

Voluntary Carbon Offsets: Background, Federal Involvement, and Issues for Congress

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A *carbon offset* is a measurable reduction, avoidance, or sequestration of greenhouse gas (GHG) emissions used to compensate for GHG emissions generated elsewhere. Carbon offset projects can involve a range of activities, from land-based projects to renewable energy deployment. Carbon offsets are created and sold in carbon markets, which are economic frameworks that support carbon offset transactions. Carbon markets are generally described as either voluntary markets or compliance markets. A compliance market typically supports a legal regime that requires certain GHG emissions sources to reduce their on-site emissions. A voluntary carbon market supports offset activities that are not legally required. For example, a company or individual may voluntarily decide to purchase carbon offsets to counterbalance their GHG emissions. The motivating factors for these purchases may vary. For example, some businesses and individuals may purchase carbon offsets to help meet specific GHG emissions reduction goals.

A range of stakeholders support the development of voluntary carbon offsets, which are generated throughout the world and involve multiple project types, including renewable energy, forestry and land use, and household and community projects. The number of offsets issued in the global voluntary carbon offset markets has increased five-fold over the last 10 years. U.S. stakeholders are engaged in these markets. The United States ranks second (behind India) in quantity of voluntary carbon offsets issued by project location between 2004 and 2025.

Carbon offsets have the potential to provide a number of benefits, including economic benefits. For example, carbon offsets may decrease the overall costs of achieving GHG emissions reduction goals. Carbon offset projects also provide financial incentives for a range of stakeholders, including landowners and agriculture operations, who may not otherwise be engaged in climate change mitigation activities. Carbon offset projects also may raise concerns among some observers, including concerns regarding carbon offset quality and credibility. A number of studies have found that specific offset projects were overestimating the GHG emissions reduced or sequestered. The availability of offsets that do not reduce GHG concentrations in the atmosphere—or reduce less GHG emissions than expected—could undermine climate change policy goals.

Carbon offsets have been a topic of discussion and debate in both international and domestic climate change policy for almost 30 years. On the international front, carbon offsets were part of the 1997 Kyoto Protocol and are a key design element in its replacement, the 2015 Paris Agreement (PA). The PA allows countries to use carbon offsets to help meet their nonbinding GHG emissions goals. Private entities also may voluntarily participate in the PA offset framework. In addition, in 2016, the International Civil Aviation Organization established the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) to limit GHG emissions from international flights. The United States participates in this voluntary framework, which allows airline operators to use carbon offsets to mitigate their CO₂ emissions from international flights. The PA and CORSIA frameworks contain elements of both voluntary and compliance markets.

Over the past 20 years, several Members of Congress have proposed domestic climate change legislation that involved carbon offsets as a compliance option. By comparison, fewer legislative proposals have addressed voluntary carbon offsets. In recent years, several U.S. federal agencies have taken regulatory actions involving the governance of voluntary carbon offsets. Some of these actions were conducted pursuant to recent statutory direction or authority. These agencies include the Department of Agriculture, the Commodity Futures Trading Commission, the Federal Trade Commission, and the Securities and Exchange Commission. The Trump Administration halted many of these actions. Some stakeholders support increased federal involvement in the voluntary carbon offset market.

Members of Congress may consider a range of issues involving voluntary carbon offsets. For example, Members may consider whether voluntary carbon offsets warrant federal involvement, and, if so, the form this involvement could take. When deciding on the scope of federal involvement, policymakers would face a central trade-off between (1) addressing the potential quality and integrity concerns associated with voluntary carbon offsets and (2) the potential consequences of addressing those concerns. Federal involvement in voluntary carbon markets could cover a range of actions. Alternatively, Members could decide the federal government should maintain its existing, limited role in carbon offset governance. These decisions could be influenced by developments in CORSIA and the PA, and policymakers may consider the potential implications of these developments.

