and all of the EMF-22 climate scenarios ended before year 2300. To accomplish this task, the Working Group arbitrarily “adjusted” the PAGE Model because it was designed to end in the year 2200. *Id.* The EMF-22 models (the five climate scenarios) also did not have projections for GDP, population, and greenhouse gas emission trajectories after the year 2100, so the Working Group also made those assumptions for the next 200 years that were used in all three IAMs. *Id.* In other words, it made up a model that would yield its pre-determined result.

The changes had the desired effect: the longer time horizon increased damages significantly. Dayaratna Decl. ¶ 30. This was a predictable change because “[t]he longer the horizon, the more years are summed into the damages and those years have greater and greater damages in a future that is difficult if not impossible to predict.” *Id.* ¶ 34. To illustrate this effect, when the DICE Model (at a 3 percent discount rate) is only run until the year 2150 (roughly half the Working Group’s time period) the damages are 13.43% to 20.28% less. *Id.* ¶ 35–36. Although categorized as uncertainty, those additional damages assume what will happen centuries into the future and solely reflect the Interagency Working Group’s assumptions for an additional 200 years. The Interagency Working Group did not submit these assumptions for peer review, expert elicitation, or public comment. It is virtually impossible to account for dynamic changes such as those caused by now commonplace technological innovations such as internet, smartphones, and GPS technology that were mere science fiction 300 years ago. *Id.* ¶ 29. And the models provide no meaningful attempt to account for future technological changes that might mitigate

⁵ See, e.g., Jean Chemnick, *Cost of Carbon Pollution Pegged at \$51 Per Ton*, SCIENTIFIC AMERICAN (March 1, 2021), <https://www.scientificamerican.com/article/cost-of-carbon-pollution-pegged-at-51-a-ton/#:~:text=Contributing%20to%20climate%20change%20is,to%20about%20%2451%20per%20ton.>

the putative climate effects of gases, nor any other future mitigation attempts by the United States or any other country.

The SCGHG estimates offer no justification why the IAMs were run to 2300 versus 2280 or an even 300 years to 2310. And if the reason is that damages were not fully accounted by the year 2100, the SCGHG does not explain its arbitrary selection of a 300-year horizon for future damages. The Interagency Working Group also does not explain why the data it used is relevant to predicting GDP and population in the year 2300. All of these issues show that the selected end-dates are arbitrary and reflect a naked result-driven policy judgment.

Fails to Include 7% Discount Rate Baseline. The selection of the relevant discount rate is another consequential policy choice that the Interagency Working Group admits “has a large influence on the present value of future damages” and “raises highly contested and exceedingly difficult questions of *science, economics, ethics, and law.*” 2021 TSD at 17 (emphasis added). The 2021 TSD notably *excludes* the use of the 7 percent discount rate that the longstanding guidance in the peer-reviewed OMB Circular A-4 recommends for regulatory analysis. OMB recognized that a 7 percent discount rate measures the cost of government regulation displacing *investment* (it is what a government project must “earn” (pre-tax) to justify the cost, else it would have been better to invest in the market); and a 3 percent rate measures the opportunity cost of government regulation that displaces future *consumption* (for example, a person considers \$1.03 tomorrow (post-tax) equal to a \$1.00 today). See OMB Circular A-4. The Interagency Working Group chose to use the consumption rate of return, alleging that it calculated the Social Cost of Carbon in terms of consumption. The Working Group, however, conceded that its analysis only works if it can convert “displaced *investment* . . . into a flow of consumption equivalents”—something it suggested it had yet to do fully. See 2021 TSD at 18; see also *id.* at 19 (needing “a more complete measure of costs, accounting for displacement of investment”). In other words, there is no rational explanation for the Working Group’s transition from investment-based to consumption-based discounting.

To illustrate the influence of the selection of discount rate, the average social cost of carbon in the FUND Model for 2020 goes from a range of \$21 to \$39, 2016 TSD App. A Table A3, to *negative* 37 cents. Dayaratna Decl. ¶ 23. Adjusted for inflation, the FUND Model at a 7 percent discount rate equals *negative* 45 cents. *Id.* This means that under the different (investment-based) discount rate, the social “cost” of emitting an extra ton of carbon dioxide becomes a net *benefit* to society. *Id.* The average social cost of carbon in the DICE Model for 2020 goes from a range of \$28 to \$48, 2016 TSD App. A Table A2, to \$5.87 when the discount rate is changed to 7 percent. Dayaratna Decl. ¶ 22. Adjusted for inflation, the social cost of carbon under the DICE Model at a 7 percent discount rate equals \$7.21. *Id.* Adjusted for inflation, the values for methane and nitrous oxide show similar sensitivity in the DICE Model for 2020 at the 7 percent rate are \$331.76 (methane) and \$2,312.44 (nitrous oxide). *Id.* ¶¶ 25–26.

In short, the selection of a discount rate has an enormous impact on the actual projected costs generated by the SCGHG estimates. But this selection is not a

scientific decision; even the 2021 Working Group admits that it “raises highly contested and exceedingly difficult questions of *science, economics, ethics, and law.*” 2021 TSD at 17. Further, the 2021 Working Group admits that it has no clear scientific or economic justification for its abandonment of the investment-displacement discount rate provided in OMB Circular A-4, and its adoption of the much lower consumption-based discount rates provided in the 2021 TSD—other than the naked policy preference for increased calculations of the “social costs” of the relevant gases. Indeed, the 2021 Working Group’s arbitrary selection of discount rates—especially rates contrary to long-accepted pre-existing regulatory policy embodied in Circular A-4—constitutes a policy judgment that Congress did not delegate to any federal agency.

2021 TSD Improperly Relies on Outdated Science. The SCGHG relies on assumptions and science used in the IAMs that do “not reflect the tremendous increase in the scientific and economic understanding of climate-related damages that has occurred in the past decade.” 2021 TSD at 22; *id.* at 32. Contrary to the IWG’s assumptions, however, such scientific advances *reduce* the calculations for SCGHGs; they do not inflate them. As a threshold issue, the NERA report notes that the IAMs are plagued by data availability issues for calibration. NERA Report at 28–30 (noting DICE 2013R and early 2000 FUND relying on studies from the 1990s). The report notes that even when new information is added, sometimes it makes relatively little difference if the IAM continues to use older studies. *Id.* There are at least three other considerations.

First, the Equilibrium Climate Sensitivity distribution (Roe and Baker (2006)) used in all the IAMs is out of date, and the Working Group does not explain why it has not considered newer ECSs. An “ECS is a distribution that probabilistically quantifies the earth’s temperature response to a doubling of carbon dioxide concentrations.” Dayaratna Decl. ¶ 39. For each IAM, the ECS shows the carbon dioxide impacts on climate, and the “[s]econdary effects, such as sea-level rise, all depend on a reliable ECS.” *Id.* The current ECS used is more than a decade old, and it vastly *overstates* the probability of high-end global warming compared to more recent distributions. *Id.* ¶ 40.

A number of more recent ECS distributions suggest lower probabilities of extreme global warming in response to higher carbon dioxide concentrations. *Id.* ¶ 41. Failing to consider these alternatives has a big impact on the SCGHG. Using newer ECS distributions, the average social cost of carbon (at the 3% discount rate in 2020 dollars) can be reduced by as much as 45% for the DICE Model and 80% for the FUND Model. Dayaratna Decl. ¶¶ 43–46. For example, the Lewis and Curry (2015) ECS that controls for observed ocean heat uptake efficiency causes the DICE Model’s values to go from \$46.43 to \$24.15 in 2020, \$55.47 to \$28.95 in 2030, \$65.43 to \$34.25 in 2040, and \$75.83 to \$39.94 in 2050. *Id.* ¶ 43. The FUND Model’s values are affected even more: \$23.75 to \$4.09 in 2020, \$26.76 to \$4.79 in 2030, \$29.93 to \$5.52 in 2040, and \$33.25 to \$6.25 in 2050. *Id.* ¶ 45. Instead of reviewing these alternatives, the 2016 and 2021 TSDs simply apply an ECS that is 15 years old and sorely outdated, without any adequate justification or explanation.

Second, four of the five EMF-22 scenarios “represent the modelers’ judgment of the most likely pathway **absent** mitigation policies to reduce greenhouse gas emissions, rather than the wider range of possible outcomes.” 2010 TSD at 16 (emphasis added). These four scenarios continue to drive the outputs in the 2021 TSD and are hopelessly outdated. In addition to climate and emissions policies and rules in the last decade, President Biden announced “that America would aim to cut its greenhouse gas emissions 50 percent to 52 percent below 2005 levels by 2030.” Brad Plumer and Nadja Popovich, *The U.S. Has a New Climate Goal. How Does It Stack Up Globally?*, N.Y. TIMES (Apr. 22, 2021).⁶ Other nations similarly pledged to cut emissions compared to 2005 emissions: the EU nations by 51%, Britain by 63%, Canada by 45%, Japan by 44%, and Australia by 28%. *Id.* All of these countries have pledged to achieve zero net emissions by 2050. *Id.* And China, the world’s largest emitter of greenhouse gases, has pledged that it will aim to get down to zero net emissions by 2060. *Id.* To be sure, many nations—such as China—may not comply or fully comply with their pledges to reduce emissions. But it is implausible to assume—as the IWG plainly does—that *no* effective mitigation measures will occur over the upcoming decades. Even before these pledges, the United States and the EU nations have all been decreasing their emissions. *Id.* The SCGHGs continued use of the four BAU scenarios cannot be justified, and have been criticized as “not just badly out of date, but reflecting a set of fictional worlds.” Roger Pielke Jr, *The Biden Administration Just Failed its First Science Integrity Test*, February 28, 2021 (available at <https://rogerpielkejr.substack.com/p/the-biden-administration-just-failed>). And this process of implausibly adopting the worst-case scenario while refusing to give any weight to possible positive or mitigating effects pervades the IWG’s entire analysis.

Third, the SCGHG analysis fails to fairly account for agricultural benefits caused by increased carbon dioxide concentrations, such as increasing plants’ internal water use efficiency and raising the rate of net photosynthesis. Only one IAM, the FUND model, includes some quantification of these benefits. Indeed, the DICE model as utilized by the Working Group explicitly presumes that *only* damages will result from more CO₂ in the atmosphere and there will be *no* benefits. Dayaratna Decl. ¶ 52. This limitation is arbitrary and only serves to overstate damages. For example, even using the outdated Roe Baker (2006) ECS distribution, the FUND Model (at a 3 percent discount rate) has a greater than 10 percent chance to generate a *negative* social cost of carbon each year through 2040. Dayaratna Decl. ¶ 49. Changing the discount rate to 7 percent raises that probability significantly. If an updated ECS distribution is used, there is a greater than 50 percent chance the social cost of carbon is negative through the year 2050. *Id.* ¶ 50–51. And there is good reason to believe that if the DICE Model was permitted to account for these benefits, then it would generate some negative values for the SCC as well. *Id.* ¶ 52.

⁶ Available at <https://www.nytimes.com/interactive/2021/04/22/climate/new-climate-pledge.html?action=click&module=Spotlight&pgtype=Homepage>.

The Interagency Working Group should stop relying on data and projections that it knows is not accurate and that only inflate the values for the SCGHGs. It should adhere to the best science showing that the Chicken Little version of future greenhouse gas emissions has no basis in reality.

The commenting States also incorporate by reference their comments and analysis regarding the “social cost” of carbon dioxide in their recent comment to the Federal Energy Regulatory Commission, which is attached as Exhibit C and herein incorporated by reference.

Conclusion

The Interagency Working Group’s promulgation of purportedly binding numerical values for the “social costs” of gases constitutes a quintessentially legislative activity, and its decision to do so without any valid delegation of authority from Congress violates the separation of powers and threatens the liberty of all Americans. Further, the 2021 TSD IAM-based methodology is deeply flawed, as highlighted by the 2017 NASEM report, and the resulting social costs estimates are arbitrary and capricious. Moreover, the entire “comment” process violates the APA, and denies the Interagency Working Group the benefit of the American people’s wisdom. The interim social costs of greenhouse gases should be withdrawn for more reflection.

