Attachment

Our Children's Trust Comment for the
NHTSA's Notice of Proposed Rulemaking for
Corporate Average Fuel Economy Standards for
Model Years 2024–2026 Passenger Cars and Light
Trucks (Docket No. NHTSA–2021–0053)

June 21, 2021
Submitted via https://www.regulations.gov/

Interagency Working Group on the Social Cost of Greenhouse Gases

Re: Comment for ‘‘Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates Under Executive Order 13990 – Docket No. 2021-09679”

Acting Director Shalanda Young, Chair Cecilia Rouse, and Director Eric Lander,

On behalf of the youth of the United States, Our Children’s Trust provides these comments on the ‘‘Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990 – Docket No. 2021-09679’’ (draft TSD) to the Office of Management and Budget (OMB) and the co-chairs of the Interagency Working Group (IWG) on the Social Cost of Greenhouse Gases (SC-GHG), including the Council of Economic Advisers (CEA) and the Office of Science and Technology Policy. Our Children’s Trust is the only law firm in the United States dedicated to representing youth whose constitutional rights are being infringed by their government’s climate change-causing conduct. Our work is driven by the fact that a climate system capable of supporting human life is fundamental to a free and ordered society and is preservative of fundamental rights, including, but not limited to, the constitutional rights to life; liberty; property; personal security; family autonomy; bodily integrity; the practice and transmission of cultural and religious traditions; and equal protection of the law.

We advise IWG to revise its draft TSD so as to properly protect the constitutional rights of children, particularly those within communities of color, low-income communities, and indigenous communities who are especially vulnerable to environmental injustices. Executive Order 13990’s policy directive clearly articulates the Biden Administration’s commitment “to listen to the science; to improve public health and protect our environment; to ensure access to clean air and water; . . . [and] to reduce greenhouse gas emissions[.]” It directs IWG to revise methodologies “to the extent that current methodologies do not adequately take account of climate risk, environmental justice, and intergenerational equity” and to “ensure that the SCC, SCN, and SCM reflect the interests of future generations in avoiding threats posed by climate change.”

As it stands, the draft TSD provides guidance that perpetuates the government’s infringement of the fundamental, constitutional rights of young people and future generations, thus violating its mandate to adequately account for intergenerational equity. The higher the discount rate used to derive SC-GHG estimations, the more that the rights and interests of young people and future generations are devalued in those calculations. The draft TSD currently uses three discount rates in its analysis: 2.5%, 3%, and 5%; yet, economic experts agree that all three of these discount rates are too high, leading to SC-GHG estimations that are artificially low. As a result, the draft TSD’s SC-GHG estimations unjustifiably undervalue the benefits of climate action for children living today and coming generations, thereby marginalizing those populations. Given the devastating climate change impacts on human output, welfare, and life that are being documented

today and that are expected to worsen in coming years and decades, much lower discount rates are required for long-term policy analysis. Many economists agree that intergenerational equity considerations as well as the likely decreases in standards of living and global productivity due to the high risk of harms from climate change necessitate a discount rate of 0% or even negative discount rates.

In light of these considerations, IWG must revise its draft TSD in order to comply with the government's duty to prevent infringement of the constitutional rights of young people and future generations to life, liberty, and property and, importantly, equal protection under law. IWG must make the following changes:

1. Remove from the draft TSD all SC-GHG estimations derived from the use of constitutionally, ethically, and economically indefensible 2.5%, 3%, and 5% discount rates.
2. Incorporate into the draft TSD SC-GHG estimations derived using a discount rate methodology that properly accounts for intergenerational equity (i.e., either a sensitivity analysis using negative, 0%, and near-zero discount rates or a declining discount rate schedule starting from a near-zero discount rate).
3. Incorporate into the draft TSD an economic directive requiring agencies to only use discount rates that uphold principles of intergenerational equity when planning policy.

The remainder of this comment provides the technical justification for these suggested changes based on the best available economic and scientific academic literature. The attachments submitted with this comment provide further details.

I. IWG's draft TSD unconstitutionally and discriminatorily disregards the increased social costs associated with the impacts of greenhouse gas emissions on the health of young people and future generations.

Climate change is causing a public health emergency that is adversely impacting the physical and mental health of children through, among other impacts, extreme weather events, increased heat exposure, decreased air quality, altered infectious disease patterns, and food and water insecurity.[1] Children are uniquely vulnerable to human-caused climate change because of their developing bodies; higher exposure to contaminants in air, food, and water per unit body weight; unique behavior patterns; dependence on caregivers; and longevity on the planet.[2] In particular, children "bear a disproportionate burden of disease and developmental impairment from

[1] Lancet Countdown on Health and Climate Change, *Policy Brief for the United States of America*, Am. P. Health Ass'n. 6 (2019); S. Ahdoot & S.E. Pacheco, *Global Climate Change and Children's Health*, 136 Pediatrics e1468, e1468 (2015) ("The effects of climate change on child health include physical and psychological sequelae of weather disasters, increased heat stress, decreased air quality, altered disease patterns of some climate-sensitive infections, and food, water, and nutrient insecurity in vulnerable regions.").

[2] Ahdoot & Pacheco, *supra* note 1, at e1470 ("Children are uniquely vulnerable to these changes. Their immature physiology and metabolism; incomplete development; higher exposure to air, food, and water per unit body weight; unique behavior patterns; and dependence on caregivers place children at much higher risk of climate-related health burdens than adults.[]"); *see generally*, Federica Perera, *Pollution from Fossil-Fuel Combustion Is the Leading Environmental Threat to Global Pediatric Health and Equity: Solutions Exist*, 15 Int'l J. Env't Res. & Pub. Health 16 (2017).

both environmental pollution and climate change due to the combustion of coal, oil, gasoline, diesel and natural gas."[3]

Increased heat exposure is particularly devastating for children at multiple stages of development. Infant mortality increases 25% on extremely hot days with the first seven days of life representing a period of critical vulnerability.[4] Extreme heat places young children at higher risk of kidney and respiratory disease as well as fever and electrolyte imbalance.[5] Heat illness is also a leading cause of death and illness in high school athletes with nearly 10,000 episodes occurring annually.[6]

Children's growing bodies are more susceptible to environmental irritants, and these irritants are increasing due to climate change. Over eight percent of children suffer from allergic rhinitis, and the ragweed pollen season in North America has grown 13-27 days longer since 1995 due to higher temperatures and greater CO_2 levels.[7] As wildfire seasons grow in length and severity across the western U.S., exposed children suffer substantial eye symptoms, as well as upper and lower respiratory symptoms, which lead to increased rates of asthma-related hospitalizations and emergency room visits.[8] Such extreme weather events have negative impacts on children's mental health as well as their physical health due to family loss or separation; school interruption; scarcities of food, water, and shelter; and public service outages during crucial stages of their growth and development.[9] Expert reports written by Dr. Susan Pacheco, Dr. Jerome Paulson, and

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[3] Perera, *supra* note 2, at 16.

[4] Xavier Basagaña et al., *Heat Waves and Cause-specific Mortality at all Ages*, 22 Epidemiology 765, 769 (2011) ("In infants, the effect of heat was particularly strong, with mortality increases of 25% when considering only the first hot day."); *see also*, Linda Giudice, *A Clarion Warning About Pregnancy Outcomes and the Climate Crisis*, 3 JAMA Network Open e208811, e208811 (2020) (noting that "exposures mainly in the third trimester (or averaged across gestation) to $PM_{2.5}$, O_3, and heat, alone or together, are associated with [preterm birth, low birth weight, and stillbirth] in the vast majority of studies analyzed").