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Introduction

A *carbon offset* is a measurable reduction or sequestration of greenhouse gas (GHG)¹ emissions used to compensate for GHG emissions generated elsewhere.² Due to the chemical and physical characteristics of the principal GHGs, a credible carbon offset project can reduce the atmospheric concentration of GHGs regardless of where or how the emissions reduction or sequestration occurs.³ For example, a ton of GHG emissions reduced at a U.S. fossil-fuel-fired electric power plant is expected to have the same atmospheric effect as a ton of GHG emissions reduced or sequestered through a carbon offset project in Brazil. This concept allows for carbon offsets to be considered as a policy option in climate change mitigation. Climate change models generally estimate that activities that remove GHGs from the atmosphere (e.g., through sequestration) would likely play a key role in achieving long-term GHG emissions reduction goals, such as net-zero GHG emissions by 2050.⁴ Carbon offsets can support these emissions goals.

The inclusion of carbon offsets in climate policy frameworks offers a number of potential benefits, including economic benefits. Many carbon offsets present relatively low-cost emissions reduction or sequestration opportunities. Allowing their use could potentially decrease the overall costs of achieving a GHG emissions reduction goal.

The inclusion of carbon offsets in policy frameworks has also caused some stakeholders to raise concerns, including concerns about offset quality and credibility. The availability of carbon offsets that do not reduce GHG concentrations in the atmosphere—as expected—could undermine progress on climate change policy goals.

Carbon offsets are created and sold in carbon markets, which are economic frameworks that support carbon offset transactions. Carbon markets are generally described as either compliance markets or voluntary markets. A compliance market typically supports a legal regime that requires certain GHG emissions sources (e.g., fossil-fuel-fired electric power plants) to reduce their on-site emissions. By comparison, a voluntary carbon market supports offset activities that are not legally required. For example, a company or individual may voluntarily decide to purchase carbon offsets to counterbalance their own GHG emissions.

In some cases, a carbon offset framework or carbon offset project may not be easily described as either voluntary or compliance. For example, some offset frameworks start out as voluntary and

¹ According to the U.S. Environmental Protection Agency (EPA) annual greenhouse gas (GHG) inventory, the primary GHGs emitted by human activities include carbon dioxide (CO₂), methane, nitrous oxide, sulfur hexafluoride, chlorofluorocarbons, hydrofluorocarbons, and perfluorocarbons. Other GHGs include water vapor, carbonaceous and sulfuric aerosols, hydrochlorofluorocarbons, and elevated tropospheric ozone pollution generated by emissions of nitrogen oxides and volatile organic compounds, such as solvents. See, for example, EPA, “Inventory of U.S. Greenhouse Gas Emissions and Sinks,” <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks>.

² The terms *carbon offset* and *carbon credit* are generally interchangeable. This report uses the term *carbon offset*. *Carbon offset* is a term of art in climate policy. Some carbon offset activities may involve GHGs that do not include carbon (e.g., nitrous oxide), but these activities are generally described as carbon offsets.

³ The principal GHGs—CO₂, methane, nitrous oxide, and fluorinated gases (e.g., hydrofluorocarbons)—are considered to be well-mixed gases in the atmosphere. EPA states that these GHGs “remain in the atmosphere long enough to become well mixed, meaning that the amount that is measured in the atmosphere is roughly the same all over the world, regardless of the source of the emissions.” See EPA, “Overview of Greenhouse Gases,” <https://www.epa.gov/ghgemissions/overview-greenhouse-gases>.

⁴ For more information, see CRS In Focus IF12753, *Climate Change: What Are Net-Zero Emissions?*, by Jonathan D. Haskett.

evolve into compliance systems over time. In addition, some carbon offset projects may be eligible in both voluntary and compliance markets.

