

Greenhouse Gas Mitigation: CRS Products

September 20, 2022

Congressional Research Service

<https://crsreports.congress.gov>

R47254

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The 117th Congress has considered a variety of policies and legislation intended to help mitigate greenhouse gas (GHG)¹ emissions associated with climate change, and to address adaptation and resilience to impacts from climate change.

Enacted laws in the 117th Congress addressing GHG mitigation have included P.L. 117-169, commonly known as the “Inflation Reduction Act of 2022” (IRA), and the Infrastructure Investment and Jobs Act (IIJA; P.L. 117-58). Provisions in these acts authorize and provide funding and financial incentives for programs and policies likely to directly or indirectly reduce GHG emissions. Other provisions in these acts may lead to increased GHG emissions in particular contexts. In addition, litigation challenging executive branch actions, including the recent Supreme Court decision that the U.S. Environmental Protection Agency had exceeded its authority in promulgating a regulation, have raised questions about the extent of agencies’ authorities to mitigate GHG emissions.² Other decisions may clarify authorities to regulate GHG emissions. To help provide context for considering legislative proposals and questions about executive authorities, this report compiles a selection of CRS products on GHG-related policy, enacted and proposed legislation, executive branch actions, and programs for GHG mitigation.

CRS selected its products below by searching CRS.gov using the terms *climate* and *greenhouse gas* and through discussion with CRS subject matter experts.³ Products were selected from the search results and included here if they met the search criteria, contained substantial discussion of GHG mitigation, and have been published within the last three years, or are of special interest if older. Other CRS products focused on adaptation and resilience to impacts from climate change are generally not included. The selected products are sorted into eight broad subject categories. A ninth category includes products that substantively address multiple categories but were added to a single category for organizational purposes. Products are arranged alphabetically by title in each category. Categories are as follows:

1. **Agriculture, Oceans, and Forestry**, which includes products about carbon in soils, oceans, forests, and land, both domestic and international;
2. **Carbon Capture and Sequestration**, which includes products about sequestration technology, application, and finance;⁴

¹ The glossary in IPCC, *Climate Change 2014: Mitigation of Climate Change—Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, 2014, provides the following definition of greenhouse gases:

Greenhouse gases are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of terrestrial radiation emitted by the earth’s surface, the atmosphere itself, and by clouds. This property causes the greenhouse effect.

The most commonly discussed human-related GHGs are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), sulfur hexafluoride (SF₆), perfluorocarbons (PFCs), and hydrofluorocarbons (HFCs). There are additional GHGs, however, including regulated ozone-depleting substances (chlorofluorocarbons or CFCs, and hydrochlorofluorocarbons or HCFCs); tropospheric ozone (O₃); black carbon (BC); and additional trace gases, such as nitrogen trifluoride (NF₃). Water in the atmosphere is also an important GHG but scientists believe its concentration to be unaffected directly by human activities. Additional GHGs may be identified over time.

² *West Virginia v. EPA*, 142 S. Ct. 2587 (2022). See CRS Legal Sidebar LSB10791, *Supreme Court Addresses Major Questions Doctrine and EPA’s Regulation of Greenhouse Gas Emissions*, by Kate R. Bowers.

³ Searches are current as of September 20, 2022. For detailed information regarding the search, congressional clients may contact the authors of this report. CRS staff who have authored the products included in this report may be contacted by congressional clients via each product’s hyperlinked title. If an author is unavailable, congressional clients may contact the authors of this report.

⁴ The following definition is contained in the IPCC, “Annex I: Glossary” in *Global Warming of 1.5°C. An IPCC Special Report on the Impacts of Global Warming of 1.5°C Above Pre-industrial Levels and Related Global*

3. **Carbon Pricing, Tax Policy, and Regulatory Approaches**, which includes products relating to domestic and international climate financial issues such as taxes, regulations, and carbon pricing;
4. **Electricity Sector**, which includes products that focus on mitigation options and issues specific to the electricity sector;
5. **Fossil Fuel Production**, which includes products related to domestic production of fossil fuels;
6. **Industry**, which includes products about GHG mitigation in specific industries;
7. **International**, which includes products about international GHG mitigation and climate-related policy;
8. **Transportation**, which includes products about mitigation options for vehicles and fuels; and
9. **Cross-Cutting**, which includes products that cover multiple mitigation topics.