Respectfully submitted,



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Exhibit 2



**PUBLIC
INTEREST
COMMENT**

THE INTERAGENCY WORKING GROUP ON THE SOCIAL COST OF GREENHOUSE GASES SHOULD BE TRANSPARENT ABOUT THE VALUE JUDGMENTS BEHIND ITS ESTIMATES AND ACKNOWLEDGE THEIR COST

JAMES BROUGHEL

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Notice of Availability and Request for Comment on “Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates Under Executive Order 13990”

Agency: Office of Management and Budget

Comment Period Opens: May 7, 2021

Comment Period Closes: June 21, 2021

Comment Submitted: June 11, 2021

Docket No. OMB_FRDOC_0001-0292

Document No. 2021-09679

The Office of Management and Budget (OMB) is seeking comments on behalf of the Interagency Working Group on the Social Cost of Greenhouse Gases (IWG) regarding a recent update made to estimates of the social cost of carbon, methane, and nitrous oxide in a technical support document (TSD) issued by the IWG.¹ The IWG intends for federal regulatory agencies to use the values from the TSD in regulatory impact analyses to justify regulations targeting greenhouses gas emissions.

The Mercatus Center’s Fourth Branch project is dedicated to advancing knowledge about the effects of regulation on society. As part of its mission, scholars conduct careful and independent analyses that employ contemporary economic scholarship to assess regulations and their effects on economic opportunities and societal well-being. This comment provides guidance to OMB and to the IWG about ways to improve the social cost of greenhouse gases (SCGG) estimates in the TSD, in particular by providing transparency about the nature of value judgments embedded in the process of selecting SCGGs, as well as about the substantial cost that use of these estimates is likely to impose on the American public. Throughout this comment, recommendations will be written in bold, so it is clear what is being recommended to these federal agencies.

1. Office of Management and Budget, Notice of Availability and Request for Comment on “Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates Under Executive Order 13990,” 86 Fed. Reg. 24669 (May 7, 2021); Interagency Working Group on Social Cost of Greenhouse Gases, *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990*, February 2021.

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THE IWG REPORT ON THE SOCIAL COST OF GREENHOUSE GASES IS AN ECONOMICALLY SIGNIFICANT REGULATORY ACTION

Under executive order 12866, an economically significant regulatory action, as defined in Section 3(f)(1) of the order, is “any regulatory action that is likely to result in a rule that may . . . have an annual effect on the economy of \$100 million or more or adversely affect in a material way the economy, a sector of the economy, productivity, competition, jobs, the environment, public health or safety or State, local or tribal governments or communities.”² Economically significant regulatory actions require a full regulatory impact analysis, which includes an assessment of benefits, costs, and alternatives.³

The TSD on the SCGG meets the definition of an economically significant regulatory action under executive order 12866 because it “is likely to result in a rule that may . . . have an annual effect on the economy of \$100 million or more.”⁴ As evidence, according to a 2017 law review article, the Obama administration used the social cost of carbon (SCC) or social cost of methane (SCM) metrics in economic analysis for at least 83 regulatory proceedings.⁵ The total cost of these 83 regulatory actions is estimated to be between \$447 billion and \$561 billion (in 2020 dollars), on the basis of regulatory agencies’ own impact analyses (see appendix A of this comment for these calculations). This estimate may be conservative because it is unclear whether the list of 83 regulatory proceedings is comprehensive,⁶ and because some regulatory analyses from these proceedings include only cost estimates for benchmark years (as opposed to calculating total cost across all years). The perpetuity value of \$447 billion at a 7 percent interest rate is \$31.3 billion, implying that if these costs were spread across an infinite time horizon, annual costs would still be 30 times higher than the threshold for economic significance, according to executive order 12866. Therefore, a regulatory impact analysis is required and should be made available for public scrutiny.

Recommendation 1: OMB should withdraw the TSD so that the TSD may be reintroduced, supplemented with a regulatory impact analysis, and made available for public comment.

THE SOCIAL WELFARE FUNCTION USED BY THE IWG TO CALCULATE THE SCGG IS ARBITRARY AND LACKS JUSTIFICATION

The SCGG values in the TSD are calculated using a social welfare function, the selection of which is normative in nature. The selection of the particular social welfare function used by the IWG is problematic for several reasons.

First, any number of alternative social welfare functions could be used to assign a value to the effects of greenhouse gas emissions on societal well-being, because the selection of the social welfare function is a value judgment made by analysts. Alternative social welfare functions are

2. Exec. Order No. 12866, 58 Fed. Reg. 190 (October 3, 1993).

3. Exec. Order No. 12866, § 6(a)(3)(C).

4. Exec. Order No. 12866, § 3(f)(1).

5. Peter Howard and Jason Schwartz, “Think Global: International Reciprocity as Justification for a Global Social Cost of Carbon,” *Columbia Journal of Environmental Law* 42, issue 5 (2017): 203–94.

6. The law review article that serves as the source of the identified rules says “at least” these rules have used the SCC or SCM in their analyses. Howard and Schwartz, “Think Global,” 219.

available in the academic literature.⁷ The IWG has not provided sufficient explanation for why it chose to use the particular social welfare function that it did.

Second, the social welfare function used (which is drawn from the Ramsey growth model) conflicts with a directive from President Biden regarding modernizing regulatory review.⁸ Biden has directed OMB to produce a set of recommendations that “promote . . . the interests of future generations,” which is clearly at odds with the social welfare function being used by the IWG, which treats the present generation as a dictator (more discussion of this issue comes later).⁹

To demonstrate the arbitrariness of the IWG’s current approach, consider the following social welfare function:

$$SW_i = B_i - C_i + \$51 \times \sum_{t=0}^{\infty} TON_{GHG_i} \quad (1)$$

Equation (1) states that social welfare from a policy i is equivalent to the total nongreenhouse-gas-related benefits from the policy minus total nongreenhouse-gas-related costs, plus the change in tons of greenhouse gases emitted owing to the policy, multiplied by the value of \$51 per ton. In this social welfare function, greenhouse gas emissions enter as a *benefit* rather than a cost (and therefore reductions in greenhouse gases constitute a cost).

I am not necessarily recommending that the IWG use the social welfare function in the equation (although greenhouse gas emissions may be correlated with things that people value); I present this equation only to point out the completely arbitrary nature of the social welfare function currently being used by the IWG. One could just as easily identify a social welfare function that reaches completely opposite policy conclusions—as I have just shown with equation (1). Without any explanation, how can one know which social welfare function is superior?

Recommendation 2: The IWG should be explicit about which social welfare function it is using, and it should explain why it selected that particular social welfare function.

Additionally, the social welfare function utilized by the IWG is not consistent with producing “an assessment of the potential costs and benefits” of a regulatory action, as is required under executive order 12866. Thus, the values in the TSD should not be used in any benefit-cost analysis. This is the case because, rather than assessing the dollar value of impacts, the TSD filters greenhouse gas impacts through a social planner’s welfare function before final headline numbers are reported. The values reported in the TSD are estimates of *a social planner’s well-being*, not estimates of benefits or costs (which are measured in dollars). This issue leads to confusion throughout OMB and IWG documentation. For example, the *Federal Register* notice from OMB announcing the opening of the comment period on the IWG report states “the Executive Branch has developed a set of estimates that represent the monetized impact to society associated with an incremental change in greenhouse gas emissions.” This statement is incorrect as written, as what is being reported is not a money value. In fact, calculations of the SCC, SCM, and social cost of

7. W. J. Wouter Botzen and Jeroen C. J. M. van den Bergh, “Specifications of Social Welfare in Economic Studies of Climate Policy: Overview of Criteria and Related Policy Insights,” *Environmental and Resource Economics* 58 (2014): 1–33.

8. Executive Office of the President, Modernizing Regulatory Review, 86 Fed. Reg. 7223 (January 20, 2021).

9. James Broughel, “The Unlikely Story of American Regulatory Socialism,” *Quarterly Journal of Austrian Economics* 24, no. 1 (2021): 147–65.

nitrous oxide are incorrectly labelled throughout the TSD as well, including in tables ES-1, ES-2, and ES-3, where the primary values are reported. The numbers in these tables are reported in dollar terms, but what are actually being measured are estimates of well-being. Values represent units of the well-being of a social planner (or someone similar), and they should be reported as such.

Recommendation 3: The IWG should report units accurately when reporting the SCGG values. The IWG should make clear that the units the SCGG values are measured in which are units of the well-being of a social planner or of society. Alternatively, the term “well-being dollars” would be appropriate.

Recommendation 4: The IWG should make clear that the SCGG values are inappropriate for use in any benefit-cost analysis, where the relevant impacts are measured in US dollars.

The IWG should acknowledge the normative nature of the SCGG metrics, given that they are statements of what policy *should* aim to do according to analyst preferences, not a statement of what greenhouse gas emissions *actually* do to the environment or the economy.¹⁰ As such, I also recommend the following:

Recommendation 5: The IWG should acknowledge that the SCGG values are normative statements of analysts’ political priorities, divorced from objective science.

THE SOCIAL DISCOUNT RATES USED BY THE IWG TO CALCULATE THE SCGG ARE ARBITRARY AND LACK JUSTIFICATION

Like the social welfare function, the social discount rate is a normative input in benefit-cost analysis.¹¹ To its credit, the IWG acknowledges that certain ethical values go into the selection of this rate, but it falls short of acknowledging the full truth, which is that selection of this rate is entirely dependent on value judgments. There is no objective scientific way to arrive at the rates currently being used by the IWG.

The TSD identifies several ways in which the selection of the social discount rate could occur. One approach is to follow OMB’s guidance in *Circular A-4*,¹² which is to base the social discount rate on market interest rates.¹³ There are at least two problems with this approach. First, there is no compelling reason why one should rely on market interest rates to select the social discount rate, as opposed to any other method. This is especially true of policies (like those related to greenhouse gases) with intergenerational consequences. Future generations cannot participate in present markets, so present markets will not reflect their preferences. Second, OMB’s discount rate guidelines in *Circular A-4* are flawed and should not be replicated. For example, *Circular A-4* discounting guidance leads regulatory agencies to fail to account for the opportunity cost of capital

10. James Broughel, “What Is vs. What Should Be in Climate Policy: The Hidden Value Judgments Underlying the Social Cost of Carbon” (Mercatus Policy Brief, Mercatus Center at George Mason University, Arlington, VA, April 2021).

11. On the normative nature of the social discount rate, see M. S. Feldstein, “The Social Time Preference Discount Rate in Cost-Benefit Analysis,” *Economic Journal* 74, no. 294 (1964): 360–79; M. S. Feldstein, “The Inadequacy of Weighted Discount Rates,” in *Cost-Benefit Analysis: Selected Readings*, ed. Richard E. Layard (Baltimore, MD: Penguin, 1972), 311–32.

12. Office of Management and Budget, *Circular A-4*, September 17, 2003.

13. The IWG argues that because market interest rates have declined in recent years, a lower social discount rate might be appropriate. Interagency Working Group on Social Cost of Greenhouse Gases, *Technical Support Document*, 19–21.

properly, because *Circular A-4* conflates two concepts: the social discount rate and the opportunity cost of capital.¹⁴ If anything, aspects of the discounting guidelines in *Circular A-4* should be abandoned, not given more legitimacy by being cited in the TSD.

Recommendation 6: The IWG should not double down on the most problematic aspects of OMB *Circular A-4*, such as its social discounting guidance.

Recommendation 7: The IWG should make clear that the consumption rate of interest used to discount the SCGG and the opportunity cost of capital are two different concepts.

Recommendation 8: The IWG should make clear that there is no objective reason why market interest rates should be the basis for selecting the social discount rate.

In addition to discussing basing the social discount rate on market interest rates, the TSD discusses using the Ramsey equation to select a social discount rate.¹⁵ Following this approach, the social discount rate is “approached from the perspective of a social planner who wishes to maximize the social welfare of society.”¹⁶ The discount rate in this method is the planner’s rate of time preference, and it serves as a device to convert benefits and costs from dollar values into units of the planner’s well-being.¹⁷

The Ramsey equation provides a useful way to explain the role of the social discount rate in a benefit-cost analysis. The social planner abstraction is used as a proxy to represent the current generation’s well-being. However, the parameters of the Ramsey equation still require ethical judgments for their selection, and there is no reason to believe that the analysts who work on the IWG have any particular expertise in this area.

Given these facts, I recommend the following.

Recommendation 9: The IWG should acknowledge the normative nature of the social discount rate and be upfront that ethical judgments, which likely fall outside the expertise of analysts, are required to identify a social discount rate.