[5] Nick Watts et al., *The 2019 Report of The Lancet Countdown on Health and Climate Change: Ensuring That the Health of a Child Born Today Is Not Defined by a Changing Climate*, 394 The Lancet 1836, 1841 (2019).

[6] J. Gilchrist et al., *Heat Illness Among High School Athletes—United States, 2005–2009*, 59 CDC Morbidity & Mortality Weekly Report 1009, 1009 (2010) ("Heat illness during practice or competition is a leading cause of death and disability among U.S. high school athletes[]. . . . The average [time-loss heat illness] corresponds to a weighted average annual estimate of 9,237 illnesses nationwide."); *see also*, Perry Sheffield et al., *Climate Change and Schools: Environmental Hazards and Resiliency*, 14 Int'l J. Env't Res. & Pub. Health 1397, 1399 (Nov. 16, 2017) (noting that climate change-induced extreme heat "is of particular concern for student athletes").

[7] *Allergy Facts*, American College of Allergy, Asthma, & Immunology (Jan. 9, 2018) ("In data published from the 2014 National Health Interview Survey (NHIS), 8.4% of US children under age 18 suffered from hay fever[.] . . ."); Lewis Ziska et al., *Recent Warming by Latitude Associated with Increased Length of Ragweed Pollen Season in Central North America*, 108 Proc. Nat'l Acad. Sci. 4248, 4248 (2011) ("Overall, these data indicate a significant increase in the length of the ragweed pollen season by as much as 13–27 [days] at latitudes above ~44°N since 1995.").

[8] Nino Künzli et al., *Health Effects of the 2003 Southern California Wildfires on Children*, 174 Am. J. Respiratory & Critical Care Med. 1221, 1224 (2006) ("Having fire smoke smell indoors for more than 6 [days] was associated with more than fourfold higher rates of eye symptoms, approximately threefold increased rates of dry cough and sneezing, and more than twofold higher rates of cold, sore throat, wet cough, medication use, physician visits, and missed school due to symptoms. . . . Asthma attacks increased 63%."); *see also*, Watts et al., *supra* note 5, at 1837 ("Through adolescence and beyond, air pollution – principally driven by fossil fuels, and exacerbated by climate change – damages the heart, lungs, and every other vital organ. These effects accumulate over time[.]").

[9] Daniel Martinez Garcia & Mary C. Sheehan, *Extreme Weather-Driven Disasters and Children's Health*, 46 Int'l J. Health Services 79, 88 (2016) ("Abrupt disruptions in a child's life such as family loss or separation; school interruption; changes in food and water supply and shelter conditions; and public service outages may cause direct acute shock and other emotional trauma, as well as longer-term indirect effects.").

Dr. Howard Frumkin are attached to this Comment, providing more detail on these extreme, particularized impacts. In addition to scientific experts, judicial systems around the world are recognizing the increased, foreseeable risk of severe health issues that children and future generations face from climate change impacts.[10]

The draft TSD purposely devalues the long-term effects of these climate-induced harms that today's young people and young people in the future will endure throughout their lives.[11] By incorporating high discount rates into its SC-GHG analysis, IWG makes a value judgment that these intense negative health impacts matter very little, if at all, "suggesting that climate mitigation (or other policies that benefit future generations) are not worth spending much on today."[12]

Nobel Laureate economist, Dr. Joseph Stiglitz, whom IWG cites in its draft TSD, has been advising the U.S. government and the CEA for years (including in 2021) to lower the discount rate in order to account for the high risk of climate harms and for the need to protect children and future generations. Dr. Stiglitz believes the U.S. government's policies that discount children's future "at inappropriately high rates continue to steer America on the path of incalculable losses and away from that more demanding and sane course."[13]

Other countries have begun to recognize the dangers and inequities involved in following the lead of the United States.[14] A recent decision from Germany's Constitutional Court deemed federal climate legislation unconstitutional for failing to adequately value and limit the burdens on future generations.[15] Around the same time, the Supreme Court of Pakistan viscerally condemned such myopic approaches to watered-down climate planning.

> The tragedy is that tomorrow's generations aren't here to challenge this pillaging of their inheritance. The great silent majority of future generations is rendered powerless and needs a voice. This Court should be mindful that its decisions also adjudicate upon the rights of the future generations of this country. It is important

[10] *See, e.g.*, Sharma et al. v Minister for the Environment, [2021] FCA 560, ¶¶225, 235, 246 (Austl.); Klimaatzaak v Belgium et al., Tribunal de Premiére Instance [Civ.] [Tribunal of First Instance] Brussels, 4 ch. Jun. 17, 2021, 63 (Belg.).

[11] *See* Expert Report of Susan E. Pacheco, MD and Jerome A. Paulson, MD, FAAP at 26-29, Juliana v. United States, No. 6:15-cv-01517 (D. Or. Jun. 28, 2018) (documenting the severe, long-term impacts climate change will have on children's lifelong success and development) [Attachment 1]; *see also*, Expert Report of Howard Frumkin, MD, MPH, DrPH, Juliana v. United States, No. 6:15-cv-01517 (D. Or. Jun. 28, 2018) [Attachment 2].

[12] Expert Report of Frank Ackerman at 2, Juliana v. United States, No. 6:15-cv-01517 (D. Or. Jun. 28, 2018) [Attachment 3].

[13] Expert Report of Joseph E. Stiglitz, Ph.D. at ¶79, Juliana v. United States, No. 6:15-cv-01517 (D. Or. Jun. 28, 2018) [Attachment 4].

[14] S*ee, e.g.*, *Sharma*, [2021] FCA 560 at ¶235 ("Of the people living in Australia who are currently alive, it is the Children who are most likely to remain alive long enough to fully experience the wholesale destruction by fire of much of Australia's forests in the latter part of this century.").

[15] Neubauer et al. v Germany, BVerfG, 1 BvR 2656/18, Mar. 24, 2021, ¶192 (Ger.) ("[O]ne generation must not be allowed to consume large parts of the CO_2 budget under a comparatively mild reduction burden if this would at the same time leave future generations with a radical reduction burden – described by the complainants as a "full brake" – and expose their lives to serious losses of freedom.").

to question ourselves; how will the future generations look back on us and what legacy we leave for them?[16]

II. IWG's draft TSD disproportionately discounts future social costs in comparison to present-day social costs, thereby unconstitutionally devaluing the welfare of young people and future generations in comparison to the welfare of present-day adults.

Although it is common within economic analysis to apply a discount rate to future costs and benefits when determining the present value of an action or policy, the draft TSD does so in a way that discriminatorily undervalues the interests and rights of young people and future generations. IWG uses discount rates when determining SC-GHG estimates that explicitly exclude intergenerational equity principles, despite being aware of recognized methods for incorporating such considerations. Specifically, the discount rates of 2.5%, 3%, and 5% used by IWG to determine SC-GHG estimates in the draft TSD are too high, undervaluing or, in some cases, completely eliminating considerations of the welfare of young people and future generations.

a. IWG loosely derives the 2.5%, 3%, and 5% discount rates that it uses in its draft TSD from a descriptive methodology that inherently undervalues the interests and welfare of young people and future generations.