Carbon offsets have been a key topic of discussion and debate in both international and domestic climate change policy for almost 30 years. For example, carbon offsets were included in the 1997 Kyoto Protocol, the first international climate change agreement to establish country-specific, legally binding GHG emissions reduction targets.⁵ The Kyoto Protocol, which went into effect in 2005, allowed countries to use carbon offset projects to help meet their reduction targets. The United States signed the Kyoto Protocol but did not ratify the agreement and thus did not participate.

Following the Kyoto Protocol (generally, 2003-2010), some Members of Congress proposed domestic climate change legislation, such as cap-and-trade programs, that would have required GHG emissions reductions.⁶ Most of these proposals would have allowed carbon offsets as a compliance option.⁷ In addition, a number of U.S. states began to develop and implement their own GHG emissions reductions programs during this time period. For example, in 2009, a group of Northeast Mid-Atlantic states established the Regional Greenhouse Gas Initiative, a cap-and-trade program that covers GHG emissions from the electric power sector. California began to implement a cap-and-trade program in 2013. Each of these programs allow for covered GHG emissions sources to use carbon offsets as a compliance option. In 2015, multiple countries, including the United States, signed the Paris Agreement (PA), a climate change agreement that eventually replaced the Kyoto Protocol.⁸ The PA requires participating countries to submit GHG emissions reduction pledges, referred to as a *nationally determined contribution* (NDC).⁹ The GHG emissions goals a country decides to include in its NDC are considered nonbinding.¹⁰ The PA allows countries to use carbon offsets to help meet their GHG emissions goals.¹¹ Private

⁵ For more information, see CRS Report R46204, *The United Nations Framework Convention on Climate Change, the Kyoto Protocol, and the Paris Agreement: A Summary*.

⁶ A cap-and-trade system is a policy tool that creates a cap on GHG emissions from selected emission sources while providing the sources with flexibility—on-site reduction or emissions trading—when complying with the emissions cap. For more details, see 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.

⁷ For example, in the 111th Congress, the House passed H.R. 2454 (often referred to as “Waxman-Markey”), an economy-wide cap-and-trade bill that allowed for the use of both domestic and international carbon offsets. A companion bill in the Senate (S. 1733, 111th Congress), which also included carbon offsets, was reported from the Committee on Environment and Public Works. This bill was not brought up for a vote on the Senate floor. See CRS Report R45472, *Market-Based Greenhouse Gas Emission Reduction Legislation: 108th Through 118th Congresses*, by Jonathan L. Ramseur.

⁸ Daniel Bodansky, United Nations Audiovisual Library of International Law, “Paris Agreement,” 2021, https://legal.un.org/avl/pdf/ha/pa/pa_e.pdf.

⁹ The United States submitted a nationally determined contribution (NDC) in 2021, which included the goal of reducing net GHG emissions in the United States by 50%-52% below 2005 levels by 2030. United Nations Framework Convention on Climate Change (UNFCCC), “The United States of America—Nationally Determined Contribution. Reducing Greenhouse Gases in the United States: A 2035 Emissions Target,” <https://unfccc.int/sites/default/files/2024-12/United%20States%202035%20NDC.pdf>. For more information, see CRS Report R48248, *Paris Agreement: Nationally Determined Contributions Conditional on International Support—In Brief*, by Claire M. Jordan.

¹⁰ See, for example, U.S. Department of State, “Background Briefing on the Paris Climate Agreement,” December 12, 2015, <https://2009-2017.state.gov/r/pa/prs/ps/2015/12/250592.htm>. This briefing transcript describes the Paris Agreement (PA) as “a hybrid kind of legal form where a number of elements would be legally binding, including essentially the whole accountability system, the requirement to put in targets or ratchet them to be—to report on them and be reviewed on them, and various rules for counting emissions and so forth would be legally binding, but the targets themselves would not be.” For further discussion, see CRS Report R44609, *Climate Change: Frequently Asked Questions About the 2015 Paris Agreement*.

¹¹ PA, Article 6.1.

entities also may voluntarily participate in these offset frameworks. Although the United States withdrew from the PA in 2026, numerous other countries continue to develop and use the frameworks created by the PA.

