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Social Cost of Carbon

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What Is the SCC?

The Social Cost of Carbon is the best available estimate for the most significant, quantifiable damages caused by each additional ton of carbon dioxide emitted.

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Need for the SCC

- Different agencies were using different numbers.
  - Richard L. Revesz, *Quantifying Regulatory Benefits*, 102 Cal. L. Rev. 1423, 1439-41, 1454-55 (2014).
- Some agencies were failing to value climate damages at all.
  - *Ctr. for Biological Diversity v. Nat'l Highway Traffic Safety Admin.*, 538 F.3d 1172 (9th Cir. 2008).
    - National Highway Traffic Safety Administration (NHTSA) had issued fuel economy standards for trucks.
    - NHTSA failed to assess the social costs of greenhouse gas emissions.
    - The court held that "while the record shows that there is a range of values, the value of carbon emissions reduction is certainly not zero."

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Genesis of the SCC

- In 2009, a federal Interagency Working Group (IWG) brought together experts from a dozen federal agencies and White House offices.

- The goal was to "estimate the monetized damages associated with an incremental increase in carbon emissions in a given year" based on "a defensible set of input assumptions that are grounded in the existing scientific and economic literature."
  - Interagency Working Group on Social Cost of Carbon, *Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866* (2010) ("TSD 2010")


Technical Support Document

With participation by

Council of Economic Advisers
Council on Environmental Quality
Department of Agriculture
Department of Commerce
Department of Energy
Department of Transportation
Environmental Protection Agency
National Economic Council
Office of Energy and Climate Change
Office of Management and Budget
Office of Science and Technology Policy
Department of the Treasury

February 2010

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Calculating the SCC

- The IWG used the three most-cited peer-reviewed models:
  - Dynamic Integrated Climate and Economy (DICE) - by William Nordhaus
  - Policy Analysis of the Greenhouse Effect (PAGE) - by Chris Hope and used by European decision-makers
  - Climate Framework for Uncertainty, Negotiation, and Distribution (FUND) - by Richard Tol
- The models were built to "translate emissions into changes in atmospheric greenhouse concentrations, atmospheric concentrations into changes in temperature, and changes in temperature into economic damages." TSD 2010 at 5.
- Damages included: extreme weather, increased disease, decreased fresh water availability, lost agricultural productivity, lost property value, and many other categories of harm. *See* TSD 2010 at 2.
  - Not included: ocean acidification, wildlife loss, catastrophic damages, etc.

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Calculating the SCC

- IWG steps to calculate the SCC:
  - Run the three models to obtain economic damages estimate for business as usual.
    - Run the calculation using five different socio-economic scenarios and three different discount rates (2.5%, 3%, and 5%).
  - Add a single additional unit of carbon emissions to the models.
    - Run the calculation using five different socio-economic scenarios and three different discount rates (2.5%, 3%, and 5%).
  - Average the estimates to show the cost of additional unit for each discount rate.
- Result: an estimate of the external cost of the damages from an additional unit of carbon emissions.
- Most recent central estimate (3% discount rate): around $50 per ton of CO2.