As IWG points out in the draft TSD, the academic literature does not pinpoint a specific discount rate to use when considering impacts from greenhouse gas emissions.[17] IWG must, therefore, derive discount rates for its analysis according to some widely accepted and justifiable methodology.

The descriptive methodology that led to IWG's use of 2.5%, 3%, and 5% discount rates is unjustifiable and unconstitutional for the purpose of determining long-term social costs and benefits.[18] Even if a descriptive approach were acceptable for such considerations, it does not endorse the use of 2.5%, 3%, and 5% discount rates.[19] Such an approach is unjustifiable based on basic economic theory for high risk, long-term social planning as well as long-established intergenerational equity principles that are widely accepted in the field of economics.

The fact that IWG conducts a sensitivity analysis involving three different discount rates in its draft TSD is not per se a problem. This decision reflects an effort to address the inherent uncertainty in future discount rates over lengthy time horizons.[20] A problem arises, however, from

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[16] D. G. Khan Cement Company v Government of Punjab, (2019) C.P. 1290-L/2019 (SC) ¶19 (Pak.) (citing Roman Krznaric, *The Good Ancestor* (Penguin/Random House ed., 2020)); *see also*, Robin Krznaric, *The Good Ancestor* 86 (Penguin/Random House ed., 2020) (noting the importance of "bring[ing] the silent majority of future generations into the room when we are making choices, whether as individuals or as a society[]").

[17] 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*, U.S. Gov. 17 (Feb. 2021) [hereinafter *TSD 2021*].

[18] *See infra* sections II(a)(i) and II(a)(ii) of this Comment.

[19] *See infra* section II(a)(iii) of this Comment.

[20] *TSD 2021*, *supra* note 17, at 17; *see* National Academies of Sciences, Engineering, and Medicine, *Valuing Climate Damages: Updating Estimation of the Social Cost of Carbon Dioxide*, 164 (Washington, DC: The National Academies Press, 2017) ("Over long time horizons, the discount rate is uncertain.").

the fact that IWG's discount rates of 2.5%, 3%, and 5% were derived using a "descriptive" methodology based on past market trends and behavior. Such methodologies are inappropriate and discriminatory for considerations of long-term policy parameters, like SC-GHG estimations, both because past market trends are unlikely to be representative of future market behavior in a climate-ravaged world and because past market behavior is based on personal consumption decisions that generally ignore considerations of future generations' welfare. As a result, relying on descriptive methodologies to determine discount rates for SC-GHG estimations has an enormous, negative impact on the rights of young people and future generations. Such methodologies inevitably lead to inflated discount rates (and subsequently deflated SC-GHG estimations) that undermine and often eliminate the concerns of future generations, as is evident in the draft TSD.

i. IWG relies on a discriminatory and unconstitutional descriptive methodology to determine the 3% discount rate and provides no methodological justification for the 5% discount rate that it uses to calculate long-term SC-GHG estimations.

The three discount rates that IWG uses to determine SC-GHG estimations are "centered around" the 3% discount rate identified in OMB's 2003 Circular A-4.[21] OMB, in turn, used a descriptive methodology to derive this 3% discount rate. All descriptive methodologies for determining discount rates inherently and unconstitutionally undervalue the welfare of young people and future generations.

Descriptive approaches determine a discount rate based on observable rates of return on assets in financial markets (i.e., they attempt to "describe" what we observe in market trends and behavior). Such approaches account for individuals' revealed preferences based on how they choose to consume goods and amass wealth.[22] The 3% rate set forth in OMB's 2003 Circular A-4 specifically represents the real market rate of return for long-term government debt such as 10-year treasury notes.[23] It approximates "the rate that the average saver uses to discount future consumption" and is meant to be used for regulations that primarily affect private purchasing behavior.[24]

The observed behavior of private consumers is an unconstitutional metric by which to establish SC-GHG estimates that will inform long-term climate policy. As former chief economist of the World Bank, Lord Nicholas Stern, and Dr. Stiglitz, jointly observed,

> [t]here is a large and conceptually flawed literature that suggests that the market rate of interest is an appropriate discount rate for evaluating the costs and benefits of climate mitigation actions. Markets are not about social values and most capital markets have serious imperfections[.][25]

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[21] *TSD 2021*, *supra* note 17, at 19.
[22] Nicholas Stern, *Stern Review: The Economics of Climate Change*, 47 (2006) (citing K. J. Arrow, *Inter-generational Equity and the Rate of Discount in Long-Term Social Investment* (IEA World Congress, Working Paper, Dec. 1995) [hereinafter *Stern Review*].
[23] Office of Management and Budget (OMB), *Circular A-4*, U.S. Gov. 33-34 (2003) [hereinafter *Circular A-4*].
[24] *Id* at 33.
[25] Nicholas Stern & Joseph Stiglitz, *The Social Cost of Carbon, Risk, Distribution, Market Failures: An Alternative Approach*, 47 (Nat'l Bureau of Econ. Res., Working Paper No. 28472, 2021).

In 1991, the General Accounting Office (renamed the Governmental Accountability Office in 2004) (GAO) specifically acknowledged "market-based measures may not be satisfactory" for policies with intergenerational impacts that also involve major changes in risk, such as climate change policies.[26] The GAO recommended that sensitivity analyses with "very low discount rates" be used in such cases, specifically suggesting "an effective real discount rate very close to zero for the future life benefits[.]"[27]

The Interagency Working Group that developed the 2010 Technical Support Document on the Social Cost of Carbon also articulated arguments against using historic trends in market statistics to derive a discount rate for long-term policy considerations. For one, it is not necessarily the case that future generations will have the same preferences as people living today regarding the trade-offs between consumption and environmental services.[28] Indeed, it is arguably *unlikely* that such preferences will be the same for subsequent generations given the likely increase in value of environmental amenities in a future that is ravaged by climate impacts. For another, market failures, distortions, or inefficiencies may disrupt intergenerational wealth transfers, thus undercutting the key assumption behind the use of current market rates to develop discount rates: namely, that increased wealth in the future will compensate future generations for climate damage.[29] Such market distortions are highly likely in a climate-impacted future; indeed, according to Lord Stern, climate change is the "greatest and widest-ranging market failure ever seen[.]"[30]

Economists who advocate for a descriptive approach argue discount rates should be based on actual, observed behavior and should therefore be able to predict future individual behavior.[31] However, an expert panel of twelve economists assembled by the Environmental Protection Agency (EPA) indicated in 2012 that observed market behavior, "even for longer-term assets such as 30-year bonds, is likely to reflect intragenerational rather than intergenerational preferences[]" because individual behavior in markets is primarily driven by self-interest rather than interest in the welfare of future generations.[32] Relatedly, Lord Stern notes

> [t]he allocation an individual makes in her own lifetime may well reflect the possibility of her death[.] . . . [T]his intertemporal allocation by the individual has only limited relevance for the long-run ethical question associated with climate change.[33]

Stern further asserts the standard, descriptive approach for calculating discount rates is not capable

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[26] General Accounting Office, *Discount Rate Policy*, U.S. Gov. 11 (May 1991) [hereinafter *Discount Rate Policy*].
[27] *Id.*
[28] Interagency Working Group on Social Cost of Carbon, *Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866*, U.S. Gov. 18 (2010) [hereinafter *TSD 2010*].
[29] *Id.*
[30] Robert S. Devine, *The 'Market' Won't Save Us from Climate Disaster. We Must Rethink our System*, The Guardian, Nov. 19, 2020 (quoting Nicholas Stern).
[31] Environmental Protection Agency (EPA), *Ch. 6 Discounting Future Benefits and Costs*, *in Guidelines for Preparing Economic Analyses* 6-13 (2010).
[32] Kenneth Arrow et al., *How Should Benefits and Costs Be Discounted in an Intergenerational Context? The Views of an Expert Panel*, 3 (Resources for the Future, Disc. Paper No. 12-53, 2012).
[33] *Stern Review*, *supra* note 22, at 47.

