

# Federal Citations to the Social Cost of Greenhouse Gases

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## Introduction

Executive Order 12866 requires that federal agencies assess the cost and the benefits of intended regulations as part of their regulatory impact analyses (RIAs). The 1993 executive order stated that “recognizing that some costs and benefits are difficult to quantify, [each agency shall] propose or adopt a regulation only upon a reasoned determination that the benefits of the intended regulation justify its costs.”<sup>1</sup> In 2008, a federal appeals court remanded a rule in part because, despite acknowledging the uncertainty, the agency did not monetize climate-related benefits of anticipated emission reductions in its RIA.<sup>2</sup> In response, in 2008, federal agencies began using various values of the *social cost of carbon* (SCC or SC-CO<sub>2</sub>) as a means to estimate the climate-related benefits of abating emissions of carbon dioxide (CO<sub>2</sub>). Since then, they have begun using similar estimates for the benefits of reducing emissions of other greenhouse gases (GHG), including methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O).

The SC-CO<sub>2</sub> is an “estimate of the monetized damages associated with an incremental increase in carbon emissions in a given year,” according to a federal Interagency Working Group (IWG).<sup>3</sup> This group developed a range of SC-CO<sub>2</sub> values “to make it possible for agencies to incorporate the social benefits from reducing carbon dioxide emissions into cost-benefit analyses of regulatory actions that have small, or ‘marginal,’ impacts on cumulative global emissions.”<sup>4</sup> In the United States, the SC-CO<sub>2</sub> has been expressed as U.S. dollars per metric ton of carbon dioxide (\$/t CO<sub>2</sub>) for a given year’s emissions. Agencies primarily used their own, differing SC-CO<sub>2</sub> values until the IWG recommended in 2009 a set of values to improve consistency across regulations. Estimations of the *social cost of methane* (SC-CH<sub>4</sub>) and the *social cost of nitrous oxide* (SC-N<sub>2</sub>O) have used methods similar to those for the SC-CO<sub>2</sub>. Federal agencies began using the SC-CO<sub>2</sub> in regulatory actions in 2008, the SC-CH<sub>4</sub> in 2015, and SC-N<sub>2</sub>O in 2016. Since August 2016, federal agencies collectively call these analyses and applications the *social cost of greenhouse gases* (SC-GHG).

This report compiles a table of *Federal Register* notices related to federal regulatory actions that specifically cite the SC-CO<sub>2</sub>, SC-CH<sub>4</sub>, SC-N<sub>2</sub>O, or SC-GHG. The actions listed in **Table 1** were identified by searches online of the *Federal Register*<sup>5</sup> for the terms “social cost of carbon,” “social cost of methane,” and “social cost.” The table below reflects searches completed by December 5, 2016.

**Table 1** first lists the actions that used the SC-CO<sub>2</sub> estimate and then the actions citing other SC-GHG estimates. The table includes proposed, final and additional actions, sometimes for the same rule (so a simple count of entries in the table would double-count the number of regulations with benefits calculated using the SC-GHG estimates). Almost all non-regulatory notices are omitted, including notices of funding availability for grant programs. A few entries contain commentary that identifies notices of key stages in development of an interagency SC-GHG—for example,

<sup>1</sup> “Executive Order 12866 of September 30, 1993: Regulatory Planning and Review,” 58 *Federal Register* 51735, October 4, 1993.

<sup>2</sup> *Center for Biological Diversity v. National Highway Traffic Safety Administration*, 538 F.3d 1172 (9<sup>th</sup> Cir. 2008).

<sup>3</sup> Interagency Working Group on Social Cost of Carbon, *Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866*, Office of Management and Budget, May 2013, revision of July 2015, <http://www.whitehouse.gov/sites/default/files/omb/assets/inforeg/technical-update-social-cost-of-carbon-for-regulator-impact-analysis.pdf>. This document was revised and released again on July 2, 2015.

<sup>4</sup> *Ibid.*

<sup>5</sup> [Federalregister.gov](http://www.federalregister.gov).

that an interagency process was underway or the first use of an interagency value. One column identifies which version of the SC-CO<sub>2</sub>, SC-CH<sub>4</sub>, or SC-N<sub>2</sub>O was cited in each regulatory action. In this report, CRS does not analyze the social cost values or methods used in the cited agency actions. It does not review or analyze the listed actions.

**Table 1. U.S. Federal Regulatory Actions Referring to the Social Cost of Carbon (SC-CO<sub>2</sub>), the Social Cost of Methane (SC-CH<sub>4</sub>), or the Social Cost of Nitrous Oxide (SC-N<sub>2</sub>O)**