Selected CRS Products Relevant to GHG Mitigation

Agriculture, Oceans, and Forestry

CRS Report R46956, *Agriculture and Forestry Offsets in Carbon Markets: Background and Selected Issues*, by Megan Stubbs, Katie Hoover, and Jonathan L. Ramseur

CRS In Focus IF11693, *Agricultural Soils and Climate Change Mitigation*, by Megan Stubbs

CRS Report R46312, *Forest Carbon Primer*, by Katie Hoover and Anne A. Riddle

CRS Report R47172, *Geoengineering: Ocean Iron Fertilization*, by Caitlin Keating-Bitonti

CRS In Focus IF11404, *Greenhouse Gas Emissions and Sinks in U.S. Agriculture*, by Megan Stubbs

CRS Insight IN11978, *Inflation Reduction Act: Agricultural Conservation and Credit, Renewable Energy, and Forestry*, by Jim Monke et al.

CRS Report R46952, *Reduction in Emissions from Deforestation and Forest Degradation (REDD+)*, by Pervaze A. Sheikh et al.

CRS Report R46313, *U.S. Forest Carbon Data: In Brief*, by Katie Hoover and Anne A. Riddle

Carbon Capture and Sequestration

CRS Insight IN11710, *Carbon Capture and Sequestration Tax Credit ("Section 45Q") Legislation in the 117th Congress*, by Molly F. Sherlock and Angela C. Jones

CRS Report R44902, *Carbon Capture and Sequestration (CCS) in the United States*, by Angela C. Jones and Ashley J. Lawson

CRS Video WVB00491, *Carbon Capture and Sequestration in the United States*, by Angela C. Jones, Ashley J. Lawson, and Paul W. Parfomak

Greenhouse Gas Emission Pathways, in the Context of Strengthening the Goal Response to the Threat of Climate Change, Sustainable Development, and Efforts to Eradicate Poverty, 2018: "Carbon sequestration: The process of storing carbon in a carbon pool." In the current report, *sequestration* refers to the storage of carbon in geologic formations or in long-lived materials such as cement and other products.

CRS In Focus IF11501, *Carbon Capture Versus Direct Air Capture*, by Ashley J. Lawson

CRS Insight IN11944, *Carbon Dioxide Pipelines: Safety Issues*, by Paul W. Parfomak

CRS In Focus IF11639, *Carbon Storage Requirements in the 45Q Tax Credit*, by Angela C. Jones

CRS In Focus IF11578, *CO2 Underground Injection Regulations: Selected Differences for Enhanced Oil Recovery and Geologic Sequestration*, by Angela C. Jones

CRS In Focus IF11861, *DOE's Carbon Capture and Storage (CCS) and Carbon Removal Programs*, by Ashley J. Lawson

CRS Report R46192, *Injection and Geologic Sequestration of Carbon Dioxide: Federal Role and Issues for Congress*, by Angela C. Jones

CRS Report R46757, *Reporting Carbon Dioxide Injection and Storage: Federal Authorities and Programs*, by Angela C. Jones

CRS In Focus IF11455, *The Tax Credit for Carbon Sequestration (Section 45Q)*, by Angela C. Jones and Molly F. Sherlock

Carbon Pricing, Tax Policy, and Regulatory Approaches

CRS Report R45625, *Attaching a Price to Greenhouse Gas Emissions with a Carbon Tax or Emissions Fee: Considerations and Potential Impacts*, by Jonathan L. Ramseur and Jane A. Leggett

CRS In Focus IF11103, *A Brief Comparison of Two Climate Change Mitigation Approaches: Cap-and-Trade and Carbon Tax (or Fee)*, by Jonathan L. Ramseur

CRS Report R46766, *Climate Change Risk Disclosures and the Securities and Exchange Commission*, by Rena S. Miller, Gary Shorter, and Nicole Vanatko

CRS In Focus IF11307, *Climate-Related Risk Disclosure Under U.S. Securities Laws*, by Eva Su and Nicole Vanatko

CRS Report R46865, *Energy Tax Provisions: Overview and Budgetary Cost*, by Molly F. Sherlock

CRS Report R45472, *Market-Based Greenhouse Gas Emission Reduction Legislation: 108th Through 117th Congresses*, by Jonathan L. Ramseur

CRS In Focus IF11791, *Mitigating Greenhouse Gas Emissions: Selected Policy Options*, by Jonathan L. Ramseur et al.