of "assessing and comparing paths that have very different trajectories and involve very long-term and large inter-generational impacts."[34] Market-based metrics thus cannot be used to determine constitutionally compliant policies that account for intergenerational equity. As the EPA puts it, "the fundamental choice of what moral perspective should guide intergenerational social discounting . . . cannot be made on economic grounds alone."[35]

Given these considerations, the draft TSD's reliance on a 3% discount rate derived from a descriptive, market-based methodology ignores intergenerational considerations and thereby unconstitutionally disregards the welfare of young people and future generations. The EPA's report entitled *Guidelines for Preparing Economic Analyses* presents the widely accepted alternative "that the discount rate should be below market rates . . . to[] (1) correct for market distortions and inefficiencies in intergenerational transfers; and (2) [ensure] generations are treated equally based on ethical principles[.]"[36] Yet, IWG ignores this alternative, instead using a market-based 3% discount rate in its regulatory analyses that negatively and disproportionately impacts future generations by discriminatorily ignoring their interests, preferences, and well-being.

The upper 5% discount rate that IWG incorporates in the draft TSD is even more unjustifiable. Although the draft TSD asserts a 5% discount rate is "reasonable,"[37] there is no rational basis or compelling reason for using a 5% discount rate. IWG does not cite to economic experts who support such a high discount rate for intergenerational social policy considerations, nor does IWG justify a 5% discount rate using any commonly accepted economic methodology – descriptive, prescriptive, or otherwise.

The Interagency Working Group that developed the 2010 Technical Support Document on the Social Cost of Carbon originally included this high 5% discount rate in order to represent the possibility of "a positive correlation between the net benefits from climate policies and market returns."[38] In other words, such a discount rate assumes that as market returns increase so do the net present-day benefits of enacting climate policies. In making this assumption, however, a 5% discount rate heavily emphasizes near term benefits from such policies while treating the long-term benefits accruing to later generations as negligible or non-existent. For this reason, high discount rates such as the 5% discount rate used by IWG are unconstitutional; they violate the rights of future children to equal protection of the law as well as the intergenerational equity principles of the Posterity Clause in the U.S. Constitution.

More equitable "prescriptive" alternatives to determining discount rates that better account for intergenerational equity are available, as acknowledged by IWG.[39] Unlike a descriptive methodology, a prescriptive approach "directly specifies a discount rate influenced by ethical principles[.] . . . It mixes efficiency and equity considerations[] and is frequently advocated when

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[34] *Id.* at 23; *see also, id.* at 25 (implying the inadequacy of market-based analysis on climate change policies because climate change "is an example of market failure involving externalities and public goods," and, in fact, "must be regarded as market failure on the greatest scale the world has seen[]").
[35] EPA, *supra* note 31, at 6-12.
[36] *Id*. at 6-15.
[37] *TSD 2021*, *supra* note 17, at 27.
[38] National Academies of Sciences, Engineering, and Medicine, *supra* note 20, at 168 (citing *TSD 2010*, *supra* note 28).
[39] *TSD 2021*, *supra* note 17, at 17.

projects affect future generations."[40] In other words, a prescriptive methodology "prescribes" a normative principle by which to set a discount rate (such as an intergenerational equity principle in the case of climate policy). An example of such a prescriptive approach is the Ramsey formula (derived by economist F. P. Ramsey) which explicitly accounts for intergenerational equity:

$$a = b + c*d$$

where *a* is the discount rate; *b* is the rate at which society prefers present consumption to future consumption ("the pure time preference"); *c* is the rate at which the marginal utility of consumption decreases as we get wealthier; and *d* is the rate of per capita consumption growth. According to prominent economist Maureen Cropper, the *b* term in the Ramsey equation specifically implicates intergenerational equity, representing "[t]he rate at which society discounts the utility of future generations."[41] In 1928, Ramsey asserted that using any value greater than zero for *b* is "ethically indefensible" because doing so would arbitrarily judge utility of future generations to count for less than our own utility.[42] As Lord Stern points out, "it is hard to see any ethical justification" for devaluing future generations in this way.[43] Over the course of the twentieth century, a string of eminent scholars followed Ramsey's lead and endorsed an "ethical preference for neutrality as between the welfare of different generations" (i.e., they advocated for setting the *b* term in the Ramsey formula equal to zero).[44]

IWG could explicitly account for intergenerational equity by using the Ramsey formula and definitively setting the *b* term at (or near)[45] zero when determining the discount rates to use for its SC-GHG estimations. In the 2003 Circular A-4, OMB endorses the general principle of welfare equality across generations that informs such a strategy:

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[40] Mark Harrison, *Valuing the Future: The Social Discount Rate in Cost-Benefit Analysis*, xi-xii (Apr. 2010); *see also*, National Academies of Sciences, Engineering, and Medicine, *supra* note 20, at 162 ("[T]he prescriptive approach is based on a social welfare function that reflects the weight that a policy maker attaches to the utility of current and future generations.").

[41] Maureen Cropper, *How Should Benefits and Costs Be Discounted in an Intergenerational Context?*, 9 (Resources for the Future, Disc. Paper No. 12-42, 2012).

[42] F. P. Ramsey, *A Mathematical Theory of Saving*, 38 Econ. J. 543, 543 (1928); see Krznaric, *supra* note 16, at 73 (arguing that discounting the utility of future generations in such a way represents "intergenerational oppression disguised as a rational economic methodology").

[43] *Stern Review*, *supra* note 22, at 31 ("It is, of course, possible that people actually do place less value on the welfare of future generations, simply on the grounds that they are more distant in time. But it is hard to see any ethical justification for this."); *see also*, Wilfred Beckerman & Cameron Hepburn, *Ethics of the Discount Rate in the Stern Review on the Economics of Climate Change*, 8 World Economics 187, 196 (2007). *But see Stern Review*, *supra* note 22, at 299 (When Stern uses the Ramsey formula in the Stern Review, he sets a *b* (pure time reference) value slightly above 0, not based on the fact that future generations have a lower ethical status but rather based on the small probability that future generations won't exist due to extinction.).

[44] Cameron Hepburn, *Valuing the Far-Off Future: Discounting and Its Alternatives*, *in Handbook of Sustainable Development* 8 (Giles Atkinson & Simon Dietz eds., 2007) (listing F. P. Ramsey (1928), A.C. Pigou (1932), R. F. Harrod (1948), T. C. Koopmans (1965), and R. Solow (1974) as examples of scholars who advocate for setting the pure time preference variable at zero); *see also*, William R. Cline, *Chapter 6: William Cline, Peterson Institute for International Economics*, *in Yale Symposium on the Stern Review* 80 (Ernesto Zedillo ed., 2007) ("I set the rate of pure time preference at zero[.]"; John Broome, *Counting the Cost of Global Warming*, 133 (The White Horse Press ed., 1992) ("I conclude that we need to face up directly to the question of discounting future wellbeing. . . . I examined the arguments, and, on the basis of present evidence, came down in favour of a zero rate.").