Date	Agency	Regulatory or Related Action	Action	Version of SC-CO <sub>2</sub> , SC-CH <sub>4</sub> , or SC-N <sub>2</sub> O Estimate Used <sup>cd</sup>
<b>SOCIAL COST OF CARBON ACTIONS</b>				
7-Apr-08	DOE	proposed	Energy Conservation Program (ECP) for Commercial and Industrial Equipment: Packaged Terminal Air Conditioner and Packaged Terminal Heat Pump Energy Conservation Standards. 73 FR 18858.	IPCC 2007
2-May-08	DOT	proposed	Corporate Average Fuel Economy Standards, Passenger Cars and Light Trucks; Model Years 2011-2015. 73 FR 24352.	own
30-Jul-08	EPA	advance notice	Advance Notice of Proposed Rulemaking for Regulating Greenhouse Gas Emissions Under the Clean Air Act. 73 FR 44354.	none
25-Aug-08	DOE	proposed	Commercial Ice-Cream Freezers; Self-Contained Commercial Refrigerators, Commercial Freezers, and Commercial Refrigerator-Freezers Without Doors; and Remote Condensing Commercial Refrigerators, Commercial Freezers, and Commercial Refrigerator-Freezers. 73 FR 50072.	IPCC 2007
7-Oct-08	DOE	final	ECP <sup>b</sup> for Commercial and Industrial Equipment: Packaged Terminal Air Conditioner and Packaged Terminal Heat Pump Energy Conservation Standards. 73 FR 58772.	IPCC 2007
17-Oct-08	DOE	proposed	ECP: Energy Conservation Standards (ESC) for Commercial Ice-Cream Freezers; Self-Contained Commercial Refrigerators, Commercial Freezers, and Commercial Refrigerator-Freezers Without Doors; and Remote Condensing Commercial Refrigerators, Commercial Freezers, and Commercial Refrigerator-Freezers. 73 FR 44354.	none
11-Nov-08	EPA & DOT	advance notice	Advance Notice of Proposed Rulemaking, Regulating Greenhouse Gas Emissions Under the Clean Air Act. FRL-8694-2.	own
9-Jan-09	DOE	final	ECS for Commercial Ice-Cream Freezers; Self-Contained Commercial Refrigerators, Commercial Freezers, and Commercial Refrigerator-Freezers Without Doors; and Remote Condensing Commercial Refrigerators, Commercial Freezers, and Commercial Refrigerator-Freezers. 74 FR 1092.	IPCC 2007 (corrects year of dollars)

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30-Mar-09	DOT	final	Corporate Average Fuel Economy Standards Passenger Cars and Light Trucks Model Year 2011. 74 FR 14196.	2009
1-Apr-09	DOT	notice of intent	Notice of Intent to Prepare an Environmental Impact Statement for New Corporate Average Fuel Economy Standards. 74 FR 14857.	none
8-Apr-09	DOE	final (amended)	Amends final rule ECS <sup>b</sup> for Certain Consumer Products (Dishwashers, Dehumidifiers, Microwave Ovens, and Electric and Gas Kitchen Ranges and Ovens) and for Certain Commercial and Industrial Equipment (Commercial Clothes Washers), and additional actions. 74 FR 16040. The <i>Federal Register</i> notice stated that DOE and other federal agencies were reviewing methodologies on the monetary value of reductions of CO <sub>2</sub> and other greenhouse gas emissions and would consider comments that are part of the public record on issues in this and other rulemakings. 74 FR 16040. (FR p. 16079)	own
13-Apr-09	DOE	proposed	ECS for General Service Fluorescent Lamps and Incandescent Reflector Lamps. 74 FR 16920.	own
26-May-09	DOE	proposed	ECS for General Service Fluorescent Lamps and Incandescent Reflector Lamps. 74 FR 24904.	own
26-May-09	EPA	proposed	Regulation of Fuels and Fuel Additives: Changes to Renewable Fuel Standard Program. 74 FR 24904.	own
29-May-09	DOE	proposed	ECS for Refrigerated Bottled or Canned Beverage Vending Machines. 74 FR 26020.	own
14-Jul-09	DOE	final	ECS and Test Procedures for General Service Fluorescent Lamps and Incandescent Reflector Lamps. 74 FR 34080.	own
22-Jul-09	DOE	final	ECS Energy Conservation Standards and Test Procedures for Commercial Heating, Air-Conditioning, and Water-Heating Equipment. 74 FR 36312.	own
31-Aug-09	DOE	final	Refrigerated Bottled or Canned Beverage Vending Machines. 74 FR 44914.	own
25-Sep-09	DOT	proposed	Proposed Rule and Notice of Availability of a Draft Environmental Impact Statement (DEIS) for New Corporate Average Fuel Economy Standards; Notice of Public Hearing. 74 FR 48894.	own