Recommendation 10: The IWG should acknowledge that the social discount rate is often interpreted as the rate of time preference of a social planner.¹⁸

14. In environmental benefit-cost analysis, the opportunity cost of capital is addressed using a shadow price, not a social discount rate. Feldstein, “The Inadequacy of Weighted Discount Rates”; David F. Burgess, “The Appropriate Measure of the Social Discount Rate and Its Role in the Analysis of Policies with Long-Run Consequences” (Mercatus Symposium, Mercatus Center at George Mason University, Arlington, VA, December 2018); James Broughel, “Cost-Benefit Analysis as a Failure to Learn from the Past,” *Journal of Private Enterprise* 35, no. 1 (2020): 105–13.

15. Interagency Working Group on Social Cost of Greenhouse Gases, *Technical Support Document*, 21.

16. Kenneth J. Arrow et al., “How Should Benefits and Costs Be Discounted in an Intergenerational Context? The Views of an Expert Panel” (RFF DP No. 12-53, Resources for the Future, Washington, DC, December 2012).

17. James Broughel, “Cost-Benefit Analysis as a Failure to Learn from the Past.”

18. Although aspects of the discounting guidelines in *Circular A-4* are problematic (such as how they deal with the issue of opportunity cost), other aspects make sense. For example, according to *Circular A-4*, the 3 percent social discount rate is “society’s” rate of time preference (society is used in quotes in the original). *Circular A-4* does not make clear what society is, but it is reasonable to conclude that society is the agent in the Ramsey growth model. That agent can be understood as either a social planner or a representative of the collection of individuals comprising the current generation of citizens. Broughel, “The Unlikely Story of American Regulatory Socialism.”

Recommendation 11: The IWG should acknowledge that what is being measured after social discounting is the well-being of a social planner or of society, either one being an abstraction meant to capture the welfare of the current generation of citizens.

CONCLUSION

There is a very real danger that the values reported in the TSD will be perceived as objective scientific inputs in regulatory analysis, as opposed to what they are: statements reflecting the political priorities of analysts. No doubt some serious scholars have been involved in the calculation of these values, but when they work in this context, they are stepping outside of the domain of scholarship and entering into the domain of political advocacy. There is nothing wrong with political advocacy, per se, but political advocacy should not masquerade as objective science, and there is a danger of this occurring with the SCGG values in the TSD.

The IWG should be explicit and transparent about the value-laden nature of the metrics it is producing, or it should cease to use these metrics altogether and focus on scientifically based measures of the impacts of greenhouse gases instead, measures that should be consistent with objective assessments of benefits and costs.

ATTACHMENTS (2)

“The Social Discount Rate: A Primer for Policymakers” (Mercatus Policy Brief, Mercatus Center at George Mason University, Arlington, VA, June 2020)

“What Is vs. What Should Be in Climate Policy: The Hidden Value Judgments Underlying the Social Cost of Carbon” (Mercatus Policy Brief, Mercatus Center at George Mason University, Arlington, VA, April 2021)

APPENDIX A: COST ESTIMATES FOR OBAMA-ERA REGULATORY PROCEEDINGS UTILIZING THE SOCIAL COST OF CARBON OR SOCIAL COST OF METHANE

It is estimated that the Obama administration employed the SCC or SCM metrics to justify regulatory proceedings with an estimated total cost of between \$447 billion and \$561 billion (in 2020 dollars). This analysis uses a list of 83 rulemaking actions found in a 2017 paper by Peter Howard and Jason Schwartz that is presented in table A-1. The authors note that at that time, “at least eighty-three separate regulatory or planning proceedings conducted by six different federal agencies have used the SCC or SCM in their analyses.”¹⁹

Using this list of 83 regulatory proceedings as a starting point, I employ the following methodology to calculate the cost of these rules. I collect the *Federal Register* notices for each of the 83 items (or, if the item is not a regulation, I collect the relevant primary document). Next, I identify cost estimates in the regulatory agencies’ regulatory impact analyses. These numbers are found either in the preamble of the rulemaking notice or in a separate regulatory impact analysis document. The usual practice of regulatory agencies is to calculate costs using 3 percent and 7 percent discount rates, so I collect both sets of cost estimates. In cases where the agency calculates a range of costs, I take the average of the range calculated at each discount rate.

19. Howard and Schwartz, “Think Global,” 219.

Some costs are reported by the agency as a present value, whereas others are reported in annualized form. Meanwhile, still other estimates are calculated for specific benchmark years only. For annualized costs, I identify the time horizon of the analysis and convert costs from annualized to present value using the relevant discount rate. For those rules with cost estimates in specific benchmark years, I assume costs occurred in only those years (which clearly underestimates the costs of these rules). However, for one rule, a series of benchmark years are presented over a 10-year time frame, so I interpolate costs for the missing years using the benchmark year values. Finally, I adjust all values for inflation to 2020 dollars and then aggregate the estimates. The range of estimates, \$447 billion to \$561 billion, reflects estimates calculated at the 7 percent and 3 percent discount rates, respectively.

There are a number of issues relating to uncertainty surrounding these cost estimates that should be noted. First, these are ex ante cost estimates, meaning that these are forecasts made by the regulating agency prior to a rule going into effect. Forecasts of the future can turn out to be incorrect. Moreover, numerous analytical assumptions go into these agency calculations, any number of which could turn out to be wrong or biased in some manner. Some regulations on the list are duplicates. Cost estimates from duplicate regulations are dropped from the total cost estimate. Some items are not regulations. For example, there are several environmental impact studies on the list. I assume that these items have zero cost. Some regulations are insignificant, or they otherwise do not have a cost estimate associated with them. I assume these have zero cost. Finally, some regulations are proposals, meaning that they were either later finalized or may not have been finalized. I include cost estimates for these regulations because they are regulatory actions that are supported using the SCC or SCM metrics.

TABLE A-1: COST ESTIMATES FOR OBAMA-ERA REGULATORY PROCEEDINGS USING THE SCC OR SCM

| NO. | RULEMAKING | PUBLICATION DATE AND CITATION | FINAL RULE | TOTAL COST PRESENT VALUE | | TOTAL COST ANNUALIZED (MILLIONS) | SOURCE PAGE NUMBER | DOLLAR YEAR | YEARS COVERED | TOTAL COST PV (MILLIONS OF CURRENT DOLLARS) | | TOTAL COST PV (MILLIONS OF 2020\$) | |
|-----|--|---|------------|--------------------------|----------|----------------------------------|--------------------|-------------|---------------|---|----------|------------------------------------|----------|
| | | | | 3% | 7% | | | | | 3% | 7% | | 3% |
| 1 | Energy Conservation Standards for Refrigerated Bottled or Canned Beverage Vending Machines | 74 Fed. Reg. 44,914 (finalized Aug. 31, 2009) RIN 1904-AB58 | Yes | - | - | \$23.1 | 44916 | 2008 | 31 | \$462 | \$301 | \$556 | \$362 |
| 2 | Light-Duty Vehicle Greenhouse Gas Standards and Corporate Average Fuel Economy Standards | 74 Fed. Re. 49,454 (proposed Sept. 28, 2009); 75 Fed. Reg. 25,323 (finalized May 7, 2010) RIN 2127-AK50; RIN 2127-AK90; RIN 2060-AP58 | Yes | \$51,800 | \$51,800 | - | 25343 | 2007 | - | \$51,800 | \$51,800 | \$64,666 | \$64,666 |
| 3 | Energy Conservation Standards for Dishwashers, Dehumidifiers, Microwave Ovens, Electric & Gas Kitchen Ranges and Ovens, and Commercial Clothes Washers | 74 Fed. Reg. 57,738 (proposed Nov. 9, 2009); 75 Fed. Reg. 1121 (finalized Jan. 8, 2010) RIN 1904-AB93 | Yes | - | \$22.7 | \$23.4 | 1124 | 2008 | 31 | \$454 | \$293 | \$546 | \$353 |
| 4 | Energy Conservation Standards for Small Electric Motors | 74 Fed. Reg. 61,410 (proposed Nov. 24, 2009); 75 Fed. Reg. 10,874 (finalized Mar. 9, 2010) RIN 1904-AB70 | Yes | - | \$263.9 | \$263.7 | 10877 | 2009 | 31 | \$5,278 | \$3,305 | \$6,367 | \$3,987 |
| 5 | Changes to Renewable Fuel Standard Program | 75 Fed. Reg. 14,669 (Mar. 26, 2010) RIN 2060-A081 | Yes | \$90.5 | \$90.5 | - | 4,5,0827 of RIA | 2007 | - | \$90.5 | \$90.5 | \$113 | \$113 |
| 6 | FIP to Reduce Interstate Transport of Fine Particulate Matter and Ozone | 75 Fed. Reg. 45,209 (proposed Aug. 2, 2010); 76 Fed. Reg. 48,207 (finalized Aug. 8, 2011) RIN 2060-AP50 | Yes | - | \$810 | \$810 | 48215, p. 2 RIA | 2007 | 1 | \$810 | \$810 | \$1011 | \$1011 |
| 7 | Energy Conservation Standards for Residential Refrigerators, Refrigerator-Freezers, and Freezers | 75 Fed. Reg. 59,470 (proposed Sept. 27, 2010); 76 Fed. Reg. 57,515 (finalized Sept. 15, 2011) RIN 1904-AB79 | Yes | \$23,300 | \$13,300 | \$23,300 | 57519, 57520 | 2009 | - | \$23,300 | \$13,300 | \$28,108 | \$16,045 |

TABLE A-1 (CONTINUED)

| NO. | RULEMAKING | PUBLICATION DATE AND CITATION | FINAL RULE | TOTAL COST PRESENT VALUE (MILLIONS) | | | TOTAL COST ANNUALIZED (MILLIONS) | SOURCE PAGE NUMBER | DOLLAR YEAR | YEARS COVERED | TOTAL COST PV (MILLIONS OF CURRENT DOLLARS) | | | TOTAL COST PV (MILLIONS OF 2020\$) |
|-----|--|--|--------------------------------|-------------------------------------|---------|-------|----------------------------------|--------------------|-------------|---------------|---|---------|---------|------------------------------------|
| | | | | 3% | 7% | 3% | | | | | 3% | 7% | 3% | |
| 8 | NPS and Emission Guidelines for Sewage Sludge Incineration Units | 75 Fed. Reg. 63,260 (proposed Oct. 14, 2010); 76 Fed. Reg. 15,372 (finalized Mar. 21, 2011) RIN 2060-AP90 | Yes | \$55 | \$55 | - | 15398, p. 3 PDF | 2008 | 1 | \$55 | \$55 | \$66 | \$66 | |
| 9 | GHG Emission Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles | 75 Fed. Reg. 74,152 (proposed Nov. 30, 2010); 76 Fed. Reg. 57,105 (finalized Sept. 15, 2011) RIN 2060-AP61; RIN 2127-AK74 | Yes | \$8,100 | \$8,100 | - | 57111 | 2009 | - | \$8,100 | \$8,100 | \$9,772 | \$9,772 | |
| 10 | NESHAP: Mercury Emissions from Mercury Cell Chlor-Alkali Plants | 76 Fed. Reg. 13,852 (proposed Mar. 14, 2011) RIN 2060-AN99 | No, supplemental proposed rule | \$0 | \$0 | - | 13867 | 2007 | - | \$0 | \$0 | NA | NA | |
| 11 | NESHAP: Industrial, Commercial, and Institutional Boilers (Area Sources) | 76 Fed. Reg. 15,554 (Mar. 21, 2011) RIN 2060-AM44 | Yes | - | - | \$490 | 15558, 15582 | 2008 | 1 | \$490 | \$490 | \$589 | \$589 | |
| 12 | NESHAP: Industrial, Commercial, and Institutional Boilers and Process Heaters (Major Sources) | 76 Fed. Reg. 15,607 (Mar. 21, 2011) RIN 2060-AQ25 | Yes | \$1,500 | \$1,500 | - | 15611 | 2008 | - | \$1,500 | \$1,500 | \$1,804 | \$1,804 | |