[45] *See supra* discussion in note 43.

> [a]lthough most people demonstrate time preference in their own consumption behavior, it may not be appropriate for society to demonstrate a similar preference when deciding between the well-being of current and future generations. Future citizens who are affected by such choices cannot take part in making them, and today's society must act with some consideration of their interest.[46]

Despite this acknowledgement, OMB chooses to determine discount rates using values based on observable consumption patterns within the market that do *not* consider the interests of future generations. Stern implicitly objects to this choice, indicating such a market-based, descriptive approach is improper for determining discount rates in the context of long-term regulatory analysis because

> the decisions at issue for the long-run analyses concern allocation across generations rather than within. One can confront [intergenerational allocation decisions] only by looking carefully at the ethical issues themselves. The intertemporal valuations of individuals over their own lifetimes . . . is not the same issue. They do not constitute a market-revealed preference of the trade-offs at stake here.[47]

The CEA agreed with Lord Stern in January 2017, stating

> market rates of return give scant indication of the discount factors that might apply beyond the limited horizon of the standard traded securities that are available. Yet mechanical extrapolation of current rates of return places a negligible weight on the welfare of future generations[.][48]

Even further, the EPA's Guidelines for Preparing Economic Analyses directly and emphatically acknowledge that "there are no market rates for intergenerational time periods."[49]

Yet, despite this overwhelming consensus, IWG skirts around a direct consideration of intergenerational equity, ultimately using inappropriately high discount rates derived from market-based intragenerational preferences rather than relatively low discount rates based on prescriptive intergenerational preferences. As a result, the draft TSD discriminates against future generations by severely undervaluing their preferences and welfare.

There is legitimate scholarly debate within the field of economics regarding whether to use a prescriptive or a descriptive approach to determine discount rates in various circumstances. The U.S. government is not free to engage in this debate when setting long-term social policy, however. Unlike economists and other individuals, the U.S. government and its agents have a duty to respect the deeply rooted principle upon which our Nation was founded of securing "the Blessings of

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[46] *Circular A-4*, *supra* note 23, at 35.
[47] *Stern Review*, *supra* note 22, at 51.
[48] Council of Economic Advisers (CEA), *Discounting for Public Policy: Theory and Recent Evidence on the Merits of Updating the Discount Rate*, Issue Brief, 8 (2017); *see also*, EPA, *supra* note 31, at 6-15 ("[M]echanically discounting very large distant future effects of a policy without thinking carefully about the implications is not advised.").
[49] EPA, *supra* note 31, at 6-15 n. 23.

Liberty to ourselves and our Posterity."[50] The U.S. government is also constrained from perpetuating policies that infringe upon constitutional rights such as equal protection of the law for all, children and future generations included.

> It is quite expected that firms will maximize the present value of their net profit streams, and this ordinary behavior often works toward efficiency. But framers of a constitution are expected to abstract themselves, as far as they can, from their own narrow self-interests and establish the rules of the game that are sustainable indefinitely. Those who come later, for example justices of the Supreme Court like Souter, have the corresponding timeless task of maintaining the constitutional system intact "forever" without regard to a time horizon or the numerical discounting of future benefits or costs.[51]

With these considerations in mind, IWG, as an agent of the U.S. government, must revise its draft TSD, eliminating the 3% and 5% discount rates that were derived using a descriptive method or no method at all. Instead, IWG must incorporate discount rates derived using prescriptive methods that are at or near 0% and that thus align with the U.S. government's constitutional responsibility to secure the blessings of liberty for young people and future generations.

ii. Although purportedly derived from a partly prescriptive methodology, the 2.5% discount rate that IWG uses in the draft TSD is also fundamentally derived from a descriptive methodology and, thus, violates the constitutional rights of young people and future generations.

IWG derives the 2.5% discount rate that it uses in its sensitivity analysis from two approaches for discount rate determination that are specified in a 2003 academic article by R. Newell and W. Pizer. IWG incorporates this lower-than-3% discount rate, at least in part, to be "responsive to . . . ethical obligations that have been raised about rates of 3 percent or higher."[52] Thus, this 2.5% discount rate is purportedly "prescriptive," seemingly taking into account intergenerational concerns. That is not, however, the case in actuality.

Both of the approaches specified by Newell and Pizer's 2003 article are fundamentally descriptive, and thereby unconstitutional for long-term social policy planning. These approaches use a 3% discount rate that is derived from market data as a baseline for their analysis. As indicated in the previous section of this Comment, this market-based 3% discount rate disproportionately devalues the concerns and welfare of those who will be living in the future. In order to safeguard the constitutional rights of future generations, IWG cannot rely on a discount rate determination approach that uses a descriptive methodology to establish a baseline and that ultimately delivers a discount rate only slightly lower than the discount rate delivered by the descriptive method. A proper prescriptive approach must rely on current, economic literature that intentionally accounts for intergenerational equity by specifying a very low or even a negative discount rate for policy

[50] U.S. Const. pmbl.
[51] Talbot Page, *On the Problem of Achieving Efficiency and Equity, Intergenerationally*, 73 Land Econ. 580, 590 (Nov. 1997).
[52] *TSD 2021*, *supra* note 17, at 17.

analyses involving long term impacts from greenhouse gas emissions.[53]

Using a 3% discount rate as a baseline for a prescriptive methodology is not even justified by the most up-to-date market data or by the current consensus of hundreds of expert economists.[54] IWG explicitly recognizes this shortcoming in the text of the draft TSD when it acknowledges "confirming evidence that the economics profession generally agrees that the appropriate social discount rate is below 3 percent as reflected in the recent trends in data."[55] IWG does not address why it acted in opposition to current market data and a clear professional consensus by setting 3% as a baseline from which to conduct its sensitivity analysis. Instead, IWG cites a further prominent study by the CEA, concluding "that the appropriate consumption discount rate should be at most 2 percent."[56] IWG then admits,

> [i]f 2 percent was used as the consumption interest rate and adjusted for uncertainty using the results of Newell and Pizer (2003) as was done in the 2010 TSD, the process would yield a discount rate lower than 2 percent. Therefore, a consideration of discount rates below 3 percent, including 2 percent and lower, are warranted when discounting intergenerational impacts.[57]

Even if IWG's 2.5% discount rate was not derived using a problematic and unconstitutional baseline, it is only one of three discount rates that IWG used in its sensitivity analysis; IWG also uses 3% and 5% discount rates to calculate its SC-GHG estimations. IWG does not require agencies to use the SC-GHG calculations that were obtained using the 2.5% discount rate, nor does it emphasize those particular SC-GHG estimations. Instead, it emphasizes the SC-GHG estimations that were calculated using the "central value" 3% discount rate.[58] IWG also calculates a fourth SC-GHG using the 3% discount rate in a special scenario, further emphasizing the "central" status of this SC-GHG over the SC-GHG based on a 2.5% discount rate. As such, the lowest discount rate used by IWG is not only unconstitutional in its own right, but it is also given a deferential position in IWG's analysis to the even more discriminatory discount rate of 3%.

In the end, regardless of the emphasis it receives in IWG's draft TSD, the 2.5% discount rate violates the constitutional rights of young people and future generations. IWG must eliminate the 2.5% discount rate from its analysis in the draft TSD.

iii. Descriptive methods based on the most recent market data do not justify a 2.5%, a 3%, or a 5% discount rate.