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28-Sep-09	EPA & DOT	proposed	Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards. 74 FR 49454. This action marks the first FR notice of the federal interagency working group's 2010 values for SC-CO <sub>2</sub> . The rule uses joint EPA/DOT values for SC-CO <sub>2</sub> .	own
9-Nov-09	DOE	proposed	ECS for Certain Consumer Products (Dishwashers, Dehumidifiers, Microwave Ovens, and Electric and Gas Kitchen Ranges and Ovens) and for Certain Commercial and Industrial Equipment (Commercial Clothes Washers). 74 FR 57738.	own
24-Nov-09	DOE	proposed	ECS for Small Electric Motors. 74 FR 61410.	2009
11-Dec-09	DOE	proposed	ECS for Residential Water Heaters, Direct Heating Equipment, and Pool Heaters. 74 FR 65852.	own
8-Jan-10	DOE	final	ECS for Certain Consumer Products (Dishwashers, Dehumidifiers, Microwave Ovens, and Electric and Gas Kitchen Ranges and Ovens) and for Certain Commercial and Industrial Equipment (Commercial Clothes Washers). 75 FR 1121.	own
9-Mar-10	DOE	final	ECS for Small Electric Motors. 75 FR 10874.	2009
26-Mar-10	EPA	final	Regulation of Fuels and Fuel Additives: Changes to Renewable Fuel Standard Program. 75 FR 14669.	2009
16-Apr-10	DOE	final	ECS for Residential Water Heaters. 75 FR 20112.	2010
7-May-10	EPA & DOT	final	Light Duty Vehicle GHG Emissions and Corporate Average Fuel Economy Standards. 75 FR 25324. The notice states, "As part of the interagency group, EPA and NHTSA have critically evaluated the new SCC estimates and endorse them for use in these regulatory analyses, for the reasons presented below."	2010
1-May-10	DOT	final	Automatic Dependent Surveillance—Broadcast (ADS-B) Out Performance Requirements to Support Air Traffic Control Service. 75 FR 30160.	2010
21-Jun-10	EPA	other	Hazardous and Solid Waste Management System; Identification and Listing of Special Wastes; Disposal of Coal Combustion Residuals from Electric Utilities. 75 FR 35127.	2009
2-Aug-10	EPA	proposed	Federal Implementation Plans to Reduce Interstate Transport of Fine Particulate Matter and Ozone. 75 FR 45210.	2010
27-Sep-10	DOE	proposed	ECS for Residential Refrigerators, Refrigerator-Freezers, and Freezers. 75 FR 59469.	2010

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14-Oct-10	EPA	proposed	Standards of Performance for New Stationary Sources and Emission Guidelines for Existing Sources: Sewage Sludge Incineration Units. 75 FR 63260.	2010
30-Nov-10	EPA & DOT	proposed	Greenhouse Gas Emissions Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles. 75 FR 74151.	2010
8-Dec-10	EPA	proposed	2017 and Later Model Year Light-Duty Vehicle GHG Emissions and CAFE Standards: Supplemental Notice of Intent.	none
14-Mar-11	EPA	proposed	National Emission Standards for Mercury from Mercury Cell Chlor-Alkali Plants. 76 FR 13852.	2010
21-Mar-11	EPA	final	National Emission Standards for Industrial, Commercial, and Institutional Boilers and Process Heaters. 76 FR 15608.	2010
21-Mar-11	EPA	final	National Emission Standards for Industrial, Commercial, and Institutional Boilers and Process Heaters. 76 FR 15554.	2010
21-Mar-11	EPA	final	Standards of Performance for New Stationary Sources and Emission Guidelines for Existing Sources: Commercial and Industrial Solid Waste Incineration Units. 76 FR 15703.	2010
21-Apr-11	DOE	final and proposed	ECS for Residential Clothes Dryers and Room AC. 76 FR 22454.	2010
10-May-11	DOT	notice of intent	Notice of Intent to Prepare an Environmental Impact Statement for New Corporate Average Fuel Economy Standards. 76 FR 26996.	none
27-Jun-11	DOE	final and proposed	ECS for Residential Furnaces and Residential Central AC and Heat Pumps. 76 FR 37408.	2010
8-Aug-11	EPA	final	Interstate Transport of Fine PM and Ozone. 76 FR 48208.	2010
23-Aug-11	EPA	proposed	Oil and Natural Gas Sector: New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants Reviews. 76 FR 52737.	2010
15-Sep-11	EPA & DOT	final	GHG Emission Standards and Fuel Efficiency Standards for Medium- and Heavy-Duty Vehicles. 76 FR 57105.	2010
15-Sep-11	DOE	final	ECS for Residential Refrigerators. 76 FR 57516.	2010
14-Nov-11	DOE	final	ECS for Fluorescent Lamp Ballasts. 76 FR 70548.	2010

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1-Dec-11	EPA & DOT	proposed	2017 and Later Model Year Light Duty Vehicle GHG Emissions and Corporate Average Fuel Economy Standards. 76 FR 74854.	2010
23-Dec-11	EPA	proposed	New Source Performance Standards: Commercial and Industrial Solid Waste Incineration Units. 76 FR 80452.	2010
17-Jan-12	DOE	proposed	ECS for Commercial Heating, AC, and Water Heating Equipment. 77 FR 2356.	2010
10-Feb-12	DOE	proposed	ECS for Distribution Transformers. 77 FR 7282.	2010
14-Feb-12	DOE	proposed	ECS for Standby Mode and Off Mode for Microwave Ovens. 77 FR 8526.	2010
16-Feb-12	EPA	final	National Emission Standards for Hazardous Air Pollutants from Coal- and Oil-Fired Electric Utility Steam Generating Units and Standards of Performance for Fossil-Fuel-Fired Electric Utility, Industrial-Commercial-, Institutional, and Small Industrial-Commercial-Institutional Steam Generating Units. 77 FR 9303.	2010
27-Mar-12	DOE	proposed	ECS for Battery Chargers and External Power Supplies. 77 FR 18477.	2010
13-Apr-12	EPA	proposed	Standards of Performance for Greenhouse Gas Emissions for New Stationary Sources; Electric Utility Generating Units. 77 FR 22391.	2010
16-May-12	DOE	final	ECS for Certain Industrial Equipment: Energy Conservation Standards and Test Procedures for Commercial Heating, Air-Conditioning, and Water-Heating Equipment. 77 FR 28927.	2010
30-May-12	DOE	final	ECS for Certain Industrial Equipment: Energy Conservation Standards and Test Procedures for Commercial Heating, Air-Conditioning, and Water-Heating Equipment. 77 FR 28927.	2010
30-May-12	DOE	final	ECS for Residential Dishwashers. 77 FR 31917.	2010
31-May-12	DOE	proposed	ECS for Residential Clothes Washers. 77 FR 32381.	2010
31-May-12	DOE	final	Direct final rule ECS Residential Clothes Washers. 77 FR 32307.	2010
16-Aug-12	EPA	final	Oil and Natural Gas Sector: New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants Reviews. 77 FR 49489.	2010