TABLE A-1 (CONTINUED)

| NO. | RULEMAKING | PUBLICATION DATE AND CITATION | FINAL RULE | TOTAL COST PRESENT VALUE (MILLIONS) | | | TOTAL COST ANNUALIZED (MILLIONS) | SOURCE PAGE NUMBER | DOLLAR YEAR | YEARS COVERED | TOTAL COST PV (MILLIONS OF CURRENT DOLLARS) | | | TOTAL COST PV (MILLIONS OF 2020\$) | | |
|-----|--|---|---------------------------|-------------------------------------|---------|---------|----------------------------------|--------------------|-------------|---------------|---|----------|----------|------------------------------------|----|----|
| | | | | 3% | 7% | 3% | | | | | 3% | 7% | 3% | 7% | 3% | 7% |
| 13 | NPS and EG: Commercial and Industrial Solid Waste Incineration Units | 76 Fed. Reg. 15,704 (Mar. 21, 2011); 76 Fed. Reg. 20660-A012 RIN 2060-A012 | Yes | \$290 | \$290 | - | 15713, 15746 | 2008 | - | \$290 | \$290 | \$349 | \$349 | | | |
| 14 | Energy Conservation Standards for Fluorescent Lamp Ballasts | 76 Fed. Reg. 20,090 (proposed Apr. 11, 2011); 76 Fed. Reg. 70, 547 (finalized Nov. 14, 2011) RIN 1904-AB50 | Yes | \$6,910 | \$3,680 | - | 70551, 70552 | 2010 | - | \$6,910 | \$3,680 | \$8,202 | \$4,368 | | | |
| 15 | Energy Conservation Standards for Residential Clothes Dryers and Room Air Conditioners | 76 Fed. Reg. 22,324 (proposed Apr. 21, 2011); 76 Fed. Reg. 22,453 (direct final rule, Apr. 21, 2011); 76 Fed. Reg. 22,454 (direct final rule, May 26, 2011) RIN 1904-AA89 | Yes | - | - | \$166.4 | 22458 | 2009 | 30 | \$3,262 | \$1,985 | \$3,955 | \$2,395 | | | |
| 16 | Energy Conservation Standards for Residential Furnaces and Residential Central Air Conditioners and Heat Pumps | 76 Fed. Reg. 37,549 (proposed June 27, 2011); 76 Fed. Reg. 37,407 (direct final rule, June 27, 2011) RIN 1904-AC06 | Yes, plus a proposed rule | - | - | \$711.9 | 37413, 37414 | 2009 | 30 | \$13,954 | \$8,303 | \$16,833 | \$10,016 | | | |
| 17 | Federal Implementation Plans: Interstate Transport of Fine Particulate Matter and Ozone | 76 Fed. Reg. 48,207 (Aug. 8, 2011) 2060-AP50 | Yes | 0 | 0 | - | 48215 | 2007 | - | NA | NA | NA | NA | | | |

TABLE A-1 (CONTINUED)

| NO. | RULEMAKING | PUBLICATION DATE AND CITATION | FINAL RULE | TOTAL COST PRESENT VALUE (MILLIONS) | | | TOTAL COST ANNUALIZED (MILLIONS) | SOURCE PAGE NUMBER | DOLLAR YEAR | YEARS COVERED | TOTAL COST PV (MILLIONS OF CURRENT DOLLARS) | | | TOTAL COST PV (MILLIONS OF 2020\$) | | |
|-----|--|--|-----------------------------------|-------------------------------------|-----------|-------|----------------------------------|--------------------|-------------|---------------|---|-----------|-----------|------------------------------------|----|--|
| | | | | 3% | 7% | 3% | | | | | 7% | 3% | 7% | 3% | 7% | |
| 18 | NSPS and NESHAP for Oil and Natural Gas Sector | 76 Fed. Reg. 52,738 (proposed Aug. 23, 2011); 77 Fed. Reg. 49,489 (finalized Aug. 16, 2012) RIN 2060-AP76 | Yes | - | - | -\$11 | 49492 | 2008 | - | - | -\$11 | -\$11 | -\$13 | -\$13 | | |
| 19 | 2017+ Model Year Light-Duty Vehicle Greenhouse Gas Standards and Corporate Average Fuel Economy Standards & DOT's environmental impact statement | 76 Fed. Reg. 74,854 (proposed Dec. 1, 2011); 77 Fed. Reg. 62,623 (finalized Oct. 15, 2012) RIN 2060-AG54; RIN 2127-AK79 | Yes | \$150,000 | \$144,000 | - | 62629 | 2010 | - | - | \$150,000 | \$144,000 | \$178,042 | \$170,920 | | |
| 20 | Commercial and Industrial Solid Waste Incineration Units | 76 Fed. Reg. 80,452 (proposed Dec. 23, 2011) RIN 2050-AG44; RIN 2060-ART5 | Proposed/reconsideration of final | \$0 | \$0 | - | - | - | - | - | NA | NA | NA | NA | | |
| 21 | Energy Conservation Standards and Test Procedures for Commercial Heating, Air-Conditioning, and Water-Heating Equipment | 77 Fed. Reg. 2356 (proposed Jan. 17, 2012); 77 Fed. Reg. 28,927 (finalized May 16, 2012) RIN 1904-AC47 | Yes | no cost estimate | - | - | 28972, 28973 | 2011 | - | - | NA | NA | NA | NA | | |
| 22 | Energy Conservation Standards for Distribution Transformers | 77 Fed. Reg. 7281 (proposed Feb. 10, 2012); 78 Fed. Reg. 23,335 (finalized Apr. 18, 2013) RIN 1094-AC04 | Yes | - | - | \$282 | 23426 | 2011 | 30 | - | \$5,527 | \$3,301 | \$6,361 | \$3,799 | | |
| 23 | Energy Conservation Standards for Standby Mode and Off Mode for Microwave Ovens | 77 Fed. Reg. 8526 (proposed Feb. 14, 2012); 78 Fed. Reg. 36,316 (finalized June 17, 2013) RIN 1904-AC07 | Yes | \$1,341 | \$776 | - | 36318, 36320 | 2011 | - | - | \$1,341 | \$776 | \$1,543 | \$893 | | |

TABLE A-1 (CONTINUED)

| NO. | RULEMAKING | PUBLICATION DATE AND CITATION | FINAL RULE | TOTAL COST PRESENT VALUE (MILLIONS) | | | SOURCE PAGE NUMBER | DOLLAR YEAR | YEARS COVERED | TOTAL COST PV (MILLIONS OF CURRENT DOLLARS) | | | TOTAL COST PV (MILLIONS OF 2020\$) |
|-----|--|--|-------------------------|-------------------------------------|---------|-------|--------------------|-------------|---------------|---|---------|----------|------------------------------------|
| | | | | 3% | 7% | 3% | | | | 7% | 3% | 7% | |
| 24 | NESHAP from Coal- and Oil-Fired Electric Utility Steam Generation Units and Standards of Performance for Fossil-Fuel-Fired Electric Utility, Industrial-Commercial-Institutional, and Small Industrial-Commercial-Institutional Steam Generating Units | 77 Fed. Reg. 9303 (Feb. 16, 2012) RIN 2060-AP52; RIN 2060-AR31 | Yes | \$9,600 | \$9,600 | - | 9306 | 2007 | - | \$9,600 | \$9,600 | \$11,984 | \$11,984 |
| 25 | Energy Conservation Standards for Battery Chargers and External Power Supplies | 77 Fed. Reg. 18,477 (proposed Mar. 27, 2012); 79 Fed. Reg. 7845 (finalized Feb. 10, 2014) RIN 1904-AB57 | Yes | - | \$162 | \$147 | 7925, 31921 | 2012 | 30 | \$3,175 | \$1,824 | \$3,580 | \$2,057 |
| 26 | Energy Conservation Standards for Residential Dishwashers | 77 Fed. Reg. 31,964 (proposed May 30, 2012); 77 Fed. Reg. 31,917 (direct final rule, May 30, 2012); 77 Fed. Reg. 59,712 (direct final rule, Oct. 1, 2012) RIN 1904-AC64 | Yes, final and proposed | \$881 | - | - | 31920 | 2010 | - | \$881 | \$522 | \$1046 | \$620 |
| 27 | Energy Conservation Standards for Residential Clothes Washers | 77 Fed. Reg. 32,381 (proposed May 31, 2012); 77 Fed. Reg. 32,307 (direct final rule, May 31, 2012) RIN 1904-AB90 | Yes, final and proposed | - | \$212 | \$185 | 32311 | 2010 | 30 | \$4,155 | \$2,296 | \$4,932 | \$2,725 |
| 28 | Performance Standards for Petroleum Refiners | 77 Fed. Reg. 56,422 (Sept. 12, 2012) RIN 2060-AN72 | Yes | - | - | - | 56425 | 2006 | - | -\$79 | -\$79 | -\$101 | -\$101 |
| 29 | NESHAP for Industrial, Commercial, and Institutional Boilers and Process Heaters (Major Sources) | 78 Fed. Reg. 7138 (Jan. 31, 2013) RIN 2060-AR13 | Yes | \$1,500 | - | - | 7139 | 2008 | - | \$1,500 | \$1,500 | \$1,804 | \$1,804 |

TABLE A-1 (CONTINUED)

| NO. | RULEMAKING | PUBLICATION DATE AND CITATION | FINAL RULE | TOTAL COST PRESENT VALUE (MILLIONS) | | | SOURCE PAGE NUMBER | DOLLAR YEAR | YEARS COVERED | TOTAL COST PV (MILLIONS OF CURRENT DOLLARS) | | | TOTAL COST PV (MILLIONS OF 2020\$) | | |
|-----|--|---|------------|-------------------------------------|---------|-------|--------------------|-------------|---------------|---|---------|----------|------------------------------------|---------|----|
| | | | | 3% | 7% | 7% | | | | 3% | 7% | 7% | 3% | 7% | 7% |
| 30 | Energy Conservation Standards for Distribution Transformers | 78 Fed. Reg. 23,335 (Apr. 18, 2013) RIN 1904-AC04 | Yes | - | - | - | 23342 | - | DUPLICATE | NA | NA | NA | NA | NA | NA |
| 31 | Effluent Limitation Guidelines and Standards for the Steam Electric Power Generating Point Source Category | 78 Fed. Reg. 34,431 (proposed June 7, 2013); 80 Fed. Reg. 67,837 (finalized Nov. 3, 2015) RIN 2040-AF14 | Yes | - | \$480 | \$471 | 67842, 67887 | 2013 | 24 | \$8,129 | \$5,402 | \$9,033 | \$6,002 | \$6,002 | |
| 32 | Environmental Assessment of Montana Oil and Gas Lease Sales | Env'tl. Assessment (July 24, 2013) DOI-BLM-MT-Gas Lease Sales 0010-2013-0022-EA | No | - | - | - | | | - | NA | NA | NA | NA | NA | |
| 33 | Energy Conservation Standards for Metal Halide Lamp Fixtures | 78 Fed. Reg. 51,463 (proposed Aug. 20, 2013); 79 Fed. Reg. 7745 (finalized Feb. 10, 2014) RIN 1904-AC00 | Yes | \$721 | \$465 | - | 7749, 7750 | 2012 | - | \$721 | \$465 | \$813 | \$524 | \$524 | |
| 34 | Energy Conservation Standards for Walk-In Coolers and Freezers | 78 Fed. Reg. 55,781 (proposed Sept. 11, 2013); 79 Fed. Reg. 32,049 (finalized June 3, 2014) RIN 1904-AB86 | Yes | \$9,800 | \$5,500 | - | 32053, 32054 | 2013 | - | \$9,800 | \$5,500 | \$10,889 | \$6,111 | \$6,111 | |
| 35 | Energy Conservation Standards for Commercial Refrigeration Equipment | 78 Fed. Reg. 55,889 (proposed Sept. 11, 2013); 79 Fed. Reg. 17,725 (finalized Mar. 28, 2014) RIN 1904-AC19 | Yes | \$4,890 | \$2,770 | - | 17729, 17730 | 2012 | - | \$4,890 | \$2,770 | \$5,513 | \$3,123 | \$3,123 | |
| 36 | Energy Conservation Standards for Residential Furnace Fans | 78 Fed. Reg. 64,067 (proposed Oct. 25, 2013); 79 Fed. Reg. 38,129 (finalized July 3, 2014) RIN 1904-AC22 | Yes | \$6,189 | \$3,385 | - | 38132, 38133 | 2013 | - | \$6,189 | \$3,385 | \$6,877 | \$3,761 | \$3,761 | |