As mentioned previously, the 3% discount rate set forth in OMB's 2003 Circular A-4 specifically represents the real market rate of return (i.e., the interest rate) for long-term government debt. IWG's continued reliance on this 3% discount rate in 2021 is particularly problematic given that long-term interest rates have been in continuous, significant decline,

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[53] Stern & Stiglitz, *supra* note 25, at 47.
[54] *See infra* section II(a)(iii) of this Comment.
[55] *TSD 2021*, *supra* note 17, at 20.
[56] *Id*. (citing CEA, *supra* note 48).
[57] *Id*. at 21 (emphasis added).
[58] *See* Government Accountability Office, *Regulatory Impact Analysis: Development of Social Cost of Carbon Estimates*, U.S. Gov. 7 (Jul. 2014).

leading to "historically low levels[.]"[59] Indeed, long-term interest rates "are expected to remain low for a considerable period of time. Even if they rise some over the next decade – as most forecasts suggest – they are projected to be far below 3 percent."[60] As such, even a descriptive method (discriminatory as it is for determining long-term costs of greenhouse gas emissions) cannot justify the 3% discount rate that IWG uses to "center" its SC-GHG estimations in the draft TSD.[61]

OMB's 2003 Circular A-4 looks to "the real rate of return on 10-year Treasury Securities from the prior 30 years (1973 through 2002)[]" to determine an average long-term interest rate of 3.1% over that time period.[62] This descriptive determination led to the 3% discount rate that became the foundation of its recommendations for discounting in regulatory analysis. Yet, Circular A-4 was released almost twenty years ago. IWG acknowledges that

> [o]ver the past four decades there has been a substantial and persistent decline in real interest rates[.] . . . Re-estimating the consumption rate of interest following the same approach applied in Circular A-4, including using data from the most recent 30 years, yields a substantially lower result. The average rate of return on inflation adjusted 10-year Treasury Securities over the last 30 years (1991-2020) is 2.0 percent. These rates are not without historic precedent, such that over the last 60 years the inflation adjusted 10-year Treasury Securities is 2.3 percent. Current real rates of returns below 2 percent are expected to persist. The U.S. Congressional Budget Office (CBO) in its September 2020 Long Term Budget Outlook forecasts real rates of return on 10-Year Treasury Securities to average 1.2 percent over the next 30 years (U.S. CBO 2020). This new information suggests that the consumption rate of interest is notably lower than 3 percent. CEA (2017) examined additional forecasts of 10-Year Treasury Securities and data on futures contracts, reaching the conclusion that the appropriate consumption discount rate should be at most 2 percent.[63]

Even further, IWG recognizes there is a "surprising degree of consensus" among over 200 economics experts "that the appropriate social discount rate is below 3 percent as reflected in recent trends in data[,]" with more than three-quarters agreeing the social discount rate should be even lower than 2.5 percent. [64]

Despite this clear consensus within the economics profession, the draft TSD inexplicably maintains its outdated, unconstitutional discount rates in clear opposition to current data trends and expert analysis. This oversight is even more egregious given IWG's stated awareness that this emerging expert consensus "pointing to a lower consumption rate of interest, lower than 3 percent, does not obviate the need to carefully consider issues of uncertainty and ethics when discounting

[59] CEA, *supra* note 48, at 4.
[60] *Id.* at 12.
[61] *See supra* text accompanying note 58.
[62] *TSD 2021*, *supra* note 17, at 19.
[63] *Id*. at 19-20.
[64] *Id*. at 20 (citing and quoting Moritz Drupp et al., *Discounting Disentangled*, 10 Am. Econ. J.: Econ. Pol'y 109 (2018)).

in an intergenerational context."[65] Indeed, the TSD acknowledges that properly accounting for impacts of greenhouse gas emissions on future generations warrants "a consideration of discount rates below 3 percent, including 2 percent and lower[.]"[66] Lord Stern and Dr. Stiglitz note even a 2% discount rate is too high to adequately account for intergenerational equity because "[a] pure-time discount rate of 2% would count a life which began 35 years from now at one-half an otherwise identical life starting now."[67] OMB's 2003 Circular A-4 implicitly acknowledges this shocking revelation, noting that "discount rates as low as 1 percent could be appropriate for intergenerational problems."[68]

Ultimately, IWG "finds it appropriate as an interim recommendation that agencies may consider conducting additional sensitivity analysis using discount rates below 2.5%."[69] Rather than incorporate this "interim recommendation" into its own sensitivity analysis, however, IWG simply notes that

> the latest data as well as recent discussion in the economics literature indicates that the 3 percent discount rate used by the IWG to develop its range of discount rates is likely an overestimate of the appropriate discount rate and warrants reconsideration in future updates of the SC-GHG.[70]

In light of the multitude of evidence and expert analysis suggesting a significant lowering of the discount rate is necessary for both descriptive reasons (i.e., current market observances) and prescriptive reasons (i.e., intergenerational equity), using a 5% or a 3% discount rate, and even using a 2.5% (derived from a 3% baseline) or a 2% discount rate, are all unjustifiable under both economic and constitutional analyses.

IWG lacks any justification to wait until a "future update" of the SC-GHG to fix this egregious inequity. IWG must fix the inequity *now* in the 2021 draft TSD. IWG's draft TSD is the proper place to incorporate the most up-to-date trends in economic analysis, as well as essential considerations of intergenerational ethics and constitutional rights. Each of these considerations points to the use of a substantially lower discount rate when determining SC-GHG estimations. Not acting on these considerations *now* by using a much lower discount rate will delegitimize the draft TSD and will make the report obsolete and constitutionally indefensible before it is even finalized and published.

b. The draft TSD can and must incorporate either a sensitivity analysis that includes a negative discount rate, a baseline discount rate of 0%, and a near-zero discount rate or a declining discount rate that starts at a near-zero discount rate and thus refrains from violating the constitutional rights of young people and future generations.

IWG must not use the outdated sensitivity analysis centered around a 3% discount rate that

[65] *Id*. at 21.
[66] *Id*.
[67] Stern & Stiglitz, *supra* note 25, at 55-56.
[68] *TSD 2021*, *supra* note 17, at 21 (citing *Circular A-4*, *supra* note 23).
[69] *Id*.
[70] *Id*. at 17.

was proposed by the OMB almost twenty years ago. Instead, IWG must update its sensitivity analysis now to account for our rapidly changing world and the steadily increasing likelihood of severe climate impacts on future generations.

In 2007, when climate projections were not as dire as they are today, the Stern Review used a prescriptive methodology to derive a 1.4% discount rate. This methodology accounted for intergenerational equity by setting the pure time preference (i.e., *b* in the Ramsey formula) very close to 0%.[71] Similar low discount rates have been endorsed by many other economists.[72] It is likely that Ramsey's 1.4% discount rate should be revised *downward* given that climate change is progressing faster than widely anticipated in 2007 and the Stern Review's assumptions about wealth and consumption increases in the future arguably are no longer tenable.[73] Nevertheless, OMB has persisted in prescribing higher discount rates based on descriptive, market-based methodologies that disproportionately discriminate against young people and future generations. IWG has the opportunity to fix this persistent problem in its draft TSD.