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12-Sep-12	EPA	lifted stay on final rule	EPA lifts stay on 2008 final rule Standards of Performance for Petroleum Refineries; Standards of Performance for Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced after May 14, 2007. 77 FR 56421.	2010
1-Oct-12	DOT	final (confirms)	Confirms final rule Energy Conservation Program: Energy Conservation Standards for Dishwashers. 77 FR 59712.	2010
15-Oct-12	EPA & DOT	final	2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards. 77 FR 62623.	2010
31-Jan-13	EPA	final	National Emission Standards for Hazardous Air Pollutants for Major Sources: Industrial, Commercial, and Institutional Boilers and Process Heaters. 78 FR 7137.	2010
18-Apr-13	DOE	final	ECS for Distribution Transformers. 78 FR 23335.	2010
7-Jun-13	EPA	proposed	Effluent Limitation Guidelines and Standards for the Steam Electric Power Generating Point Source Category. 78 FR 34431.	2010
17-Jun-13	DOE	final	ECS for Standby Mode and Off Mode for Microwave Ovens. 78 FR 36315.	2013a
16-Aug-13	DOE	request for comments	Energy Conservation Program for Consumer Products: Landmark Legal Foundation; Petition for Reconsideration.	none
20-Aug-13	DOE	proposed	ECS for Metal Halide Lamp Fixtures. 78 FR 51463.	2013a
11-Sep-13	DOE	proposed	ECS for Walk-In Coolers and Freezers. 78 FR 55889.	2013a
11-Sep-13	DOE	proposed	ECS for Commercial Refrigeration Equipment. 78 FR 55781.	2013a
25-Oct-13	DOE	proposed	ECS for Residential Furnace Fans. 78 FR 64067.	2013a
6-Dec-13	DOE	proposed	ECS for Commercial and Industrial Electric Motors. 78 FR 73589.	2013b
8-Jan-14	EPA	reproposed	Standards of Performance for Greenhouse Gas Emissions from New Stationary Sources: Electric Utility Generating Units. 79 FR 1429	2013b
10-Feb-14	DOE	final	ECS for Metal Halide Lamp Fixtures. 79 FR 7745.	2013b
10-Feb-14	DOE	final	ECS for External Power Supplies. 79 FR 7845.	2013b



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4-Mar-14	DOE	proposed	ECS for Commercial Clothes Washers. 79 FR 12301.	2013b
17-Mar-14	DOE	proposed	ECS for Automatic Commercial Ice Makers. 79 FR 14845.	2013b
28-Mar-14	DOE	final	ECS for Commercial Refrigeration Equipment. 79 FR 17725.	2013b
15-Apr-14	HUD, USDA	notice of preliminary determination	Preliminary Affordability Determinations: Energy Efficiency Standards. 79 FR 21259.	2013b
29-Apr-14	DOE	proposed	ECS for General Service Fluorescent Lamps and Incandescent Reflector Lamps. 79 FR 24067.	2013b
29-May-14	DOE	final	ECS for Commercial and Industrial Electric Motors. 79 FR 30933.	2013b
3-Jun-14	DOE	final	ECS for Walk-In Coolers and Freezers. 79 FR 32049.	2013b
18-Jun-14	EPA	proposed	Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units. 79 FR 34829.	2013b
18-Jun-14	EPA	proposed	Carbon Pollution Standards for Modified and Reconstructed Stationary Sources: Electric Utility Generating Units. 79 FR 34959.	2013b
3-Jul-14	DOE	final	ECS for Residential Furnace Fans; Final Rule. 79 FR 38129.	2013b
9-Jul-14	DOT	intent to prepare EIS	Medium- and Heavy-Duty Vehicle Fuel Efficiency Improvement Program Standards: Intent to Prepare an Environmental Impact Statement (EIS). 79 FR 38842.	none
15-Aug-14	EPA	final	National Pollutant Discharge Elimination System: Cooling Water Intake Structures at Existing Facilities and Phase I Facilities; Requirements. 79 FR 48299.	2013b
11-Sep-14	DOE	revised analysis	ECS for Automatic Commercial Ice Makers: Availability of Revised Rulemaking Analysis; Notice of Data Availability (NODA). 79 FR 54215.	2013b.
16-Sep-14	DOE	proposed	ECS for Packaged Terminal Air Conditioners and Packaged Terminal Heat Pumps; Notice of Proposed Rulemaking (NOPR). 79 FR 55537.	2013b
30-Sep-14	DOE	proposed	ECS for Small, Large, and Very Large Air-Cooled Commercial Package Air Conditioning and Heating Equipment. 79 FR 58947.	2013b

