

A large, faint watermark of the U.S. Environmental Protection Agency (EPA) logo is centered in the background. The logo features a stylized flower with three leaves and a circular seal containing the text "UNITED STATES ENVIRONMENTAL PROTECTION AGENCY".

# **Social Cost of Carbon: Valuing CO<sub>2</sub> Impacts in U.S. Regulatory Impact Analysis**

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# What is the Social Cost of Carbon?



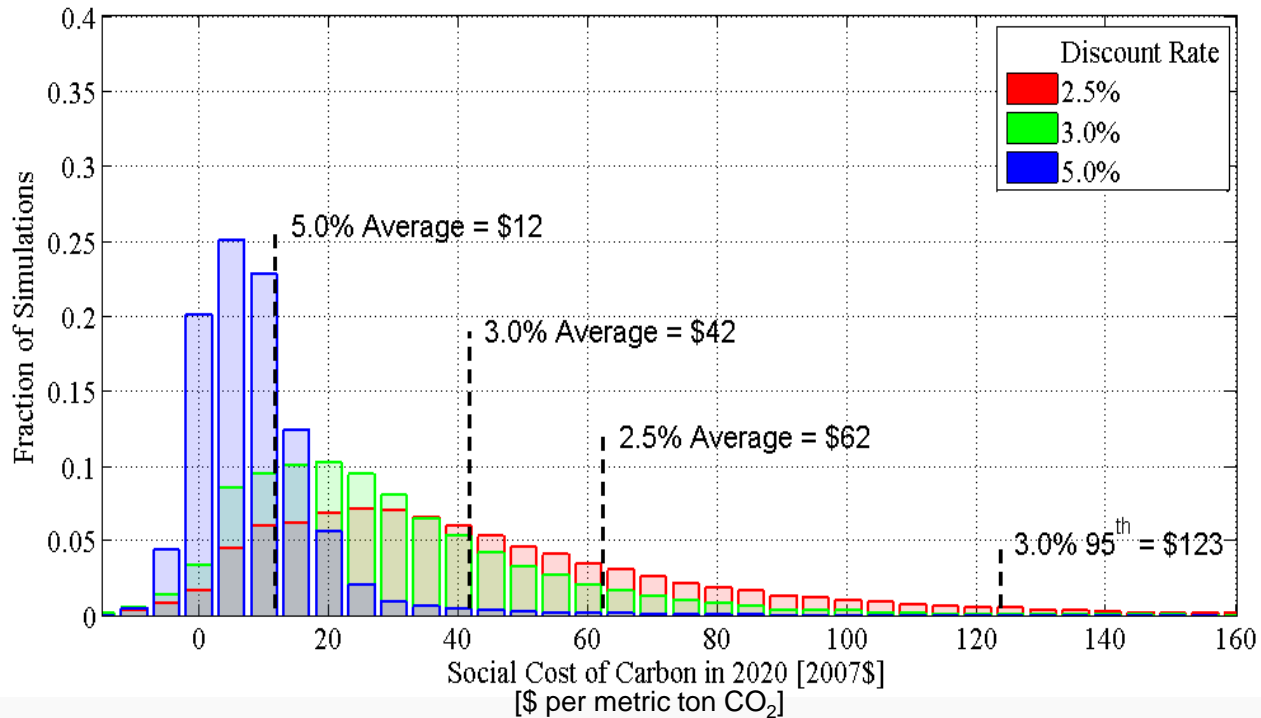
- SC-CO<sub>2</sub> is the monetized value of future worldwide economic damages associated with a one-ton increase in CO<sub>2</sub> emissions in a particular year discounted to the present.
  - Alternatively, it represents the benefit of a one-ton CO<sub>2</sub> reduction
- It is meant to be comprehensive measure of climate change damages
  - However, it does not include all important damages and is very likely an underestimate
- U.S. federal agencies use the SC-CO<sub>2</sub> to estimate benefits of CO<sub>2</sub> reductions from rulemakings
  - The SC-CO<sub>2</sub> estimated along a business-as-usual emissions path is suitable for evaluating impacts of policies that have **marginal** CO<sub>2</sub> impacts
  - Estimates of the SC-CO<sub>2</sub> were developed through a U.S. interagency process
- It is **not** the carbon price derived from a policy that specifies an environmental target (e.g., cap-and-trade, performance standard)
  - The carbon price associated with a policy that specifies an environmental target provides a measure of the marginal cost of abatement, and is not alternative way to value damages from CO<sub>2</sub> emissions.