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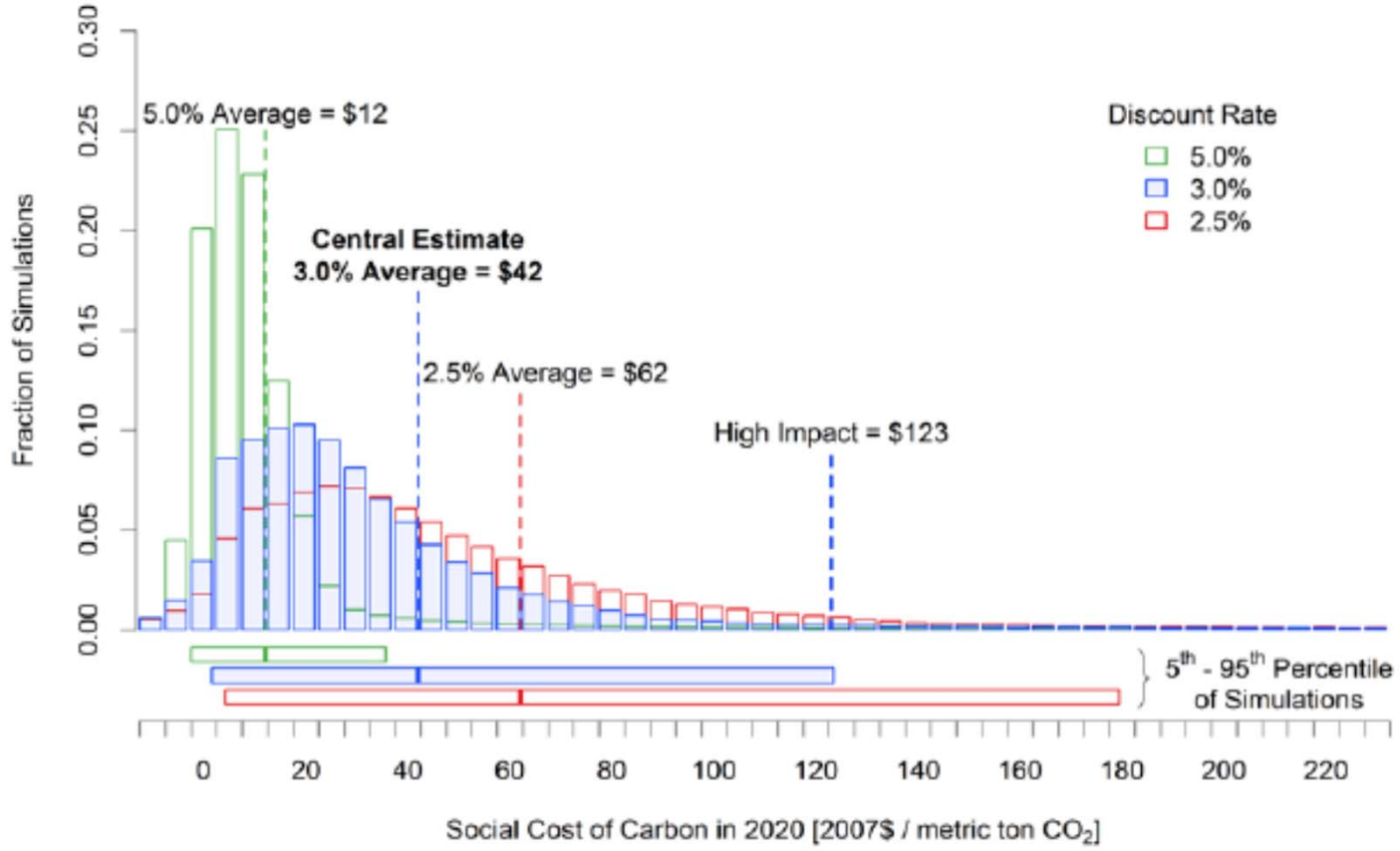
Calculating the SCC

Figure ES-1: Frequency Distribution of SC-CO_2 Estimates for 2020[3]



Source: Interagency Working Group on Social Cost of Greenhouse Gases, *Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis under Executive Order 12866* at 5 (Aug. 2016).

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Vetting & Endorsements

- Used in hundreds of regulatory proceedings.
  - *See* Peter Howard & Jason Schwartz, *Think Global: International Reciprocity as Justification for a Global Social Cost of Carbon*, 42 Columbia J. Envtl. L. 203, 270-84 (2017).
- Endorsed by U.S. Government Accountability Office.
  - Gov't Accountability Office, *Regulatory Impact Analysis: Development of Social Cost of Carbon Estimates* 12-19 (2014), http://www.gao.gov/assets/670/665016.pdf
- Endorsed by National Academies of Sciences and Engineering and Medicine.
  - Nat'l Acad. Sci., Eng. & Medicine, Valuing Climate Damages: Updating Estimates of the Social Cost of Carbon Dioxide 3 (2017), https://www.nap.edu/download/24651.
  - Nat'l Acad. Sci., Eng. & Medicine, Assessment of Approaches to Updating the Social Cost of Carbon: Phase 1 Report on a Near-Term Update 1 (2016), https://www.nap.edu/download/21898

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Vetting & Endorsements

- Upheld by the U.S. Court of Appeals of the Seventh Circuit.
  - *Zero Zone, Inc. v. Dep't of Energy*, 832 F.3d 654, 679 (7th Cir. 2016).
- Economist endorsements
  - Kenneth Arrow, Peter H. Howard, Michael A. Livermore, Michael Oppenheimer, Richard Revesz, Jason A. Schwartz, Thomas Sterner. "The Social Cost of Carbon: A Global Imperative," 11 *Review of Environmental Economics and Policy* 172 (2017).
  - Kenneth Arrow, Lawrence H. Goulder, Peter H. Howard, Robert E. Kopp, Michael A. Livermore, Michael Oppenheimer, Richard Revesz, Thomas Sterner, "Improve Economic Models of Climate Change: Costs of Carbon Emissions are being Underestimated, but Current Estimates are still Valuable for Setting Mitigation Policy," 508 *Nature* 173 (2014).