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14-Oct-14	DOE	proposed	Fossil-Fuel-Generated Energy Consumption Reduction for New Federal Buildings and Major Renovations of Federal Buildings. 79 FR 61693.	2013b
4-Nov-14	EPA	proposed	Carbon Pollution Emission Guidelines for Existing Stationary Sources: EGUs in Indian Country and U.S. Territories; Multi-Jurisdictional Partnerships. 79 FR 65481.	2013b
15-Dec-14	DOE	final	ECS for Commercial Clothes Washers. 79 FR 74491.	2013b
19-Dec-14	DOE	proposed	ECS for Residential Dishwashers. 79 FR 76141.	2013b
24-Dec-14	CEQ	other action	Revised Draft Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in NEPA Reviews. 79 FR 77801.	none
30-Dec-14	DOE	proposed	ECP for Certain Industrial Equipment: ECS for Single Package Vertical Air Conditioners and Single Package Vertical Heat Pumps. 79 FR 78613,	2013b
8-Jan-15	DOE	proposed	ECP for Certain Industrial Equipment: ECS and Test Procedures for Commercial Heating, Air-Conditioning, and Water-Heating Equipment. 80 FR 1171.	2013b
26-Jan-15	DOE	final	ECS for General Service Fluorescent Lamps and Incandescent Reflector Lamps. 80 FR 4041.	2013b
28-Jan-15	DOE	final	ECS for Automatic Commercial Ice Makers. 80 FR 4645.	2013b
4-Feb-15	DOE	proposed	ECP for Certain Industrial Equipment: ECS for Commercial Warm Air Furnaces. 80 FR 6181.	2013b
9-Feb-15	DOE	proposed	ECP for Consumer Products: ECS for Hearth Products. 80 FR 7081.	2013b
12-Mar-15	DOE	proposed	ECP for Consumer Products: ECS for Residential Furnaces. 80 FR 13119.	2013b
16-Mar-15	EPA	proposed	Standards of Performance: New Residential Wood Heaters, New Residential Hydronic Heaters and Forced-Air Furnaces. 80 FR 13671.	2013b
31-Mar-15	DOE	proposed	ECS for Residential Boilers. 80 FR 17221.	2013b
2-Apr-15	DOE	proposed	ECP Standards for Pumps. 80 FR 17825.	2013b

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6-May-15	USDA, HUD	final	Final Affordability Determination Energy Efficiency Standards. 80 FR 25901.	2013b
21-May-15	DOT	proposed	Pipeline and Hazardous Materials Safety Administration: Draft Regulatory Impact Analysis for Plastic Pipe Rule. Posted in docket.	2013b
3-Jun-15	DOE	proposed	ECS for Residential Dehumidifiers. 80 FR 31645.	2013b
10-Jun-15	DOE	proposed	ECP: ECS for Residential Conventional Ovens. 80 FR 33029.	2013b
9-Jul-15	DOE	proposed	ECP: ECS for Commercial Prerinse Spray Valves. 80 FR 39485.	2013b
13-Jul-15	EPA	proposed	Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles-Phase 2. 80 FR 40137.	2013b
17-Jul-15	DOE	final	ECP for Certain Industrial Equipment: Energy Conservation Standards and Test Procedures for Commercial Heating, Air-Conditioning, and Water-Heating Equipment. 80 FR 42613.	2013b
21-Jul-15	DOE	final	ECP: ECS for Packaged Terminal Air Conditioners and Packaged Terminal Heat Pumps. 80 FR 43161.	2013b
27-Jul-15	DOI	proposed	Office of Surface Mining Reclamation and Enforcement. Stream Protection Rule. 80 FR 44435.	2013b
13-Aug-15	DOE	proposed	ECP: ECS for Ceiling Fan Light Kits. 80 FR 48623.	2013b
19-Aug-15	DOE	proposed	ECP: ECS for Refrigerated Bottled or Canned Beverage Vending Machines. 80 FR 50461.	2015
27-Aug-15	EPA	proposed	Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills. 80 FR 52099.	2015
1-Sep-15	DOE	proposed	ECP: ECS for Battery Chargers. 80 FR 52849.	2015
23-Sep-15	DOE	final	ECP: ECS for Single Package Vertical Air Conditioners and Single Package Vertical Heat Pumps. 80 FR 57437.	2015
23-Oct-15	EPA	proposed	Federal Plan Requirements for Greenhouse Gas Emissions From Electric Utility Generating Units Constructed on or Before January 8, 2014; Model Trading Rules; Amendments to Framework Regulations. 80 FR 64965.	2015