TABLE A-1 (CONTINUED)

| NO. | RULEMAKING | PUBLICATION DATE AND CITATION | FINAL RULE | TOTAL COST PRESENT VALUE (MILLIONS) | | TOTAL COST ANNUALIZED (MILLIONS) | SOURCE PAGE NUMBER | DOLLAR YEAR | YEARS COVERED | TOTAL COST PV (MILLIONS OF CURRENT DOLLARS) | | TOTAL COST PV (MILLIONS OF 2020\$) | |
|-----|---|--|----------------------|-------------------------------------|---------|----------------------------------|--------------------|-------------|---------------|---|---------|------------------------------------|---------|
| | | | | 3% | 7% | | | | | 3% | 7% | 3% | 7% |
| 37 | Energy Conservation Standards for Commercial and Industrial Electric Motors | 78 Fed. Reg. 73,589 (proposed Dec. 6, 2013); 79 Fed. Reg. 30,933 (finalized May 29, 2014) RIN 1904-AC28 | Yes | \$12,500 | \$6,900 | - | 30939, 30940 | 2013 | - | \$12,500 | \$6,900 | \$13,889 | \$7,667 |
| 38 | Standards of Performance for Greenhouse Gas Emissions from New, Modified, and Reconstructed Stationary Sources: Electric Utility Generating Units | 79 Fed. Reg. 1429 (proposed Jan. 8, 2014); 80 Fed. Reg. 64,509 (finalized Oct. 23, 2015) RIN 2060-AG91 | Yes | \$0 | \$0 | - | 5-34, 4-1 RIA | - | - | \$0 | \$0 | NA | NA |
| 39 | Energy Conservation Standards for Commercial Clothes Washers | 79 Fed. Reg. 12,301 (proposed Mar. 4, 2014); 79 Fed. Reg. 74,491 (finalized Dec. 15, 2014) RIN 1904-AC77 | Yes | \$0.24 | \$0.46 | - | 74494, 74495 | 2013 | - | \$0 | \$0 | \$0 | \$0 |
| 40 | Energy Conservation Standards for Automatic Commercial Ice Makers | 79 Fed. Reg. 14,845 (proposed Mar. 17, 2014); 80 Fed. Reg. 4645 (finalized Jan. 28, 2015) RIN 1904-AC39 | Yes | \$411 | \$224 | - | 4650, 4651 | 2013 | - | \$411 | \$224 | \$457 | \$249 |
| 41 | Affordability Determination—Energy Efficiency Standards | 79 Fed. Reg. 21,259 (notice of preliminary determination, Apr. 15, 2014); 80 Fed. Reg. 25,901 (final determination, May 6, 2015) RIN 2501-ZA01 | No, not a regulation | - | - | - | 25921 | - | - | NA | NA | NA | NA |

TABLE A-1 (CONTINUED)

| NO. | RULEMAKING | PUBLICATION DATE AND CITATION | FINAL RULE | TOTAL COST PRESENT VALUE (MILLIONS) | | | TOTAL COST ANNUALIZED (MILLIONS) | SOURCE PAGE NUMBER | DOLLAR YEAR | YEARS COVERED | TOTAL COST PV (MILLIONS OF CURRENT DOLLARS) | | | TOTAL COST PV (MILLIONS OF 2020\$) |
|-----|---|---|------------|-------------------------------------|----------|---------|----------------------------------|------------------------|-------------|---------------|---|----------|----------|------------------------------------|
| | | | | 3% | 7% | 3% | | | | | 7% | 3% | 7% | |
| 42 | Energy Conservation Standards for General Service Fluorescent Lamps and Incandescent Reflector Lamps | 79 Fed. Reg. 24,067 (proposed Apr. 29, 2014); 80 Fed. Reg. 4041 (finalized Jan. 26, 2015) RIN 1904-AC43 | Yes | \$13,500 | \$9,170 | - | - | 4045, 4046 | 2013 | - | \$13,500 | \$9,170 | \$15,001 | \$10,189 |
| 43 | Environmental Assessment for the Miles City Oil and Gas Lease Sale | Envtl. Assessment (May 19, 2014) DOI-BLM-MT-CO20-2014-0091-EA 79 Fed. Reg. 34,829 (proposed June 18, 2014); 80 Fed. Reg. 64,661 (finalized Oct. 23, 2015) RIN 2060-AR33 | No | - | - | - | - | 76 [BLM report] | 2011 | - | NA | NA | NA | NA |
| 44 | Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units | 79 Fed. Reg. 34,829 (proposed June 18, 2014); 80 Fed. Reg. 64,661 (finalized Oct. 23, 2015) RIN 2060-AR33 | Yes | \$26,500 | \$26,500 | - | - | 64680, 64681, 3-22 RIA | 2011 | - | \$26,500 | \$26,500 | \$30,497 | \$30,497 |
| 45 | National Pollutant Discharge Elimination System: Cooling Water Intake Structures at Existing Facilities | 79 Fed. Reg. 48,300 (Aug. 15, 2014) RIN 2040-AE95 | Yes | - | - | \$274.9 | \$297.3 | 48304, 6-3 RIA | 2011 | 40 | \$6,354 | \$3,964 | \$7,313 | \$4,561 |
| 46 | Energy Conservation Standards for Packaged Terminal Air Conditioners and Packaged Terminal Heat Pumps | 79 Fed. Reg. 55,537 (proposed Sept. 16, 2014); 80 Fed. Reg. 43,161 (finalized July 21, 2015) RIN 1904-AC82 | Yes | - | - | - | - | 43176, 43194 | - | - | \$0 | \$0 | NA | NA |
| 47 | Energy Conservation Standards for Small, Large, and Very Large Air-Cooled Commercial Package Air Conditioning and Heating Equipment | 79 Fed. Reg. 58,947 (proposed Sept. 30, 2014); 81 Fed. Reg. 2419 (direct final rule, Jan. 15, 2016) RIN 1904-AC95; RIN 1904-AD11 | Yes | \$14,900 | \$7,700 | - | - | 2424, 2425 | 2014 | - | \$14,900 | \$7,700 | \$16,293 | \$8,420 |

TABLE A-1 (CONTINUED)

| NO. | RULEMAKING | PUBLICATION DATE AND CITATION | FINAL RULE | TOTAL COST PRESENT VALUE (MILLIONS) | | | TOTAL COST ANNUALIZED (MILLIONS) | SOURCE PAGE NUMBER | DOLLAR YEAR | YEARS COVERED | TOTAL COST PV (MILLIONS OF CURRENT DOLLARS) | | | TOTAL COST PV (MILLIONS OF 2020\$) | | |
|-----|---|--|--------------------------------------|-------------------------------------|---------|---------|----------------------------------|--------------------|-----------------|---------------|---|----------|---------|------------------------------------|----|----|
| | | | | 3% | 7% | 3% | | | | | 3% | 7% | 3% | 7% | 3% | 7% |
| 48 | Fossil Fuel-Generated Energy Consumption Reduction for New Federal Buildings and Major Renovations of Federal Buildings | 79 Fed. Reg. 61,693 (proposed Oct. 14, 2014) RIN 1904-AB96 | No | - | \$574.6 | \$479.4 | 61720 | 2012 | 30 | \$11,262 | \$5,949 | \$12,698 | \$6,707 | | | |
| 49 | Carbon Pollution Emission Guidelines for Existing Stationary Sources: EGUs in Indian Country and U.S. Territories | 79 Fed. Reg. 65,481 (proposed Nov. 4, 2014) RIN 2060-AR33 | No, proposed | - | - | - | 65485, 65486 | 2011 | - | NA | NA | NA | NA | | | |
| 50 | Energy Conservation Standards for Residential Dishwashers | 79 Fed. Reg. 76,141 (proposed Dec. 19, 2014) RIN 1904-AD24 | No, proposed | \$3,900 | - | - | 76144, 76145 | 2014 | - | \$7,100 | \$3,900 | \$7,764 | \$4,265 | | | |
| 51 | Energy Conservation Standards for Single Package Vertical Air Conditioners and Heat Pumps | 79 Fed. Reg. 78,613 (proposed Dec. 30, 2014); 80 Fed. Reg. 57,437 (finalized Sept. 23, 2015) RIN 1904-AC85 | Yes | \$420 | - | - | 57442 | 2014 | - | \$770 | \$420 | \$842 | \$459 | | | |
| 52 | Energy Conservation Standards for Single Package Vertical Air Conditioners and Heat Pumps | 79 Fed. Reg. 78,613 (proposed Dec. 30, 2014); 80 Fed. Reg. 57,437 (finalized Sept. 23, 2015) RIN 1904-AC85 | Yes | - | - | - | - | - | - | NA | NA | NA | NA | | | |
| 53 | Energy Conservation Standards for Commercial Heating, Air-Conditioning, and Water-Heating Equipment | 80 Fed. Reg. 1171 (proposed Jan. 8, 2015); 80 Fed. Reg. 42,613 (finalized July 17, 2015) RIN 1904-AD23 | Yes | - | - | - | 42659 | - | NOT SIGNIFICANT | NA | NA | NA | NA | | | |
| 54 | Energy Conservation Standards for Commercial Warm Air Furnaces | 80 Fed. Reg. 6181 (proposed Feb. 4, 2015) RIN 1904-AD11 | No, proposed version of earlier rule | - | - | - | 6185, 6186 | - | - | NA | NA | NA | NA | | | |
| 55 | Energy Conservation Standards for Hearth Products | 80 Fed. Reg. 7081 (proposed Feb. 9, 2015) RIN 1904-AD35 | No, proposed rule | \$505 | - | - | 7085, 7086 | 2013 | - | \$1,004 | \$505 | \$1,116 | \$561 | | | |

TABLE A-1 (CONTINUED)

| NO. | RULEMAKING | PUBLICATION DATE AND CITATION | FINAL RULE | TOTAL COST PRESENT VALUE (MILLIONS) | | | SOURCE PAGE NUMBER | DOLLAR YEAR | YEARS COVERED | TOTAL COST PV (MILLIONS OF CURRENT DOLLARS) | | | TOTAL COST PV (MILLIONS OF 2020\$) |
|-----|--|--|-------------------|-------------------------------------|---------|----|--------------------|-------------|---------------|---|---------|----------|------------------------------------|
| | | | | 3% | 7% | 3% | | | | 3% | 7% | 3% | |
| 56 | Environmental Assessment of Little Willow Creek, Protective Oil and Gas Leasing | Envtl. Assessment (Feb. 10, 2015) DOI-BLM-ID-010-2014-0036-EA | No, EIA | - | - | - | - | - | - | NA | NA | NA | NA |
| 57 | Energy Conservation Standards for Residential Furnaces | 80 Fed. Reg. 13,119 (proposed Mar. 12, 2015) RIN 1904-AD20 | No, proposed rule | \$12,270 | \$6,150 | - | 13123, 13125 | 2013 | - | \$12,270 | \$6,130 | \$13,634 | \$6,811 |
| 58 | Energy Conservation Standards for Residential Boilers | 80 Fed. Reg. 17,221 (proposed Mar. 31, 2015); 81 Fed. Reg. 2319 (finalized Jan. 15, 2016) RIN 1904-AC88 | Yes | \$278 | \$154 | - | 2324, 2326 | 2014 | - | \$278 | \$154 | \$304 | \$168 |
| 59 | Energy Conservation Standards for Pumps | 80 Fed. Reg. 17,825 (proposed Apr. 2, 2015); 81 Fed. Reg. 4367 (finalized Jan. 26, 2016) RIN 1904-AC54 | Yes | \$300 | \$200 | - | 4372, 4373 | 2014 | - | \$300 | \$200 | \$328 | \$219 |
| 60 | Final Environmental Impact Statement for Four Corners Power Plant and Navajo Mine Energy Project | Envtl. Impact Statement (May 1, 2015) EIS No. 20150119 | No | - | - | - | - | - | - | NA | NA | NA | NA |
| 61 | Energy Conservation Standards for Residential Dehumidifiers | 80 Fed. Reg. 31,645 (proposed June 3, 2015); 81 Fed. Reg. 38,337 (finalized June 13, 2016) RIN 1904-AC81 | Yes | \$190 | \$110 | - | 38340, 38341 | 2014 | - | \$190 | \$110 | \$208 | \$120 |
| 62 | Energy Conservation Standards for Residential Conventional Ovens | 80 Fed. Reg. 33,029 (proposed June 10, 2015) RIN 1904-AD15 | No, proposed rule | \$600 | \$300 | - | 33033, 33034 | 2014 | - | \$600 | \$300 | \$656 | \$328 |
| 63 | Energy Conservation Standards for Commercial Prerhse Spray Valves | 80 Fed. Reg. 39,485 (proposed July 9, 2015); 81 Fed. Reg. 4747 (finalized Jan. 27, 2016) RIN 1904-AD31 | Yes | \$2 | \$2 | - | 4751, 4752 | 2014 | - | \$2 | \$2 | \$2 | \$2 |