In 2016, the International Civil Aviation Organization (ICAO) established the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) to limit GHG emissions from international flights. The United States participates in this voluntary framework, which allows airline operators to use carbon offsets to address their GHG emissions from international flights. CORSIA becomes mandatory for ICAO member countries and their airlines in 2027.

Over the past 20 years, several Members of Congress have proposed domestic climate change legislation that allowed carbon offsets as a compliance option. By comparison, fewer legislative proposals have addressed voluntary carbon offsets. In recent years, several U.S. federal agencies have taken a range of actions involving voluntary carbon offsets. Some of these actions were conducted pursuant to recent statutory direction or authority. These agencies include the Department of Agriculture, the Commodity Futures Trading Commission, the Federal Trade Commission, and the Securities and Exchange Commission. The Trump Administration halted many of these actions.

This report focuses on voluntary carbon offset projects. The report also includes selected discussions of compliance frameworks that may affect voluntary carbon markets. This report is structured as follows:

- The first section provides background on carbon offsets, their markets, and potential benefits and concerns regarding offset use.
- The second section identifies carbon offset activity by project type and location, as well as estimates of carbon offset prices by type.
- The third section discusses selected federal agency activity and developments concerning carbon offsets.
- The fourth section describes two international frameworks that involve carbon offsets—the PA and CORSIA.
- The fifth section includes selected activities from nongovernmental organizations.
- The final section discusses issues for Congress.

Carbon Offsets—Background

Carbon offset projects can involve a range of activities. Offset projects may include GHG removal in forests, crops, soils, and oceans; as well as mechanical GHG removal by direct air capture.¹² For example, forest landowners can generate offsets through afforestation (i.e., establishing tree cover on previously unforested lands) and reforestation projects (i.e., restoring tree cover to previously forested land), among others. Other types of carbon offset projects may include support for renewable energy, destruction of ozone-depleting substances, or reduction of methane emissions in coal mines.¹³

¹² For more background on direct air capture, see CRS In Focus IF11501, *Carbon Capture Versus Direct Air Capture*, by Ashley J. Lawson.

¹³ See, for example, Derik Broekhoff et al., *Securing Climate Benefit: A Guide to Using Carbon Credits*, GHG Management Institute and Stock Environment Institute, 2025, https://offsetguide.org/wp-content/uploads/Guides/Carbon_Credit%20Guide_EN.pdf.

Carbon offsets are considered commodities and have monetary value. Carbon offsets may be tradeable in both compliance and voluntary carbon markets (discussed below). Offset projects may involve different GHGs and therefore are typically quantified in terms of metric tons of CO₂-equivalent (MTCO₂e).¹⁴ Carbon offsets obtained in both compliance and voluntary markets can serve as the underlying assets for derivatives contracts, such as futures, options, and swaps.¹⁵

Carbon Markets

A *carbon market* generally refers to an economic framework that supports the buying and selling of environmental commodities—namely, carbon offsets—that signify GHG emission reductions or removal. Governments or private entities typically create carbon markets to support climate-change-mitigation objectives. These objectives often include the reduction, avoidance, or sequestration of GHG emissions.

A carbon market can take several different forms depending on its specific structure and context. As noted above, this report focuses on the voluntary carbon market. As discussed below, some carbon offsets may be eligible for use in a compliance market, such as a GHG cap-and-trade program.

