

in South Africa (2) is one example of an inclusive program that welcomes all but strives to help those who are less prepared. The ENGAGE curriculum gradually increases the volume of work over five years to help students adjust to life at the university. The students are provided with mentoring and other forms of academic and social support, including peer-to-peer interactions. This program has documented stunning success for students from underrepresented groups (3), such as black students from poor townships, and the concept may merit serious consideration by other colleges and universities.

Allen Sessoms

The Hollins Group, Washington, DC 20011, USA.
Email: allen.sessoms@gmail.com

REFERENCES

1. Lafayette, Student Research (<https://ece.lafayette.edu/opportunities/student-research/>).
2. University of Pretoria, Engineering Augmented Degree Program (www.up.ac.za/engage-program).
3. D. Grayson, in *Proceedings of the First Biennial Conference of the South African Society for Engineering Education*, B. Collier-Reed, Ed. (Stellenbosch South Africa, 2011), pp. 69–79.

10.1126/science.aao4525

Best cost estimate of greenhouse gases

In March, President Trump's Executive Order 13783 disbanded the Interagency Working Group on the Social Cost of Greenhouse Gases (IWG) (1). IWG developed estimates for federal agencies to use in cost-benefit analyses of climate policies. IWG's most recent central estimate was \$50 in global damages per ton of carbon dioxide, based on year 2020 emissions, converted from 2007 to 2017 dollars (2). Trump's Executive Order withdrew IWG's official valuations and instead instructed agencies to monetize climate effects using "the best available science and economics" (1). Yet IWG's estimates already are the product of the most widely peer-reviewed models and best available data (3).

The Executive Order asks agencies to reconsider "appropriate discount rates" (the factor for converting future costs and benefits into present-day values) and "domestic versus international impacts" (1). These instructions implicitly question IWG's choices to base central estimates on a 3% instead of a 7% discount rate (higher discount rates place less value on avoiding future damages) and to value global damages rather than ignore climate effects beyond U.S. borders. However, scientists and economists widely endorse these methodological choices. The National

Academies of Sciences and the U.S. Council of Economic Advisers (4, 5) strongly support a 3% or lower discount rate for intergenerational effects. A 7% rate based on private capital returns is considered inappropriate because the risk profiles of climate effects differ from private investments (6, 7). Most economists and climate policy experts [though not all (8)] also defend valuing the full global externalities of U.S. emissions to reinforce reciprocal climate policies in other countries (3, 4, 9). Moreover, current models cannot accurately estimate a domestic-only share of the social cost of greenhouse gases (4, 9).

The social cost of greenhouse gases should be regularly updated, especially to reflect the latest evidence about damage functions (10). Meanwhile, government and private sector analysts should continue using IWG's central estimate of \$50 per ton of carbon dioxide with confidence that it is still the best estimate of the social cost of greenhouse gases.

R. Revesz,¹ M. Greenstone,² M. Hanemann,³ M. Livermore,⁴ T. Sterner,⁵ D. Grab,¹ P. Howard,¹ J. Schwartz^{1*}

¹Institute for Policy Integrity, New York University School of Law, New York, NY 10012, USA.

²Department of Economics, University of Chicago, Chicago, IL 60637, USA. ³Department of Agriculture and Resource Economics, University of California–Berkeley, Berkeley, CA 94720-3310, USA. ⁴University of Virginia School of Law, Charlottesville, VA 22903-1738, USA. ⁵Department of Economics, University of Gothenburg, Gothenburg, SE-405 30, Sweden.

*Corresponding author.
Email: jason.schwartz@nyu.edu

REFERENCES

1. Executive Office of the President, "Executive Order 13783: Promoting energy independence and economic growth," *Federal Register* **82**, 16093 (2017).
2. U.S. Interagency Working Group on the Social Cost of Greenhouse Gases (IWG), "Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866" (2016); <https://obamawhitehouse.archives.gov/sites/default/files/omb/inforeg/scc-tds-final-july-2015.pdf>.
3. M. Greenstone, *et al.*, *Rev. Environ. Econ. Pol.* **7**, 23 (2013).
4. National Academies of Sciences, "Valuing Climate Damages: Updating Estimation of the Social Cost of Carbon Dioxide" (National Academies Press, 2017); www.nap.edu/download/24651.
5. U.S. Council of Economic Advisers, "Discounting for public policy: Theory and recent evidence on the merits of updating the discount rate" (2017); https://obamawhitehouse.archives.gov/sites/default/files/page/files/201701_cea_discounting_issue_brief.pdf.
6. P. Howard, D. Sylvan, "The Wisdom of the Economic Crowd: Calibrating Integrated Assessment Models Using Consensus" (2016); http://ageconsearch.umn.edu/bitstream/235639/2/HowardSylvan_AAEA2016.pdf.
7. M. Greenstone, "What Financial Markets Can Teach Us About Managing Climate Risks," *New York Times* (4 April 2017).
8. A. Fraas *et al.*, *Science* **351**, 569 (2016).
9. P. Howard, J. Schwartz, *Columbia J. Environ. Law* **42**, 203 (2017).
10. A. Barreca *et al.*, *J. Polit. Econ.* **124**, 105 (2016).

10.1126/science.aao4322

Best cost estimate of greenhouse gases

R. Revesz, M. Greenstone, M. Hanemann, M. Livermore, T. Sterner, D. Grab, P. Howard and J. Schwartz

Science **357** (6352), 655.

DOI: 10.1126/science.aao4322

ARTICLE TOOLS

<http://science.sciencemag.org/content/357/6352/655>

REFERENCES

This article cites 5 articles, 1 of which you can access for free
<http://science.sciencemag.org/content/357/6352/655#BIBL>

PERMISSIONS

<http://www.sciencemag.org/help/reprints-and-permissions>

Use of this article is subject to the [Terms of Service](#)

Science (print ISSN 0036-8075; online ISSN 1095-9203) is published by the American Association for the Advancement of Science, 1200 New York Avenue NW, Washington, DC 20005. 2017 © The Authors, some rights reserved; exclusive licensee American Association for the Advancement of Science. No claim to original U.S. Government Works. The title *Science* is a registered trademark of AAAS.