TABLE A-1 (CONTINUED)

| NO. | RULEMAKING | PUBLICATION DATE AND CITATION | FINAL RULE | TOTAL COST PRESENT VALUE (MILLIONS) | | | TOTAL COST ANNUALIZED (MILLIONS) | | | SOURCE PAGE NUMBER | DOLLAR YEAR | YEARS COVERED | TOTAL COST PV (MILLIONS OF CURRENT DOLLARS) | | | TOTAL COST PV (MILLIONS OF 2020\$) |
|-----|--|---|---|-------------------------------------|----------|------|----------------------------------|--------------------------------|---------------------|--------------------|-------------|---------------|---|----------|----------|------------------------------------|
| | | | | 3% | 7% | 7% | 3% | 7% | 7% | | | | 3% | 7% | 7% | |
| 64 | GHG and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles, Phase 2 & DOT's environmental impact statement | 80 Fed. Reg. 40,137 (proposed July 13, 2015); RIN 2060-AS16; RIN 2127-AL52 | No, proposed rule | \$26,300 | \$17,600 | - | - | - | ES-11 of RIA, 40143 | 2012 | - | \$26,300 | \$17,600 | \$29,652 | \$19,843 | |
| 65 | Pipeline Safety: Expanding the Use of Excess Flow Valves in Gas Distribution Systems to Applications Other than Single-Family Residences | 80 Fed. Reg. 41,460 (proposed July 15, 2015); RIN 2137-AE71 | No, proposed rule | - | - | \$13 | \$11 | 41468, 41469, 27 and 35 in RIA | 2012 | 50 | - | \$334 | \$152 | \$377 | \$171 | |
| 66 | Energy Conservation Standards for Ceiling Fan Light Kits | 80 Fed. Reg. 48,623 (proposed Aug. 13, 2015); 81 Fed. Reg. 579 (finalized Jan. 6, 2016) | Yes | \$70 | \$60 | - | - | 583, 582, 584 | 2014 | - | - | \$70 | \$60 | \$77 | \$66 | |
| 67 | Energy Conservation Standards for Refrigerated Bottled or Canned Beverage Vending Machines | 80 Fed. Reg. 50,461 (proposed Aug. 19, 2015); 81 Fed. Reg. 1027 (finalized Jan. 8, 2016) | Yes | \$34 | \$18 | - | - | 1031, 1032 | 2014 | - | - | \$34 | \$18 | \$37 | \$20 | |
| 68 | Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills | RIN 1904-AD00 80 Fed. Reg. 52099 (proposed Aug. 27, 2015) | Yes | \$680 | \$620 | - | - | Table ES-3 RIA | 2012 | - | - | \$680 | \$620 | \$767 | \$699 | |
| 69 | NSPS for Municipal Solid Waste Landfills | 80 Fed. Reg. 52,162 (proposed Aug. 27, 2015) | No, this is a supplement to a proposed rule | - | - | - | - | - | - | - | - | NA | NA | NA | NA | |
| 70 | Energy Conservation Standards for Battery Chargers | RIN 2060-AM08 80 Fed. Reg. 52,849 (proposed Sept. 1, 2015); 81 Fed. Reg. 38,265 (finalized June 13, 2016) | Yes | \$200 | \$100 | - | - | 38269, 38270 | 2013 | - | - | \$200 | \$100 | \$222 | \$111 | |
| | | RIN 1904-AB57 | | | | | | | | | | | | | | |

TABLE A-1 (CONTINUED)

| NO. | RULEMAKING | PUBLICATION DATE AND CITATION | FINAL RULE | TOTAL COST PRESENT VALUE (MILLIONS) | | | TOTAL COST ANNUALIZED (MILLIONS) | | | SOURCE PAGE NUMBER | DOLLAR YEAR | YEARS COVERED | TOTAL COST PV (MILLIONS OF CURRENT DOLLARS) | | | TOTAL COST PV (MILLIONS OF 2020\$) | | |
|-----|---|---|-------------------|-------------------------------------|-------|---------|----------------------------------|---------|--------------------------------|--------------------|-------------|---------------|---|----|----|------------------------------------|----|----|
| | | | | 3% | 7% | 7% | 3% | 7% | 7% | | | | 3% | 7% | 3% | 7% | 3% | 7% |
| 71 | NSPS for Oil and Natural Gas Sector | 80 Fed. Reg. 56,593 (proposed Sept. 18, 2015); 81 Fed. Reg. 35,823 (finalized June 3, 2016) | Yes | - | \$520 | \$530 | \$9,055 | \$6,176 | 1-6 of RIA | 2012 | 25 | \$10,209 | \$6,964 | | | | | |
| 72 | Federal Plan for GHG from EGUs | RIN 2060-AS30 80 Fed. Reg. 64,965 (proposed Oct. 23, 2015) | No, proposed rule | - | - | - | NA | NA | 65053, 1-15 RIA | 2011 | - | NA | NA | | | | | |
| 73 | Roadless Area Conservation in Colorado & the Supplemental Environmental Impact Statement | RIN 2060-AS47 80 Fed. Reg. 72,665 (proposed Nov. 20, 2015) | No, proposed rule | - | - | - | NA | NA | 72668 | - | - | NA | NA | | | | | |
| 74 | Cross-State Air Pollution Rule Update for the 2008 Ozone NAAQS | 80 Fed. Reg. 75,705 (proposed Dec. 3, 2015) | No, proposed rule | - | \$93 | \$93 | \$93 | \$93 | 75711, ES-15 & 16 of RIA | 2011 | 1 | \$107 | \$107 | | | | | |
| 75 | Energy Conservation Standards for Ceiling Fans | 81 Fed. Reg. 1687 (proposed Jan. 13, 2016) | No, proposed rule | \$2,400 | - | \$1,400 | - | - | 1691, 1692 | 2014 | - | \$2,400 | \$1,531 | | | | | |
| 76 | Waste Prevention, Production Subject to Royalties, and Resource Conservation & accompanying regulatory impact analysis and environmental assessment | RIN 1904-AD28 81 Fed. Reg. 6615 (proposed Feb. 8, 2016) | No, proposed rule | - | \$139 | \$156 | \$1,186 | \$1,096 | 6620 FR Rule, p.4 and 7 of RIA | 2012 | 10 | \$1,337 | \$1,235 | | | | | |
| 77 | Energy Conservation Standards for General Service Lamps | 81 Fed. Reg. 14,527 (proposed Mar. 17, 2016) | No, proposed rule | -\$1,400 | - | -\$900 | - | - | 14532, 14533 | 2014 | - | -\$1,400 | -\$984 | | | | | |
| 78 | Energy Conservation Standards for Commercial Packaged Boilers | 81 Fed. Reg. 15,836 (proposed Mar. 24, 2016) | No, proposed rule | \$863 | - | \$512 | \$863 | \$512 | 15840, 15841 | 2014 | - | \$944 | \$560 | | | | | |
| 79 | Pipeline Safety: Safety of Gas Transmission and Gathering Pipelines | 81 Fed. Reg. 20,722 (proposed Apr. 8, 2016) | No, proposed rule | \$47.4 | - | \$39.8 | \$47 | \$40 | 20724 | 2015 | 15 | \$52 | \$43 | | | | | |

TABLE A-1 (CONTINUED)

| NO. | RULEMAKING | PUBLICATION DATE AND CITATION | FINAL RULE | TOTAL COST PRESENT VALUE (MILLIONS) | | | TOTAL COST ANNUALIZED (MILLIONS) | | | SOURCE PAGE NUMBER | DOLLAR YEAR COVERED | TOTAL COST PV (MILLIONS OF CURRENT DOLLARS) | | | TOTAL COST PV (MILLIONS OF 2020\$) | | |
|-------|--|--|-------------------|-------------------------------------|---------|-------|----------------------------------|--------------|--------------|--------------------|---------------------|---|-----------|---------|------------------------------------|--|--|
| | | | | 3% | 7% | 7% | 3% | 7% | 7% | | | 3% | 7% | 3% | 7% | | |
| 80 | Energy Conservation Standards for Compressors | 81 Fed. Reg. 31,679 (proposed May 19, 2016) RIN 1904-AC83 | No, proposed rule | \$200 | \$100 | - | - | - | 31685, 31686 | 2015 | - | \$200 | \$100 | \$218 | \$109 | | |
| 81 | Energy Conservation Standards for Commercial Water Heating Equipment | 81 Fed. Reg. 34,439 (proposed May 31, 2016) RIN 1904-AD34 | No, proposed rule | \$2,500 | \$1,500 | - | - | 34446, 34447 | 2014 | - | \$2,500 | \$1,500 | \$2,734 | \$1,640 | | | |
| 82 | Energy Conservation Standards for Portable Air Conditioners | 81 Fed. Reg. 38,397 (proposed June 13, 2016) RIN 1904-AD02 | No, proposed rule | \$510 | \$270 | - | - | 38401, 38402 | 2014 | - | \$510 | \$270 | \$558 | \$295 | | | |
| 83 | Energy Conservation Standards for Manufactured Housing | 81 Fed. Reg. 39,755 (proposed June 17, 2016) RIN 1904-ACT1 | No, proposed rule | - | - | \$277 | \$220 | 39761 | 2015 | 30 | \$5,429 | \$2,730 | \$5,930 | \$2,982 | | | |
| TOTAL | | | | | | | | | | | | \$560,530 | \$446,718 | | | | |



POLICY BRIEF

The Social Discount Rate: A Primer for Policymakers

James Broughel

June 2020

The social discount rate used in cost-benefit analysis (CBA) is an interest rate applied to benefits and costs that are expected to occur in the future in order to convert them into a present value. This conversion is done to ascertain what those benefits and costs are worth today. The social discount rate is widely considered to be one of the most important inputs in CBA in that small changes in this rate can result in large swings in present-value calculations, thereby having a major influence on whether a project passes or fails a cost-benefit test. However, the social discount rate is widely misunderstood for a variety of reasons. This primer explains the basic conceptual issues involved with the social discount rate and tries to clear up some common misunderstandings.

BASIC CONCEPTS

The two core discounting concepts in CBA are the “consumption rate of interest” and the “investment rate of interest.”¹ The investment rate of interest accounts for the marginal social rate of return to capital in the economy. The intuition behind this rate is that investments earn positive, compounding rates of return. The consumption rate of interest, meanwhile, represents the rate at which a unit of consumption in the present is traded for a unit of consumption in the future. This interest rate reflects consumers’ time preferences and, in certain circumstances, may be represented by the risk-free market interest rate.² The standard approaches to discounting in CBA all rely on these two interest rate concepts.³ For the sake of clarity, when this article refers to “the social discount rate” in CBA, it is the consumption rate of interest for all of society that is being referenced.

The investment rate of interest will generally be higher than observable market interest rates (and by extension the consumption rate) because the minimum required rate of return demanded by

businesses will tend to exceed their costs of borrowing, owing to taxes. If the expected after-tax rate of return on a project falls below businesses' cost of borrowing, they will not undertake certain investments that might still be profitable from a societal point of view. In this way, taxes create allocative distortions in the economy that limit the amount of overall investment.

The risk-free market interest rate can deviate from the natural rate that reflects consumer time preferences, owing to factors such as inflation or market inefficiencies (e.g., externalities). Small adjustments can be made in an analysis to account for such factors. However, discounting consumption in CBA also becomes much more complicated in an intergenerational context, because while all human beings exhibit some degree of time preference, they only exhibit positive time preference during the time they are alive. No one is impatiently waiting to be born. So while there is a potential case to be made on *positive* grounds for discounting consumption for policies that only have impacts within a lifetime or perhaps a within a generation, it does not follow that this rationale extends to policies with *intergenerational* consequences. Most often, how much value society should place on consumption in the future is an ethical question.

THE POWER OF COMPOUND INTEREST

The consumption and investment rates of interest are different from a discount rate used in financial analysis in that they are applied to real resources, which are distinct from financial resources. The consumption rate of interest is used to discount resources that are consumed, and the investment rate of interest applies to resources that are invested. Any interest rate, be it applied to money or anything else, is important owing to the power of compound interest.

Tables 1 and 2 demonstrate the influence small changes in the discount rate have on present-value calculations. As is evident from table 1, an investment paying \$1 million in 100 years is worth just \$72.45 in present-value terms at a 10 percent discount rate, \$1,152.45 at a 7 percent rate, and \$52,032.84 at a 3 percent rate.