OMB and other sources justify their use of descriptively derived discount rates by asserting that future generations will be better off relative to the present because (1) investments made today will yield greater wealth in the future[74] and, (2) as consumption grows with increasing wealth, the marginal value of consumption for future generations will be less than that for current generations.[75] Both of these arguments assume sustained, rapid market growth in the future and corresponding increases in standards of living. Yet, anticipated costs of climate change combined with potential drops in market productivity undermine these assumptions. There is substantial evidence that the rate of productivity growth in the world economy ("the primary determinant of an economy's rate of long-term economic growth and higher wages")[76] has slowed since the 2008 financial crisis,[77] indicating we may not be able to count on past rates of productivity increase continuing in future decades. In fact, evidence suggests the current, historically sluggish pace of productivity may slow even further.[78] Climate change further threatens to exacerbate this decline

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[71] *See* Frank Ackerman, *Debating Climate Economics: The Stern Review vs. Its Critics*, Report to Friends of the Earth-UK 3-4 (Jul. 2007); *see also* text accompanying note 44.

[72] *See, e.g.*, Stern & Stiglitz, *supra* note 25, at 48 (advocating for "a discount rate of far less than 1%"); Laurie T. Johnson & Chris Hope, *The Social Cost of Carbon in U.S. Regulatory Impact Analyses: An Introduction and Critique*, 2 J. Env't Stud. & Sci. 205, 211-12 (2012); Martin Weitzman, *Why the Far-Distant Future Should be Discounted at Its Lowest Possible Rate*, 36 J. Env't Econ. & Mgmt. 201, 205 (1998).

[73] NASA, Joint NASA, NOAA Study Finds Earth's Energy Imbalance Has Doubled, Jun. 15, 2021 (noting that Earth's energy imbalance approximately doubled between 2005 and 2019, an "unprecedented" increase that is "quite alarming").

[74] *Circular A-4*, *supra* note 23, at 32; *see also*, OMB, *Economic Analysis of Federal Regulations Under Executive Order 12866*, U.S. Gov. 7 (1996); Maureen Cropper, *How Should Benefits and Costs Be Discounted in an Intergenerational Context?*, 183 Res. for the Future 31, 33 (2013).

[75] *Id.*; Cropper, *supra* note 74, at 33.

[76] Pressbooks, *Ch. 20.2 Labor Productivity and Economic Growth*, Principles of Econ. (Oct. 6, 2016).

[77] U.N. Dept. of Econ. & Soc. Affairs, *The Slowdown in Productivity Growth: A View from International Trade*, Dev. Issues No. 11, 1 (Apr. 21 2017).

[78] *See*, Robert J. Gordon, *Is U.S. Economic Growth Over? Faltering Innovation Confronts the Six Headwinds* 18 (Nat'l Bureau of Econ. Res., Working Paper No. 18315, Aug. 2012) (noting that "the central theme of this article is that innovation does not have the same potential to create growth in the future as in the past[]"). *See generally* Robert J. Gordon, *The Rise and Fall of American Growth: The U.S. Standard of Living Since the Civil War* (Princeton U. Press ed., 2016).

such that there is a non-negligible risk of a worldwide *decrease* in standards of living in future decades.

Such lethargic productivity combined with increasing impacts from climate change indicate that it is important for IWG to consider a discount rate of near zero and even a negative discount rate in its sensitivity analysis when estimating the costs of greenhouse gases on future generations. There is strong scholarly support for such low discount rates. According to Lord Stern and Dr. Stiglitz, a discount rate that eliminates the morally indefensible discounting of future life or utility (as is required by principles of intergenerational equity) would simply account for any income increases that result from future technological advances, i.e., the extent to which we anticipate future generations to be "better off" than us. Because "[m]edian per capita real income in the US has been increasing far less than 1% per year[]" and there is no reason to expect this rate of increase to change, "a discount rate of far less than 1%[]" should be applied to long-term policy analysis (assuming the absence of risk) under this theory.[79] Lord Stern and Dr. Stiglitz further emphasize that increasing uncertainty regarding "the possibility of very low future income, indeed future loss of lives on a major scale, as the result of badly managed climate change[]" suggests we should take a highly precautionary approach (i.e., we should use a lower discount rate, "possibly far lower, possibly negative[]").[80]

The use of a very low or negative discount rate is further supported by anticipated losses from climate impacts that are often difficult to evaluate economically and have historically been valued at zero in U.S. policy planning such as biodiversity loss, species' extinction, personal insecurity, the inability to engage in religious and cultural practices, the inability to enjoy recreational and spiritual activities, aesthetics loss, and existential anxiety and depression.[81] Such losses correspond to losses of freedom, liberty, and unburdened decisions to have children. These are the very things enshrined in the Declaration of Independence and protected by the Constitution for all U.S. citizens: life, liberty, and the pursuit of happiness.

Past discount rates used in governmental policy making have never been evaluated by the U.S. government from a constitutional perspective.[82] Because of the immense risks posed by climate change to the constitutional rights of today's young people and future generations, such discount rates must be revised severely downward as informed by the best available climate science and impact projections as well as constitutional compliance considerations.[83] The U.S. government has a profound obligation to conduct a proper constitutional analysis of the steps it must take to ensure that it doesn't deprive children and future generations of their fundamental rights and equal protection of the law. Such an analysis endorses very low discount rates near, at, or below zero for long-term social policy planning.

Not only is the incorporation of near zero and negative discount rates into government regulatory analysis economically, constitutionally, and ethically justified, it is also precedented. For example, the U.S. Department of Energy calculated a low discount rate of 0.5% in 2018 and

[79] Stern & Stiglitz, *supra* note 25, at 48.
[80] *Id*. at 48-49.
[81] Expert Report of Frank Ackerman, *supra* note 12 at 12 [Attachment 3].
[82] *But see*, Expert Report of Joseph E. Stiglitz, *supra* note 13 at 41-46 [Attachment 4].
[83] *See* Government Climate and Energy Policies Must Target <350 ppm Atmospheric CO_2 by 2100 to Protect Children and Future Generations (Mar. 2021) [Attachment 5].

of -0.87% in 2021 for its Federal Energy Management Program (FEMP) using "[t]he procedure specified in 10 CFR 436A, *FEMP Life Cycle Cost Methodology and Procedures*, for calculating the real FEMP discount rate[.]"[84] FEMP ultimately used "the prescribed floor of 3.0%[] . . . as the real discount rate[,]" however, as mandated by 10 CFR 436A.[85]

As an alternative to conducting a sensitivity analysis with a range of discount rates, many economists acknowledge the benefits of applying a declining discount rate in long-term policy analysis as a way to account for intergenerational equity.[86] A declining discount rate initiates policy analysis with a certain, present-day discount rate, "but applies a graduated scale of lower discount rates further out in time."[87] Some countries such as France, Germany and the United Kingdom have started using such declining discount rates for regulatory analysis.[88] In addition, "[t]he National Academies (2017) and EPA's Science Advisory Board (2021) have recommended that the U.S. Government establish an explicit declining discount rate schedule that is applied to all regulatory impacts in an analysis to capture the effect of uncertainty on long-term discount rates[.]"[89]

Despite these recommendations, OMB has not prescribed a declining discount rate because "no widely-accepted declining discount rate schedule has yet been developed."[90] Yet, an expert panel of twelve economists acknowledged that coming up with such a schedule would be comparably difficult to determining a constant discount rate(s) to set for public projects, something that the OMB has done before.[91] Furthermore, other countries have been successful in establishing declining discount rate schedules,[92] indicating that it would not be out of the realm of OMB's expertise to do so as well.