# Application of the Social Cost of Carbon



- The U.S. government's SC-CO<sub>2</sub> estimates have been used in at least 75 rulemaking actions (includes proposed and final rulemakings)
- Use of these estimates promotes consistency in the way agencies quantify the benefits of reducing CO<sub>2</sub> emissions, or costs from increasing emissions, in regulatory impact analyses
- EPA has also estimated the benefits of reductions in non-CO<sub>2</sub> GHG emissions, notably methane, in regulatory impact analysis
  - Most recently, EPA used directly modeled estimates of the social cost of methane (SC-CH<sub>4</sub>) from a published, peer-reviewed paper (Marten et al. 2014) to value methane impacts in the benefit-cost analysis for a final rulemaking limiting emissions from New and Modified Sources in the Oil and Natural Gas Sector.

# APPENDIX: Current USG estimates



- Source: *Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866* (May 2013, Revised July 2015), <https://www.whitehouse.gov/sites/default/files/omb/infoeg/scc-tsd-final-july-2015.pdf>

# APPENDIX: Example of Recent Application



**Table 8-2. Monetized Benefits, Costs, and Net Benefits Under the Mass-based Illustrative Plan Approach Scenario (billions of 2011\$) <sup>a</sup>**

	Mass-Based Scenario					
	2020		2025		2030	
<b>Climate Benefits <sup>b</sup></b>						
5% discount rate	\$0.94		\$3.6		\$6.4	
3% discount rate	\$3.3		\$12		\$20	
2.5% discount rate	\$4.9		\$17		\$29	
95th percentile at 3% discount rate	\$9.7		\$35		\$60	
	<u>Air Quality Co-benefits Discount Rate</u>					
	3%		7%		3%	
<b>Air Quality Health Co-benefits <sup>c</sup></b>	\$2.0 to \$4.8	\$1.8 to \$4.4	\$7.1 to \$17	\$6.5 to \$16	\$12 to \$28	\$11 to \$26
<b>Costs <sup>d</sup></b>	\$1.4		\$3.0		\$5.1	
<b>Net Benefits <sup>e</sup></b>	\$3.9 to \$6.7	\$3.7 to \$6.3	\$16 to \$26	\$15 to \$24	\$26 to \$43	\$25 to \$40
	Non-monetized climate benefits					
	Reductions in exposure to ambient NO <sub>2</sub> and SO <sub>2</sub>					
<b>Non-Monetized Benefits</b>	Reductions in mercury deposition					
	Ecosystem benefits associated with reductions in emissions of NO <sub>x</sub> , SO <sub>2</sub> , PM, and mercury					
	Visibility improvement					

*Note: See Regulatory Impact Analysis for accompanying table notes.*

**Source:** *Regulatory Impact Analysis for the Clean Power Plan Final Rule* (August 2015), <https://www.epa.gov/sites/production/files/2015-08/documents/cpp-final-rule-ria.pdf>

# APPENDIX: Resources



- U.S. government's SC-CO<sub>2</sub> methodology and results
  - <https://www.whitehouse.gov/omb/oira/social-cost-of-carbon>
  - Current estimates: Technical Support Document (May 2013, Revised 2015): <http://www.whitehouse.gov/sites/default/files/omb/assets/inforeg/technical-update-social-cost-of-carbon-for-regulator-impact-analysis.pdf>
- EPA website on the social cost of carbon
  - <http://www.epa.gov/climatechange/EPAactivities/economics/scc.html>
- Recent rulemaking analyses
  - SC-CO<sub>2</sub> estimates: Clean Power Plan (August 2015). See RIA Section 4.2, <https://www.epa.gov/cleanpowerplan/clean-power-plan-final-rule-regulatory-impact-analysis>
  - SC-CH<sub>4</sub> (Marten et al. estimates): Updates to the New Source Performance Standards for the oil and gas industry (May 2016): <https://www3.epa.gov/airquality/oilandgas/may2016/nsps-ria.pdf>