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23-Oct-15	EPA	final	Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Utility Generating Units. 80 FR 64661.	2015
3-Nov-15	EPA	final	Effluent Limitations Guidelines and Standards for the Steam Electric Power Generating Point Source Category. 80 FR 67837.	2013b
20-Nov-15	FS	proposed	Roadless Area Conservation; National Forest System Lands in Colorado. 80 FR 72665.	2015
3-Dec-15	EPA	proposed	Cross-State Air Pollution Rule Update for the 2008 Ozone NAAQS. 80 FR 75705.	2015
6-Jan-16	DOE	final	ECP: ECS for Ceiling Fan Light Kits. 81 FR 579.	2015
8-Jan-16	DOE	final	ECP: ECS for Refrigerated Bottled or Canned Beverage Vending Machines. 81 FR 1027.	2015
13-Jan-16	DOE	proposed	ECP: ECS for Ceiling Fans. 81 FR 1687.	2015
15-Jan-16	DOE	final	ECP: ECS for Residential Boilers. 81 FR 2319.	2015
15-Jan-16	DOE	direct final	ECP for Certain Industrial Equipment: ECS for Small, Large, and Very Large Air-Cooled Commercial Package Air Conditioning and Heating Equipment and Commercial Warm Air Furnaces. 81 FR 2419.	2015
26-Jan-16	DOE	final	ECS for Pumps. 81 FR 4367.	2015
27-Jan-16	DOE	final	ECS for Commercial Prerinse Spray Valves. 81 FR 4747.	2015
9-Feb-16	FAA	proposed	Stage 5 Airplane Noise Standards. Cost-benefit analysis referenced in 81 FR 1923.	2015
7-Mar-16	FAA	proposed	Minimum Training Requirements for Entry-Level Commercial Motor Vehicle Operators.	2015
17-Mar-16	DOE	proposed	ECS for General Service Lamps. 81 FR 14527.	2015
24-Mar-16	DOE	proposed	ECS for Commercial Packaged Boilers. 81 FR 15835.	2015
13-May-16	EPA	invites comments	Pipeline Safety: Agency Information Collection Activities. 81 FR 29943.	None

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19-May-16	DOE	proposed	ECS for Compressors. 81 FR 31679.	2015
31-May-16	DOE	proposed	ECS for Commercial Water Heating Equipment. 81 FR 34439.	2015
13-Jun-16	DOE	proposed	ECS for Portable Air Conditioners. 81 FR 38397.	2015
13-Jun-16	DOE	final	ECS for Battery Chargers. 81 FR 38265.	2015
13-Jun-16	DOE	final	ECS for Dehumidifiers. 81 FR 38337.	2015
17-Jun-16	DOE	proposed	ECS for Manufactured Housing. 81 FR 39755.	2015
13-Jul-16	EPA and NHTSA	final	Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles-Phase 2. 80 FR 40137.	GWP and 2015
5-Aug-16	DOE	proposed	ECS for Uninterruptible Power Supplies. 81 FR 52195.	2015
29-Aug-16	EPA	final	Standards of Performance for Municipal Solid Waste Landfills. 81 FR 59331.	2015
29-Aug-16	EPA	final	Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills. 81 FR 59275.	2015
2-Sep-16	DOE	proposed	ECS for Residential Conventional Cooking Products. 81 FR 60783.	2015
13-Sep-16	DOE	proposed	ECS for Walk-In Cooler and Freezer Refrigeration Systems. 81 FR 62979.	2015
23-Sep-16	DOE	proposed	ECS for Residential Furnaces. 81 FR 65719.	2015
26-Oct-16	EPA	Final	Cross-State Air Pollution Rule Update for the 2008 Ozone NAAQS. 81 FR 74504.	2015
28-Oct-16	DOE	Final	ECS for Miscellaneous Refrigeration Products. 81 FR 75194.	2015
<b>SOCIAL COST OF METHANE ACTIONS</b>				
27-Aug-15	EPA	proposed	Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills. 80 FR 52099.	2015

Date	Agency	Regulatory or Related Action	Action	Version of SC-CO <sub>2</sub> , SC-CH <sub>4</sub> , or SC-N <sub>2</sub> O Estimate Used <sup>cd</sup>
18 Sep-15	EPA	proposed	Oil and Natural Gas Sector: Emission Standards for New and Modified Sources. 80 FR 56593.	2015
8-Feb-16	BLM	proposed	Waste Prevention, Production Subject to Royalties, and Resource Conservation. 81 FR 6615.	2015
23-Feb-16	FS	notice	Environmental Impact Statements; Availability, etc.: Grand Mesa, Uncompahgre, and Gunnison National Forests; Colorado; Federal Coal Lease Modifications COC-1362&COC-67232. 81 FR 8899.	None
3-Jun-16	EPA	final	Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources. 81 FR 35823.	2015
13-Jul-16	EPA and NHTSA	final	Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles-Phase 2. 80 FR 40137. (Also listed for SC-CO <sub>2</sub> and SC-N <sub>2</sub> O.)	GWP and 2015
29-Aug-16	EPA	final	Standards of Performance for Municipal Solid Waste Landfills. 81 FR 59331.	2015
29-Aug-16	EPA	final	Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills. 81 FR 59275.	2015
13-Sep-16	DOE	proposed	ECS for Walk-In Cooler and Freezer Refrigeration Systems. 81 FR 62979. (Also listed for SC-CO <sub>2</sub> and SC-N <sub>2</sub> O.)	2015
11-Nov-16	BLM	final	Waste Prevention, Production Subject to Royalties, and Resource Conservation.	2015