The primary reason for discounting cash flows is the time value of money. Since cash can be invested and earn interest, the sooner money is earned the better, otherwise interest and its subsequent returns are forgone. While the time value of money also applies to investment returns in CBA (when they come in a pecuniary form), the case for discounting nonpecuniary consumption is based on a different set of rationales than the time value of money.

| Investment rate of interest | 0% | 1% | 3% | 7% | 10% |
|-----------------------------|----------------|--------------|-------------|------------|---------|
| Present value | \$1,000,000.00 | \$369,711.21 | \$52,032.84 | \$1,152.45 | \$72.57 |

Source: Author's calculations.

On the one hand, there is the observable fact that people tend to exhibit positive time preference. That is, they prefer consumption sooner rather than later. However, as discussed earlier, this provides little justification for discounting benefits and costs to those not yet born. Common arguments for using a positive social discount rate in an intergenerational context are that people in the future will be richer than those in the present, so, owing to the phenomenon of diminishing marginal utility, a unit of consumption—including a life—can be expected to generate less utility to future citizens than to present citizens. Or sometimes it is simply stated that the well-being of people in future should be discounted at compounding exponential rates since future utility matters less than present utility.

Table 2 highlights the importance of the discounting when comparing lives saved in the future to an equivalent number of lives saved in the present. For example, 10,000 lives saved in 100 years are worth 198 lives in the present at a 3 percent social discount rate and worth just 1 life using a 10 percent social discount rate.

| Social discount rate (society's consumption rate of interest) | 0% | 1% | 3% | 7% | 10% |
|---|--------|-------|-----|----|-----|
| Present value (lives saved) | 10,000 | 3,697 | 520 | 12 | 1 |

Note: Human lives are not divisible into parts. Hence, lives are rounded to nearest whole number.
Source: Author's calculations.

WHEN TO USE EACH RATE

When conducting a CBA, one must be careful to use appropriate rates in their appropriate contexts. Nonpecuniary aspects of life cannot be invested in an account, so they should never be treated as if they will compound in value at the marginal rate of return to capital. At the same time, returns to capital often *can* be reinvested, so it is entirely appropriate to treat capital investments as if their returns compound in value at the investment rate.

Guidelines from the federal government conflate these two discounting concepts by recommending that regulatory agencies apply a single social discount rate to all benefits and costs, irrespective of whether those benefits and costs are like capital investments or like consumption.⁴ This is a problem because it means analysts are essentially treating all benefits and costs as if they are either consumption or investment,⁵ when rarely is this the case. Treating consumption and investment equally gives too much weight to consumption relative to a comparable amount of investment because, in general, one dollar of investment is more valuable to society than one dollar of consumption.⁶

The way to resolve this issue is to use the two different rates in their different contexts, which means separating consumption and investment in the analysis. Positive and negative incremental investment can be kept on one side of the ledger (out of convention this is often the cost side), and consumption can be kept on the other side of the ledger (the benefits side).⁷ Then the two different interest rates can be applied distinctly to their respective benefits or costs.⁸

SOME MISCONCEPTIONS ABOUT SOCIAL DISCOUNTING

Misconception #1: Analysts Are Discounting Money Rather Than Lives

Some commenters argue what is being discounted in CBA is money rather than lives saved.⁹ This confusion arises because benefits and costs are valued in monetary terms in order to compare them to one another. The undiscounted dollar values in CBA refer to monetary equivalents; i.e., the value individuals place on certain resources in terms of what they are willing to spend for them. Using such a valuation technique does not convert those resources into something that can be invested, like money. Dollars are simply a convenient measuring stick to make comparisons in value.

Consider, for example, the similar practice of adjusting the value of resources for inflation when they occur in different years (which also occurs in CBA). After an inflation adjustment, resources have a dollar value assigned to them, but those dollars actually represent bundles of real resources, hence the use of the term “real” when referring to inflation-adjusted values. Lives are not literally being converted into money when they are expressed as monetary equivalents in CBA. Real resources are ultimately what is being valued.

Misconception #2: The Opportunity Cost of Capital Is the Basis for Social Discounting

Other observers assert that a social discount rate is necessary in CBA because of the opportunity cost of capital; i.e., because capital earns a rate of return in the future. For example, government guidelines recommend regulatory agencies use a 7 percent social discount rate that “approximates the opportunity cost of capital.”¹⁰

Capital’s rate of return cannot be the basis for social discounting, however, because the rate at which individuals discount future consumption shapes household savings patterns and by extension determines capital’s rate of return.¹¹ Basing the social discount rate on the opportunity cost of capital rate involves circular reasoning. Moreover, an optimum is achieved when capital investment is increased to such an extent that the investment rate of interest falls to meet the social discount rate. At this point, the additional utility generated from an incremental unit of capital investment is zero, which, again, provides no particular basis for social discounting.¹²

Misconception #3: Only Regulatory Benefits Have Intergenerational Consequences

Social discounting often comes up in the context of climate change policy or other environmental contexts such as nuclear waste disposal, where society has to wait a long time for the benefits of a government regulation to pay off.¹³ This can create an impression that the social discount rate matters most for environmental projects or only for projects with nonpecuniary *benefits* far in the future. In fact, costs often have intergenerational consequences as well, though these costs often go unaccounted for in analysis. Even small amounts of investment displaced by government projects today can have significant long-acting consequences, owing to the power of compound interest.

Moreover, people are continually being born and dying, so what constitutes a “generation” may in fact be a relatively short period of time. While deciding how much weight to give to the consumption of future generations is based on a value judgment, a commitment to assessing the benefits and costs of policy as they actually occur requires acknowledgment of the impacts of policies through this investment channel.

A NOTE ABOUT DECLINING DISCOUNT RATES

Some economists have suggested that, owing to uncertainty, the government should consider using a social discount rate that declines over time.¹⁴ There are two rationales for declining discount rates that do not involve any suboptimal, or irrational, decision-making.¹⁵ One rationale takes the perspective of a social planner that centrally plans the economy. The discount rate of the social planner may decline over the investment horizon owing to the combination of the social planner being risk averse and there being fluctuations in and uncertainty about the rate of economic growth in the future.¹⁶

A second rationale for declining discount rates is called the Expected Net Present Value approach, and it asserts that in the presence of uncertainty, a declining discount rate is equivalent to a constant rate under certainty.¹⁷ Consider the possibility that there is a 50 percent chance that the social discount rate is 3 percent and a 50 percent chance that it is 7 percent. To account for this uncertainty, one could calculate the present value of the project at 3 percent, then at 7 percent, and then obtain the expected value; i.e., the average of these present values. It turns out that the implied certainty-equivalent discount rate consistent with this average present value is lower than 5 percent, the average of the two social discount rates. Furthermore, as the time horizon extends into the future, this implied discount rate gets closer and closer to 3 percent, the low end of possible discount rates. Therefore, accounting for uncertainty can entail use of a declining discount rate that is equivalent to a constant rate under certainty.

The first argument for declining discount rates, based on the preferences of a social planner, is explicitly normative. Whether to adopt this method or not is a value judgment because this rationale depends on ethical choices about the social planner’s welfare function. The second argument

is more compelling because it is simply a mathematical property that follows from taking the expected value of a function, although aspects of this argument are normative as well.¹⁸

In either case, however, if an analyst uses a declining social discount rate owing to uncertainty, he or she must also adjust the estimation of the opportunity cost of capital over time in the analysis, since it will vary with the social discount rate. In general, a lower social discount rate means a higher estimated opportunity cost of capital and vice versa, which is why low and declining discount rates need not encourage more regulation. If the opportunity cost of capital is accounted for in analysis, regulatory costs can be very large when the social discount rate is low or declining. However, these costs often go overlooked, leading to the common view that a low social discount rate encourages more regulation.

CONCLUSION

This primer has sought to provide some clarity on the topic of the social discount rate and to clear up common misconceptions about this rate. Misunderstandings often stem from conflating the two main discounting concepts: the consumption and investment rates of interest. Indeed, even government guidelines on regulatory analysis seem to make, or at least encourage, such mistakes.

Moreover, some aspects of discounting are inherently normative; that is, they involve value judgments. Analysts should always be clear about what aspects of their analysis involve value judgments. For example, if the preferences of a hypothetical social planner are important determinants of present-value calculations, this fact should be made transparent in the analysis. Furthermore, the opportunity cost of capital should always be accounted for in any analysis, and analysts should understand that estimates of the opportunity cost of capital will tend to vary with the social discount rate used, rather than the other way around.

Adhering to these basic principles could potentially resolve many common problems found in modern CBA.

ABOUT THE AUTHOR

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NOTES

1. These are sometimes referred to as the “net” and “gross” rates of interest, respectively.
2. Absent distortions, the risk-free rate can be thought to reflect a natural rate of interest that embodies current consumers’ time preferences.
3. David F. Burgess, “The Appropriate Measure of the Social Discount Rate and Its Role in the Analysis of Policies with Long-Run Consequences” (Mercatus Symposium, Mercatus Center at George Mason University, Arlington, VA, 2018); Mark A. Moore and Aidan R. Vining, “The Social Rate of Time Preference and the Social Discount Rate” (Mercatus Symposium, Mercatus Center at George Mason University, Arlington, VA, 2018).
4. Office of Management and Budget, *Circular A-4*, 2003.
5. It could also mean the analyst is assuming that the economy has reached the optimal amount of investment, such that \$1 of incremental investment will yield no more social utility than \$1 of consumption.
6. Richard A. Williams and James Broughel, “Toward an Improved OMB Annual Report on Federal Regulations,” *Regulation* 42, no. 4 (2019–2020): 20–24.
7. Capital also comes in different forms. The term often refers simply to physical capital—productive machines and equipment—but can also include human capital, social capital, and natural resources (which some call natural capital). Each will produce different rates of return depending on whether the returns are temporary or ongoing and whether some portion of the return can be reinvested.
8. It is sometimes argued that it is inappropriate to discount benefits occurring in the same year at different rates. For example, a 2017 report from the National Academies of Sciences states, “consistency requires that the same discount rate must be applied to all benefits and costs that occur in the same year.” However, as Liqun Liu correctly notes, it is entirely appropriate to discount consumption and investment at different rates owing to their different rates of return. On the inappropriateness of using two discount rates, see Kenneth J. Arrow et al., “Determining Benefits and Costs for Future Generations,” *Science* 341, no. 6144 (2013): 349–50; National Academies of Sciences, Engineering, and Medicine, *Valuing Climate Damages: Updating Estimation of the Social Cost of Carbon Dioxide* (Washington, DC: National Academies Press, 2017). On the correctness of using two discount rates, see Liqun Liu, “A Marginal Cost of Funds Approach to Multi-Period Public Project Evaluation: Implications for the Social Discount Rate,” *Journal of Public Economics* 87, no. 7(2003): 1707–18.
9. According to Arden Rowell and Cass Sunstein, “So long as monetary values are assigned to the relevant variables, it is only money, and not any variable, that is being discounted.” Kip Viscusi, citing Rowell and Sunstein, similarly states, “What is being discounted is not the number of lives, but a monetary amount equal to the willingness to pay to reduce risks to life.” Arden Rowell and Cass R. Sunstein, “On Discounting Regulatory Benefits: Risk, Money, and Intergenerational Equity,” *University of Chicago Law Review* 74, no. 1 (2007): 171–208; W. Kip Viscusi, “Rational Discounting for Regulatory Analysis,” *University of Chicago Law Review* 74, no. 1 (2007): 209–46.
10. Office of Management and Budget, *Circular A-4*.
11. Tyler Cowen and Derek Parfit, “Against the Social Discount Rate,” in *Justice Between Age Groups and Generations*, ed. Peter Laslett and James S. Fishkin (New Haven, CT: Yale University Press, 1992), 151.
12. Cowen and Parfit, “Against the Social Discount Rate.”
13. See the various Intergovernmental Panel on Climate Change reports or the 2006 Stern report on climate change. Nicholas Stern, *The Economics of Climate Change: The Stern Review* (London: Her Majesty’s Treasury, 2006).
14. Kenneth J. Arrow et al., “Should Governments Use a Declining Discount Rate in Project Analysis?,” *Review of Environmental Economics and Policy* 8, no. 8 (2014): 145–63.
15. At first glance, declining discount rates sound a lot like “hyperbolic discounting,” which is a behavioral anomaly that can lead to suboptimal, or “time inconsistent,” decisions, whereby a different decision would be made depending on the time in which the decision is made. The rationales for declining discount rates mentioned here do not suffer these problems. On hyperbolic discounting, see David Laibson, “Golden Eggs and Hyperbolic Discounting,” *Quarterly Journal of Economics* 112, no. 2 (1997): 443–77.