CRS In Focus IF12108, *Overview of the SEC Climate Risk Disclosure Proposed Rule*, by Gary Shorter and Rena S. Miller

CRS Insight IN11983, *Proposed Tax Preference for Domestic Content in Energy Infrastructure*, by Christopher D. Watson and Molly F. Sherlock

CRS Legal Sidebar LSB10736, *Recent Litigation over the Social Cost of Greenhouse Gases*, by David Gunter and Adam Vann

CRS Report R41836, *The Regional Greenhouse Gas Initiative: Background, Impacts, and Selected Issues*, by Jonathan L. Ramseur

CRS In Focus IF11844, *Social Cost of Greenhouse Gases: Issues for Congress*, by Jane A. Leggett

CRS Report R44852, *The Value of Energy Tax Incentives for Different Types of Energy Resources*, by Molly F. Sherlock

Electricity Sector

CRS In Focus IF11316, *A Brief History of U.S. Electricity Portfolio Standard Proposals*, by Ashley J. Lawson

CRS Report R46934, *The Clean Electricity Performance Program (CEPP): In Brief*, by Ashley J. Lawson

CRS Report R46691, *Clean Energy Standards: Selected Issues for the 117th Congress*, by Ashley J. Lawson

CRS Report R45913, *Electricity Portfolio Standards: Background, Design Elements, and Policy Considerations*, by Ashley J. Lawson

CRS Report R46436, *Hydrogen in Electricity's Future*, by Richard J. Campbell

CRS Insight IN11980, *Offshore Wind Provisions in the Inflation Reduction Act*, by Laura B. Comay, Corrie E. Clark, and Molly F. Sherlock

CRS Report R46015, *The POWER Initiative: Energy Transition as Economic Development*, by Julie M. Lawhorn

CRS Report RS22858, *Renewable Energy R&D Funding History: A Comparison with Funding for Nuclear Energy, Fossil Energy, Energy Efficiency, and Electric Systems R&D*, by Corrie E. Clark

CRS Report R45453, *U.S. Carbon Dioxide Emissions in the Electricity Sector: Factors, Trends, and Projections*, by Jonathan L. Ramseur

Fossil Fuel Production

CRS In Focus IF12072, *Advances in Satellite Methane Measurement: Implications for Fossil Fuel Industry Emissions Detection and Climate Policy*, by Jonathan D. Haskett

CRS Legal Sidebar LSB10289, *Drilling Under New Wyoming Leases on Hold as Judge Requires BLM to Reconsider Impacts on Climate Change*, by Adam Vann

CRS In Focus IF12134, *The Federal Role in Orphan Oil and Gas Well Reclamation*, by Lance N. Larson

CRS Legal Sidebar WSLG1867, *How Far Down the Pipe? The D.C. Circuit Directs FERC to Consider Climate Change Concerns in Considering Natural Gas Pipeline Certification*, by Adam Vann

CRS Report R47206, *Inflation Reduction Act Methane Emissions Charge: In Brief*, by Jonathan L. Ramseur

CRS In Focus IF12217, *The Legal Framework for Federal Methane Regulation*, by Benjamin M. Barczewski

CRS Report R42986, *Methane and Other Air Pollution Issues in Natural Gas Systems*, by Richard K. Lattanzio

CRS In Focus IF11909, *Offshore Oil and Gas: Leasing "Pause," Federal Leasing Review, and Current Issues*, by Laura B. Comay

Industry

CRS In Focus IF11354, *Department of Energy Appliance and Equipment Standards Program*, by Corrie E. Clark

CRS Report R47107, *Domestic Steel Manufacturing: Overview and Prospects*, by Christopher D. Watson

CRS In Focus IF11541, *Hydrofluorocarbons (HFCs): EPA and State Actions*, by Jane A. Leggett

CRS In Focus IF11779, *Hydrofluorocarbon Phasedown: Issues for Congress*, by Jane A. Leggett

International

CRS In Focus IF12037, *Approaches for the Sustainable Management of U.S. Ocean Waters and the Ocean Economy: Considerations for Congress*, by Caitlin Keating-Bitonti

CRS Report R47167, *Border Carbon Adjustments: Background and Recent Developments*, by Jonathan L. Ramseur, Brandon J. Murrill, and Christopher A. Casey

CRS In Focus IF10379, *China's Greenhouse Gas and Energy Proposals for 2016-2020*, by Jane A. Leggett

CRS In Focus IF11878, *Climate and Security in the Middle East and North Africa*, by Jeremy M. Sharp, Nicole T. Carter, and Kezee Procita

CRS Legal Sidebar WSLG1836, *Constitutional Limits on States' Efforts to "Uphold" the Paris Agreement*, by Stephen P. Mulligan

CRS In Focus IF11431, *EU Climate Action and U.S.-EU Relations*, by Kristin Archick, Jane A. Leggett, and Kezee Procita

CRS Report R46945, *Greenhouse Gas Emission Reduction Pledges by Selected Countries: Nationally Determined Contributions and Net-Zero Legislation*, by Kezee Procita