### SOCIAL COST OF NITROUS OXIDE

15-Oct-12	EPA and NHTSA	final	2017 and Later Model Year Light-Duty Vehicle Greenhouse Gas Emissions and Corporate Average Fuel Economy Standards. 77 FR 62623.	Sensitivity analysis only
13-Jul-16	EPA and NHTSA	final	Greenhouse Gas Emissions and Fuel Efficiency Standards for Medium- and Heavy-Duty Engines and Vehicles-Phase 2. 80 FR 40137. (Also listed for SC-CO <sub>2</sub> and SC-CH <sub>4</sub> .)	GWP and 2015
13-Sep-16	DOE	proposed	ECS for Walk-In Cooler and Freezer Refrigeration Systems. 81 FR 62979. (Also listed for SC-CO <sub>2</sub> and SC-CH <sub>4</sub> .)	2015
28-Oct-16	DOE	final	ECS for Miscellaneous Refrigeration Products. 81 FR 75194. (Also listed for SC-CO <sub>2</sub> and SC-CH <sub>4</sub> .)	2015

**Source:** CRS, from searches in Regulations.gov and FederalRegister.gov. This table includes regulation-related actions only, not other federal actions, such as grant programs. It also does not include notices of comments received except when accompanied by the agency responses to comments.

**Notes:** Abbreviations for offices, departments, and agencies are as follows:

BLM: Department of the Interior Bureau of Land Management

CEQ: Executive Office of the President Council on Environmental Quality

DOE: Department of Energy

DOL: Department of the Interior

DOT: Department of Transportation

EPA: Environmental Protection Agency

FAA: Department of Transportation Federal Aviation Administration

FS: Department of Agriculture Forest Service

HUD: Department of Housing and Urban Development

NHTSA: Department of Transportation National Highway Traffic Safety Administration

OMB: Executive Office of the President Office of Management and Budget

USDA: Department of Agriculture

- a. The *Federal Register* notice described two methods to compute the social costs of non-CO<sub>2</sub> gases, a “GWP approach” and the “Marten approach.” The proposed rule noted that EPA was undertaking peer review of the application of the Marten et al. (2014) non-CO<sub>2</sub> social cost estimates in regulatory analysis. Pending a favorable peer review, EPA planned to include estimated monetized benefits of CH<sub>4</sub> and N<sub>2</sub>O emission reductions in the main benefit-cost analysis of the RIA for the final rule, using the directly modeled estimates of SC-CH<sub>4</sub> and SC-N<sub>2</sub>O from Marten et al. The *Federal Register* notice sought comments on the use of the Marten approach for non-CO<sub>2</sub> GHGs. It also noted that work was in progress to develop methods to calculate the social cost of tropospheric ozone on climate change, though none was applied for this proposal.
- b. “ECP” means Energy Conservation Program. “ECS” means Energy Conservation Standard(s).
- c. “SCC” and “SC-CO<sub>2</sub>” both mean Social Cost of Carbon. “SC-CH<sub>4</sub>” means Social Cost of Methane.
- d. Tables of the SC-CO<sub>2</sub> values from the 2010 to 2015 references for this column are in an **Appendix** to this report. This column provides the date and origin of the values of SC-CO<sub>2</sub> or SC-CH<sub>4</sub> referred to in the associated federal action. “None” means that, although the SC-CO<sub>2</sub> or SC-CH<sub>4</sub> may have been mentioned, no quantitative value appeared to be used in that action; some cited actions invite comment on the use of such values. “IPCC” means SC-CO<sub>2</sub> values from the 2007 assessment of the Intergovernmental Panel on Climate Change (IPCC); “own” means values developed by an agency (sometimes in collaboration with another) and reported in that regulatory action; “2009” means interim interagency values as published in Table III.H.6–3, p. 29617 of the joint EPA and DOT-NHTSA “Proposed Rulemaking to Establish Light-Duty Vehicle Greenhouse Gas Emission Standards and Corporate Average Fuel Economy Standards,” *Federal Register*, vol. 74, no. 186, September 28, 2009; “2010” means agreed interagency values released in Interagency Working Group on Social Cost of Carbon, “Technical Support Document: Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866,” February 2010, <http://www.whitehouse.gov/sites/default/files/omb/inforeg/for-agencies/Social-Cost-of-Carbon-for-RIA.pdf>; “2013a” means updated values released in Interagency Working Group on Social Cost of Carbon, “Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866,” May 2013, <http://www.whitehouse.gov/sites/default/files/omb/assets/inforeg/technical-update-social-cost-of-carbon-for-regulator-impact-analysis.pdf>; and “2013b” means revised (corrected) values released in Interagency Working Group on Social Cost of Carbon, “Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866,” May 2013, revised November 2013, <http://www.whitehouse.gov/sites/default/files/omb/assets/inforeg/technical-update-social-cost-of-carbon-for-regulator-impact-analysis.pdf>. “2015” means the July 2, 2015 revision to the Technical Update document, available at <https://www.whitehouse.gov/sites/default/files/omb/inforeg/scc-td-final-july-2015.pdf>. The 2015 source for the SC-CH<sub>4</sub> is A. L. Marten et al., “Incremental CH<sub>4</sub> and N<sub>2</sub>O Mitigation Benefits Consistent with the U.S. Government’s SC-CO<sub>2</sub> Estimates,” *Climate Policy* (2014, online publication; 2015, print publication); and Marten et al., “Corrigendum,” *Climate Policy*, vol. 15, no. 5 (2015).