16. For a detailed description of this social planner perspective, see Christian Gollier, *Pricing the Planet's Future: The Economics of Discounting in an Uncertain World* (Princeton, NJ: Princeton University Press, 2012).
17. Martin L. Weitzman, "Gamma Discounting," *American Economic Review* 91, no. 1 (2001): 260–71; Martin L. Weitzman, "Subjective Expectations and Asset-Return Puzzle," *American Economic Review* 97, no. 4 (2007): 1102–30; Richard Newell and William Pizer, "Discounting the Benefits of Climate Change Mitigation: How Much Do Uncertain Rates Increase Valuations?," *Journal of Environmental Economics and Management* 46, no. 1 (2003): 52–71.
18. For example, if one instead evaluates projects in future-value terms (rather than present-value terms), the phenomenon reverses. That is, the social discount rate rises toward its highest possible value. Resolving the paradox requires, again, assumptions about the social planner's welfare function, including assumptions about risk aversion and consumption smoothing. Martin L. Weitzman and Christian Gollier, "How Should the Distant Future Be Discounted When Discount Rates Are Uncertain?," *Economics Letters* 107, no. 3 (2010): 350–53.



POLICY BRIEF

What Is vs. What Should Be in Climate Policy: The Hidden Value Judgments Underlying the Social Cost of Carbon

James Broughel

April 2021

The social cost of carbon (SCC) is a measure that describes the harm a ton of carbon dioxide (CO₂) emissions has on society when it is emitted into the atmosphere. The SCC is perhaps most prominently used as an input in benefit-cost analysis, which is produced for many regulations, including those targeting CO₂ emissions. The Biden administration recently updated its estimate of the SCC to \$51 per ton,¹ and the administration is expected to use this updated figure when determining how much society should spend implementing regulations and other policies targeting global warming.

Although calculating the SCC involves using complex models (known as integrated assessment models) that rely on scientific inputs as parameters, these calculations also contain certain value judgments that one who is not careful could confuse with objective scientific facts. The purpose of this policy brief is to explain two such value judgments that go into the calculation of the SCC: the choice of the social welfare function, which determines how costs and benefits are aggregated across individuals to assess an overall impact on well-being; and the choice of the social discount rate, which determines how much weight future benefits and costs should receive relative to present ones.

THE SOCIAL WELFARE FUNCTION

The SCC is an estimate of the impact CO₂ has on social welfare, and it is used in economic analysis to assess whether policies intended to reduce the harm of CO₂ pollution are worth their cost. For example, if the SCC is set at \$51 a ton (the Biden administration's estimate), and if a regulation reduces CO₂ emissions by one million tons today, then an economist might say that social welfare would fall if society spends more than \$51 million implementing this regulation.

Although sometimes the SCC is described as a measure of the dollar value of the societal cost associated with a ton of CO₂ emissions, this description is not technically accurate. Although it is theoretically possible to express the SCC in terms of dollars, in practice most people express the SCC in units of social welfare, or what might be called *well-being dollars* (though the *well-being* descriptor is often conveniently dropped).

Despite having a dollar symbol in front of it, the SCC figure is calculated using a *social welfare function*, which describes how the well-being of society is affected by activities, such as public policies. It is a method of ranking policies or other outcomes in terms of their desirability. Although social welfare functions are controversial among some economists,² and there is no social welfare function that is universally agreed upon among economists for use in policy, they are also used extensively in economics, including in the fields of social choice, optimal redistributive tax policy, growth theory, and, relevant for the purposes of this brief, climate change economics.³

The main challenge with social welfare functions is selecting the one that is appropriate for the task at hand, as there are many different social welfare functions one could use. Also challenging is reaching any kind of consensus about this choice, since the selection of this function involves making value judgments.

For instance, one of the more famous social welfare functions is the *utilitarian social welfare function*. In this approach, welfare is measured by adding up the utility of each member of society. However, the choice to give equal weight to everyone's utility, as the utilitarian social welfare function does, could be viewed as controversial. Thus, some alternative social welfare functions give priority to certain individuals, such as those who are least well off.

The selection of the social welfare function is normative. That is to say, it is an ethical choice, not a scientific one, because it depends on one's values. Normative claims in analysis are distinct from positive claims in that they express some moral judgment, not objective scientific facts. For example, the claim "the shirt is red" is an objective fact that can be verified, whereas the claim "the shirt is ugly" is a normative claim, because it depends on a value judgment.

The social welfare function that the SCC relies on comes from economic growth theory, specifically from a popular growth model known as the Ramsey model,⁴ named after the early 20th-century mathematician Frank Ramsey. The social welfare function the Ramsey model uses is called the *discounted utility model*. In this model, society as a whole is treated as having preferences like a single person, so the social welfare function for society is simply an individual's welfare function.

One interpretation of the individual in the Ramsey model is that it represents the current generation of citizens. Economic growth models sometimes make a simplifying assumption that each generation can be encapsulated into a single agent.⁵ Thus, each agent in the model represents a

collection of members of society alive at a given moment in time. The Ramsey model accounts for the well-being of just one agent who is meant to approximate the current members of society.

In the social choice literature, the discounted utility model is seen as describing a “dictatorship of the present.”⁶ The single agent in the Ramsey model (and, by extension, in the integrated assessment models that estimate the SCC) can be viewed as a dictator whose preferences are for the moment all that matters. The intuition here is that the present generation gets to be the dictator while it is living, and subsequent generations will get their turn to be dictator eventually.⁷

The choice to use a model in a climate change context that describes a dictatorship of the present is strange given that the purported aim of many climate policies is to increase well-being in the future. The Biden administration, for example, has asserted that a goal of its regulatory reforms is to promote the “interests of future generations,”⁸ which would seem to be at odds with its choice to update and expand the use of the SCC; taking the perspective that the current generation is a dictator would seem, at least on the face of it, inconsistent with the administration’s stated goals.

THE SOCIAL DISCOUNT RATE

One of the most important inputs into the calculation of the SCC is the *social discount rate*. The social discount rate describes how much less a future benefit should count relative to a present benefit. It forms a critical part of the social welfare function used to calculate the SCC because the social discount rate is the device that converts future impacts from monetary units into units of the agent’s (in the Ramsey model) well-being.⁹ Recall that the units in which the SCC is typically calculated are units on a social welfare scale. Social discounting is how outcomes across individuals and time are ranked so that they can be compared to one another on a common social welfare scale.

At a practical level, different social discount rates can result in huge swings in the value of the future benefits, owing to compounding. For example, 10,000 lives saved in 100 years are worth about 3,700 lives saved today using a 1 percent social discount rate, but those 10,000 lives are worth only about 1 life today at a 7 percent social discount rate.¹⁰ As should be obvious from this example, the social discount rate is an ethical choice about how much weight benefits such as future health, well-being, and lives saved should receive in analysis. The selection of the social discount rate, like the selection of the social welfare function, depends on one’s values.

Recently there has been a push toward using lower social discount rates, both in the context of the social cost of carbon and, more generally, in benefit-cost analysis.¹¹ Historically, conservatives and libertarians have been skeptical of using low social discount rates,¹² but it does not follow that low social discount rates necessarily correspond with more government intervention in the economy, and the SCC offers a prime example why that is so. Before discounting, integrated assessment models express CO₂ impacts in *consumption equivalent* form, meaning in terms of

impacts on society's consumption. Often overlooked is that if the social discount rate falls low enough, what matters from an efficiency perspective is investment. This is the famous "r must be greater than g" condition that has received considerable attention in recent years, owing to the influential work of French economist Thomas Piketty;¹³ it is a convergence condition underlying economic growth models.

If a growth model fails to converge,¹⁴ then a dollar of investment produces a consumption equivalent stream that is unbounded (i.e., infinite). In that case, any finite amount of consumption generally has no bearing on whether a project passes a benefit-cost test, because any amount of ongoing investment, no matter how small at the start, has a higher opportunity cost. With a low-enough social discount rate, the SCC actually drops out of the analysis because, according to the integrated assessment models, CO₂'s impact can be expressed purely in consumption form. Thus, it would be inefficient to displace even a dollar of investment to obtain the benefits of reducing CO₂ pollution.¹⁵

CONCLUSION

There are many uncertainties associated with calculating the SCC, including forecasts about the extent of future emissions and the effects of those emissions as much as 200 years in the future. The aim of this policy brief is not to question those scientific inputs into analysis, but instead to bring attention to the assumptions that depend on value judgments. These are assumptions that lie outside the domain of objective facts that can be discovered through scientific exploration. As a result, they likely lie outside the competence and expertise of federal regulators.

The choice of the social welfare function, which aggregates benefits and costs across individuals, and the choice of the social discount rate, which ranks benefits and costs across time, are two examples of such value judgments. Although it is critical to assess the merits of the scientific assumptions and uncertainties inherent in the SCC calculations, the merits of the ethical and moral assumptions embedded in analysis may be even more important. When value judgments are confused with scientific claims, an illusion is created that policy is guided by objective scientific facts, when in fact it is expressing the preferences of analysts. Distinguishing positive and normative claims can help address this ever-looming challenge in modern climate policy.

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NOTES

1. Interagency Working Group on Social Cost of Greenhouse Gases, *Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990*, February 2021.
2. For a recent discussion critiquing the use of social welfare functions to guide policy, see Christopher J. Coyne, Thomas K. Duncan, and Abigail R. Hall, “The Political Economy of State Responses to Infectious Disease,” *Southern Economic Journal* 87, no. 4 (2021): 1119–37.
3. John A. Weymark, “Social Welfare Functions,” in *The Oxford Handbook of Well-Being and Public Policy*, ed. Matthew D. Adler and Marc Fleurbaey (New York: Oxford University Press, 2016), 126–59.
4. David Romer, “Infinite-Horizon and Overlapping-Generations Models,” chap. 2 in *Advanced Macroeconomics*, 4th ed. (New York: McGraw-Hill, 2012), 49–100.
5. Peter Diamond, “National Debt in a Neoclassical Growth Model,” *American Economic Review* 55, no. 5 (1965): 1126–50.
6. Graciela Chichilnisky, “An Axiomatic Approach to Sustainable Development,” *Social Choice and Welfare* 13, no. 2 (1996): 231–57.
7. On this matter, see Kenneth J. Arrow, “Inter-Generational Equity and the Rate of Discount in Long-Term Social Investment,” in *Contemporary Economic Issues*, vol. 4, *Economic Behaviour and Design*, ed. Murat R. Sertel (London: Palgrave Macmillan, 1999), 89–102.
8. Executive Office of the President, Modernizing Regulatory Review, 86 Fed. Reg. 7223 (January 20, 2021).
9. James Broughel, “Cost-Benefit Analysis as a Failure to Learn from the Past,” *Journal of Private Enterprise* 35, no. 1 (2020): 105–13.
10. James Broughel, “The Social Discount Rate: A Primer for Policymakers” (Mercatus Policy Brief, Mercatus Center at George Mason University, Arlington, VA, June 2020).
11. Interagency Working Group on Social Cost of Greenhouse Gases, *Technical Support Document*; Michael Greenstone and James H. Stock, “The Right Discount Rate for Regulatory Costs and Benefits,” *Wall Street Journal*, March 4, 2021.
12. James Broughel, “The Unlikely Story of American Regulatory Socialism,” *Quarterly Journal of Austrian Economics* 24, no. 1 (forthcoming).
13. Thomas Piketty, *Capital in the Twenty-First Century* (Cambridge, MA: Harvard University Press, 2014).
14. In economic growth theory, this is known as the transversality condition.
15. It should be stressed here that this result—the SCC dropping out of the analysis—is an implication of the integrated assessment models, not a result of any claims being made by this author about the effects of CO₂ pollution. The integrated assessment models assume carbon dioxide pollution does not have growth rate effects, but this assumption could easily turn out not to be true. See Robert S. Pindyck, “Climate Change Policy: What Do the Models Tell Us?,” *Journal of Economic Literature* 51, no. 3 (2013): 860–72; Richard G. Newell, Brian C. Prest, and Steven E. Sexton, “The GDP-Temperature Relationship: Implications for Climate Change Damages,” *Journal of Environmental Economics and Management* (preprint, available online March 20, 2021).