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States' Use of the SCC

California:

- California Air Resources Board, *The 2017 Climate Change Scoping Plan Update; The Proposed Strategy for Achieving California's 2030 Greenhouse Gas Target* 60-61 (2017) (calculating the value of avoided economic damages associated with "suite of policies developed to reduce" greenhouse-gas emissions).
- ALJ Order Instituting Rulemaking to Create a Consistent Regulatory Framework for the Guidance at 3, att. 1 at 8 (No. 14-10-003) (Cal. PUC Mar. 14, 2018) (recommending that the California Public Utilities Commission use the SCC as part of its decision tool for determining when utilities must integrate distributed energy resources).

Colorado

- Colorado Public Utilities Commission, *In the Matter of the Application of Public Service Company of Colorado for Approval of its 2016 Electric Resource Plan*, No. 16A-0396E, at 29-30 (Apr. 28, 2017) (using the SCC to monetize value of reduced emissions when assessing utility investments in new resources).

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States' Use of SCC

Illinois

- 20 ILCS 3855/1-75(d-5)(1)(B)(i) (using the SCC to set the value of avoided emissions in a program similar to New York's ZEC program).

Maine

- Maine Public Utilities Commission, *Value of Solar Study* at 35 & n.26 (2015) (using the SCC to determine the value of distributed solar energy generation).

Minnesota

- Minnesota Dep't of Commerce, *Minnesota Value of Solar: Methodology* 40 (2014) (adopting the SCC to set the price paid to distributed solar energy generation for the value of carbon emissions they avoid).

New Jersey

- Assembly Bill 3723 § (1)(b)(8) (explaining that the IWG's SCC is "is an accepted measure of the cost of carbon emissions" and that the costs for the ZECs program was going to be significantly less than the SCC).

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States' Use of SCC

New York

- In the Matter of the Value of Distributed Energy Resources, No. 15-E-0751 (March 9, 2017); Order Establishing the Benefit Cost Analysis Framework for REV, App. C., Att. B at 1, No. 14-M-0101 (Jan. 21, 2016); Order Adopting a Clean Energy Standard 19-20, No. 15-E-0302 (Aug. 1, 2016).

Washington

- Washington Dep't of Commerce, *The Social Cost of Carbon: Washington State Energy Office Recommendation for Standardizing the Social Cost of Carbon* 2 (2014) (adopting the SCC for use by all state agencies when assessing the cost of carbon emissions associated with public decisions).

See also Peter Howard, Iliana Paul, and Jason A. Schwartz, *The Social Cost of Greenhouse Gases and State Policy (October 2017),* http://policyintegrity.org/files/publications/SCC_State_Guidance.pdf

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Pres. Trump Administration

- Executive Order 13,783 disbanded the IWG and withdrew the IWG's technical support documents. 82 Fed. Reg. 16,093 (Mar. 28, 2017).
- But agencies are still required to monetize their climate damages.
- Some agencies are using a new "interim" social cost of carbon.
  - Environmental Protection Agency in proposed repeal of the methane rule and Clean Power Plan
  - Bureau of Land Management in proposed repeal of rule restricting waste of natural gas
- Some agencies are still using the IWG's numbers:
  - Dep't of Interior in a offshore oil and gas drilling EIS
  - Dep't of Energy in a rule setting energy efficiency standards for coolers and freezers

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"Interim" SCC - Problems

- The "interim" estimate relies on so-called "domestic-only" damages.
  - But existing models cannot accurately calculate a domestic-only estimate because they were not built to include spillover effects.
  - Even if the models could calculate an accurate domestic-only number, the calculation ignores the need to spur reciprocal actions from other countries to curb emissions.
- The "interim" estimate also includes a 7% discount rate.
  - But that discount rate obscures the harm that emissions will have on the younger and future generations.
  - It was rejected by the IWG as inappropriate.

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Updates

- National Academies of Science (NAS) recommended regular updates.
- The IWG updated the estimates in 2013, 2015, and 2016.
- Most recent NAS recommendations:
  - Update to the socio-economic methodology
  - Update the damages estimates
  - Update climate information in the models
  - Update models to make it easier to update specific components
- Resources for the Future and the Climate Impact Lab are working on implementing some of the NAS recommendations.
  - RFF's Social Cost of Carbon Initiative, Resources for the Future, http://www.rff.org/research/collection/rffs-social-cost-carbon-initiative
  - Social Cost of Carbon, Climate Impact Lab, http://www.climateprospectus.org/research-area/social-cost/.

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What Now?

Science

Best cost estimate of greenhouse gases

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

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.

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Questions?

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