## Appendix. Versions of the Social Cost of GHG Used in Federal Regulatory Actions, 2010 to 2015

**Table A-1. 2010 Interagency Working Group on the Social Cost of Carbon**  
(2007 dollars per metric ton of carbon dioxide)

Discount Rate	5% Average	3% Average	2.5% Average	3% 95 <sup>th</sup> Percentile
2010	4.7	21.4	35.1	64.9
2015	5.7	23.8	38.4	72.8
2020	6.8	26.3	41.7	80.7
2025	8.2	29.6	45.9	90.4
2030	9.7	32.8	50.0	100.0
2035	11.2	36.0	54.2	109.7
2040	12.7	39.2	58.4	119.3
2045	14.2	42.1	61.7	127.8
2050	15.7	44.9	65.0	136.2

**Source:** Interagency Working Group on Social Cost of Carbon, “Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866,” February 2010.

**Table A-2. May 2013 Technical Update of the Social Cost of Carbon**  
Revised social cost of CO<sub>2</sub>, 2010-2050 (in 2007 dollars per metric ton of CO<sub>2</sub>)

Discount Rate	5% Average	3% Average	2.5% Average	3% 95 <sup>th</sup> Percentile
2010	11	33	52	90
2015	12	38	58	109
2020	12	43	65	129
2025	14	48	70	144
2030	16	52	76	159
2035	19	57	81	176
2040	21	62	87	192
2045	24	66	92	206
2050	27	71	99	221

**Source:** Interagency Working Group on Social Cost of Carbon, “Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866,” May 2013.



**Table A-3. July 2015 Revision of the May 2013 Technical Update of the Social Cost of Carbon**Revised social cost of CO<sub>2</sub>, 2010-2050 (in 2007 dollars per metric ton of CO<sub>2</sub>)

Discount Rate	5.0% Average	3.0% Average	2.5% Average	3.0% 95 <sup>th</sup> Percentile
2010	10	31	50	86
2015	11	36	56	105
2020	12	42	62	123
2025	14	46	68	138
2030	16	50	73	152
2035	18	55	78	168
2040	21	60	84	183
2045	23	64	89	197
2050	26	69	95	212

**Source:** Interagency Working Group on Social Cost of Carbon, “Technical Support Document: Technical Update of the Social Cost of Carbon for Regulatory Impact Analysis Under Executive Order 12866,” May 2013, revised November 2013.

**Table A-4. Social Cost of Methane (SC-CH<sub>4</sub>) 2012-2050<sup>a</sup>**Revised social cost of CO<sub>2</sub>, 2012-2050 (in 2007 dollars per metric ton of CO<sub>2</sub>)

Discount Rate	5.0% Average	3.0% Average	2.5% Average	3.0% 95 <sup>th</sup> Percentile
2012	\$430	\$1,000	\$1,400	\$2,800
2015	490	1,100	1,500	3,000
2020	580	1,300	1,700	3,500
2025	700	1,500	1,900	4,000
2030	820	1,700	2,200	4,500
2035	970	1,900	2,500	5,300
2040	1,100	2,200	2,800	5,900
2045	1,300	2,500	3,000	6,600
2050	1,400	2,700	3,300	7,200

**Source:** A. L. Marten et al., “Incremental CH<sub>4</sub> and N<sub>2</sub>O Mitigation Benefits Consistent with the U.S. Government’s SC-CO<sub>2</sub> Estimates,” *Climate Policy* (2014, online publication; 2015, print publication); and Marten et al., “Corrigendum,” *Climate Policy*, vol. 15, no. 5 (2015).

**Notes:** The values are emissions-year specific. Estimates using several discount rates are included because the literature shows that estimates of the SC-CO<sub>2</sub> (and SC-CH<sub>4</sub>) are sensitive to assumptions about the discount rate and because no consensus exists on the appropriate rate to use in an intergenerational context (where costs and benefits are incurred by different generations). The fourth value is the 95<sup>th</sup> percentile of the SC-CH<sub>4</sub> estimates across three models using a 3% discount rate. It is included to represent higher-than-expected impacts from temperature change further out in the tails of the SC-CH<sub>4</sub> distribution. Marten et al., adjusted the estimates in this table to reflect the 2015 minor technical corrections to the SC-CO<sub>2</sub> estimates.

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