CRS In Focus IF12178, *India: Climate Change Issues*, by K. Alan Kronstadt, Kezee Procita, and Bruce Vaughn

CRS Legal Sidebar LSB10712, *Stratospheric Ozone Treaties and the Kigali Amendment: Ratification Considerations*, by Kristen Hite

CRS Report R46204, *The United Nations Framework Convention on Climate Change, the Kyoto Protocol, and the Paris Agreement: A Summary*, by Jane A. Leggett

CRS In Focus IF11746, *United States Rejoins the Paris Agreement on Climate Change: Options for Congress*, by Jane A. Leggett

CRS In Focus IF12036, *U.S. International Climate Finance: FY2023*, by Richard K. Lattanzio

CRS In Focus IF10763, *U.S. International Climate Finance: A Primer*, by Richard K. Lattanzio

Transportation

CRS Report R42566, *Alternative Fuel and Advanced Vehicle Technology Incentives: A Summary of Federal Programs*, by Lynn J. Cunningham et al.

CRS Report R46864, *Alternative Fuels and Vehicles: Legislative Proposals*, by Melissa N. Diaz

CRS In Focus IF11696, *Aviation, Air Pollution, and Climate Change*, by Richard K. Lattanzio

CRS In Focus IF11299, *Climate Change and the America's Transportation Infrastructure Act of 2019 (S. 2302)*, by William J. Mallett

CRS Report R46231, *Electric Vehicles: A Primer on Technology and Selected Policy Issues*, by Melissa N. Diaz

CRS Report R46420, *Environmental Effects of Battery Electric and Internal Combustion Engine Vehicles*, by Richard K. Lattanzio and Corrie E. Clark

CRS In Focus IF12043, *Heavy-Duty Vehicles, Air Pollution, and Climate Change*, by Richard K. Lattanzio

CRS Report R46835, *A Low Carbon Fuel Standard: In Brief*, by Kelsi Bracmort

CRS In Focus IF10842, *The Renewable Fuel Standard: Is Legislative Reform Needed?*, by Kelsi Bracmort

CRS Report R43325, *The Renewable Fuel Standard (RFS): An Overview*, by Kelsi Bracmort

CRS In Focus IF11921, *Surface Transportation and Climate Change: Provisions in the Infrastructure Investment and Jobs Act (P.L. 117-58)*, by William J. Mallett

CRS Report R46452, *Surface Transportation Reauthorization and Climate Change: H.R. 2 and S. 2302*, by William J. Mallett

CRS Report R47171, *Sustainable Aviation Fuel (SAF): In Brief*, by Kelsi Bracmort and Molly F. Sherlock

CRS Report R45747, *Vehicle Electrification: Federal and State Issues Affecting Deployment*, by Bill Canis, Corrie E. Clark, and Molly F. Sherlock

CRS In Focus IF10871, *Vehicle Fuel Economy and Greenhouse Gas Standards*, by Richard K. Lattanzio

Cross-Cutting

CRS Report R46881, *The Bioeconomy: A Primer*, by Marcy E. Gallo

CRS Report RL30853, *Clean Air Act: A Summary of the Act and Its Major Requirements*, by Richard K. Lattanzio

CRS In Focus IF11815, *Climate Change: Selected Federal Economic Development Tools and Policy Considerations*, by Jane A. Leggett and Julie M. Lawhorn

CRS In Focus IF11754, *EPA's Greenhouse Gas Reporting Program*, by Angela C. Jones

CRS Report R45086, *Evolving Assessments of Human and Natural Contributions to Climate Change*, by Jane A. Leggett

CRS Report R46719, *Green Building Overview and Issues*, by Corrie E. Clark

CRS Report R46807, *Greenhouse Gas Emissions Scenarios: Background, Issues, and Policy Relevance*, by Jane A. Leggett

CRS Insight IN11984, *Inflation Reduction Act of 2022 (IRA): Department of Energy Loan Guarantee Programs*, by Phillip Brown

CRS Insight IN11987, *Inflation Reduction Act of 2022: U.S. Environmental Protection Agency and Selected Other Environmental Provisions*, by Angela C. Jones

CRS In Focus IF10752, *Methane Emissions: A Primer*, by Richard K. Lattanzio

CRS Report R46700, *Pipeline Transportation of Hydrogen: Regulation, Research, and Policy*, by Paul W. Parfomak

CRS Legal Sidebar LSB10791, *Supreme Court Addresses Major Questions Doctrine and EPA's Regulation of Greenhouse Gas Emissions*, by Kate R. Bowers

CRS Report R46947, *U.S. Climate Change Policy*, coordinated by Richard K. Lattanzio

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