If IWG decides to implement a declining discount rate in order to properly account for intergenerational equity, it is imperative that the starting rate for the analysis not be set too high. If the initial rate is too high, intergenerational equity will be undervalued almost as much as it would be if IWG used a high, constant discount rate. As the late prominent economist Frank Ackerman notes, even a declining discount rate can be set "high enough in the first few decades

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[84] Department of Energy (DOE), *2021 Discount Rates*, 1 n. 1 (Apr. 1, 2021).
[85] *Id.*
[86] *See* Cropper, *supra* note 74, at 32 (noting that twelve prominent economists at a 2011 Intergenerational Discounting Workshop were in "strong agreement about the rationale for using a discount rate that declines over time[]"); Hepburn, *supra* note 44, at 11-12 Cameron Hepburn, *Valuing the Far-Off Future: Discounting and Its Alternatives* 11-12 (April 2005) (arguing that declining discount rates "are likely to be *necessary* for achieving intergenerational efficiency[]"); Frank Ackerman & Ian Finlayson, *The Economics of Inaction on Climate Change: A Sensitivity Analysis* 6 (Oct. 2006) (citing Geoffrey Heal, *Discounting and Climate Change*, 37 Climatic Change 335 (1997)) ("Geoffrey Heal has also demonstrated that a modified prescriptive model, incorporating a more nuanced, future-oriented view of human welfare and preferences, implies declining discount rates[.]").
[87] *TSD 2021*, *supra* note 17, at 22.
[88] *Id*. at 21-22.
[89] *Id*. at 22; *see also*, EPA, *supra* note 31, at 6-19 (noting that declining discount rates can "account[] for discount rate uncertainty and variability, which are known to have potentially large effects on NPV estimates for policies with long time horizons[]").
[90] Interagency Working Group on Social Cost of Carbon, *Response to Comments: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866*, U.S. Gov. 23 (Jul. 2015).
[91] Cropper, *supra* note 74, at 35.
[92] *Id*. at 32; see text accompanying note 88.

to cause all far-future costs and benefits to be discounted away to insignificance."[93] As such, IWG should only use a declining discount rate if it sets the initial discount rate low enough so that considerations of far future interests are not significantly devalued or completely erased.

c. IWG must require agencies to determine and use discount rates that protect the constitutional rights of young people and future generations.

Government agencies have long recommended (but have stopped short of formally requiring) the use of lower discount rates when considering rules and policies that will have far-reaching intergenerational effects. The U.S. GAO indicated in 1991 that "sensitivity analysis should be used to address issues such as . . . intergenerational effects of policies on human life[,]"[94] noting that "[t]his approach can yield an effective real discount rate very close to zero[.]"[95] In 2003, OMB similarly suggested that, "[i]f your rule will have important intergenerational benefits or costs[,] you might consider a further sensitivity analysis using a lower but positive discount rate[.]"[96] Yet, these prescriptions use indecisive language, suggesting that agencies "should be" using or "might consider" conducting "further sensitivity analysis" that may or may not be incorporated into final rule-making. As the EPA puts it in 2010 guidelines for Preparing Economic Analyses,

> OMB's *Circular A-4* (2003) *requires* the use of constant 3 percent and 7 percent for both intra- and intergenerational discounting for benefit-cost estimation of economically significant rules *but allows for* lower, positive consumption discount rates, perhaps in the 1 percent to 3 percent range, if there are important intergenerational values.[97] (emphasis added)

By hesitantly "allowing for" intergenerationally aware analyses rather than explicitly requiring that agencies use a specific, lower discount rate for policies that implicate future generations, these agencies have historically set the stage for young people and future generations to be disproportionately devalued in climate change regulatory analysis. In the 1996 report entitled *Economic Analysis of Regulations Under Executive Order 12866*, OMB puts the onus on agencies imploring them to "consult with OMB prior to conducting special analyses of regulations having substantial intergenerational effects."[98] Yet, there is no strict requirement for agencies to conduct these special analyses let alone to reach out to OMB for advice when doing so. Such irresolute language is ineffective at securing the desired action. For example, EPA waited until 2011 – eight years after OMB's *Circular A-4* and fifteen years after its *Economic Analysis of Regulations Under Executive Order 12866* – to ask a panel of twelve economists to actually determine "how the benefits and costs of regulations should be discounted for projects that affect future generations."[99] By dragging its feet in attempting to make this determination, EPA allowed climate change regulations to be evaluated for years in a way that disproportionately impacted young people and future generations.

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[93] Ackerman & Finlayson, *supra* note 86, at 6.
[94] *Discount Rate Policy*, *supra* note 26, at 9.
[95] *Id*. at 11.
[96] *Circular A-4*, *supra* note 23, at 36.
[97] EPA, *supra* note 31, at 6-15 n. 22.
[98] OMB, *Economic Analysis of Federal Regulations Under Executive Order 12866*, U.S. Gov. (Jan 11, 1996).
[99] Arrow et al., *supra* note 32, at ii.

These young people and future generations cannot afford for IWG to make the same mistake with its draft TSD. The bottom line is that in order to treat a life in the future equally to a life today, we must take into account all the services that a stable climate system has provided for past and present generations, services that are at severe risk of widespread diminishment for future generations. When taking these considerations into account, economic and scientific analyses strongly indicate that future generations will likely be about as well off as those of us living today (suggesting a discount rate of zero) or even worse off than us (suggesting a negative discount rate). If people living in the future can be expected to be better off than us, any improvement is highly likely to be only marginal given the anticipated impacts of climate change in the coming years, decades, and centuries (suggesting a discount rate near zero).

Given the considerations, analysis, evidence and attachments presented in this Comment, including background materials on government climate and energy policy targets and energy pathways,[100] we firmly request IWG to take three actions. First, IWG must completely eliminate from its analysis the use of 2.5%, 3%, and 5% discount rates (and the SC-GHG estimations derived from them) that undermine intergenerational equity. Second, IWG must instead incorporate a sensitivity analysis using negative, 0% and near-zero discount rates or a declining discount rate schedule that adequately accounts for intergenerational equity considerations by starting from a near-zero discount rate. Third, IWG must require agencies to use these constitutionally compliant discount rates.

Thank you for your consideration. Please include all cited evidence in the administrative record. We are happy to provide any of the cited evidence on request. Please send us a response to our comments and decision documents to the address and emails listed below.

Sincerely,
/s/

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[100] *See* Attachments 6-8.

Attachment 1: Expert Report of Susan E. Pacheco and Jerome A. Paulson
Attachment 2: Expert Report of Howard Frumkin
Attachment 3: Expert Report of Frank Ackerman
Attachment 4: Expert Report of Joseph E. Stiglitz
Attachment 5: Government Climate and Energy Policies Must Target <350 ppm Atmospheric CO_2 by 2100 to Protect Children and Future Generations (Mar. 2021)
Attachment 6: Karina von Schuckmann et al., Heat Stored in the Earth System: Where Does the Energy Go? (2020).
Attachment 7: Ben Haley et al., 350 ppm Pathways for the United States, Executive Summary (2019). Full report available at https://www.ourchildrenstrust.org/s/350-PPM-Pathways-for-the-United-States-gk6k.pdf.
Attachment 8: Ben Haley et al., 350 ppm Pathways for Florida, Executive Summary and U.S. data from the Technical Supplement (2020). Full report available at https://www.ourchildrenstrust.org/s/350-PPM-Pathways-Florida-Report-pa2t.pdf.