The operations of a carbon market generally involve a number of entities. Some key terms include the following:

- ***Carbon offset protocols*** (or methodologies) describe the scope of eligible activities and detailed requirements—measuring, reporting, and verification—for generating carbon offsets. Protocols are specific to individual project types (e.g., afforestation or methane capture at landfills).
- ***Carbon registries*** track the ownership of carbon offset projects and issue offsets for GHG emission reductions or sequestration. Carbon registries may establish general rules and requirements for certifying projects, accredit third-party verifiers of carbon offset projects, and develop and approve specific carbon offset project protocols.
- ***Offset project developers*** generally plan, design, and implement an offset project from start to finish. Developers may include private companies, nongovernmental organizations, or government agencies. Developers follow the requirements of offset protocols, which are specific to offset categories, and typically record the offsets with a carbon registry.
- ***Offset project participants*** may include farmers, ranchers, or landowners who implement certain land-based practices that have been shown to reduce GHG emissions or sequester carbon. Other participants may include owners of industrial facilities that switch to materials that release less GHG emissions through their use in industrial processes.

¹⁴ CO₂ equivalents are used because GHGs vary by global warming potential (GWP). GWP is an index developed by the Intergovernmental Panel on Climate Change (IPCC) that allows comparisons of the heat-trapping ability of different gases over a period of time, typically 100 years. Consistent with international GHG reporting requirements, the EPA's most recent GHG inventory (with data from 2022) used the GWP values presented in the IPCC's 2013 *Fifth Assessment Report*. For example, based on these GWP values, a ton of methane is 28 times more potent than a ton of CO₂ when averaged over a 100-year time frame. See EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2022, 2024*, <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks>.

¹⁵ See CRS Report R48095, *Voluntary Carbon Credit Markets and the Commodity Futures Trading Commission*, by Rena S. Miller and Jonathan L. Ramseur; and International Swaps and Derivatives Association, *Role of Derivatives in Carbon Markets*, 2021, <https://www.isda.org/a/soigE/Role-of-Derivatives-in-Carbon-Markets.pdf>.

- **Third-party verifiers** assess whether specific offset protocols are followed and confirm the developer's GHG emissions calculations. Third-party verifiers are typically hired by an offset project developer.
- **Offset purchasers** include entities that use the offsets to comply with mandatory emission-reduction requirements or corporations and individuals pursuing voluntary GHG emissions reductions.

Voluntary Carbon Markets

In the United States and around the world, entities (e.g., private companies and nonprofit organizations) and individuals purchase carbon offsets in voluntary carbon markets (VCMs). The motivating factors for these purchases may vary. For example, some businesses and individuals may purchase carbon offsets to help meet specific GHG emissions reduction goals. These goals may include reaching a "carbon neutral"¹⁶ or "carbon negative" status by a specific year.¹⁷ A number of economic studies indicate that carbon offsets likely offer the most cost-effective approach toward achieving these goals.¹⁸ The underlying motivations for these emissions goals may vary and can include improving a company's brand, reputation, or public relations.¹⁹

A range of different entities buy and sell carbon offsets in VCMs. The credibility of GHG reduction claims associated with these offsets may vary, as the voluntary markets do not have a recognized central authority or universally accepted standards or guidelines for generating offsets. Some sellers offer offsets that comply with relatively rigorous, independently verified standards. Other sellers offer offsets that meet the seller's self-established guidelines.

Compliance Carbon Markets

Compliance carbon markets are linked with a legal framework that requires GHG emission reductions.²⁰ An example is a GHG emission cap-and-trade system, which caps GHG emissions for covered entities (e.g., fossil-fuel-fired power plants or industrial facilities) while providing flexibility—such as on-site reduction or emissions allowance trading—when complying with the emissions cap.²¹ Several compliance markets are in the United States,²² including California's

¹⁶ See, for example, Apple, *Environmental Progress Report*, 2026, https://www.apple.com/environment/pdf/Apple_Environmental_Progress_Report_2026.pdf.

¹⁷ See, for example, Microsoft, *2025 Environmental Sustainability Report: Accelerating progress to 2030*, 2025, <https://cdn-dynmedia-1.microsoft.com/is/content/microsoftcorp/microsoft/msc/documents/presentations/CSR/2025-Microsoft-Environmental-Sustainability-Report.pdf#page=01>.

¹⁸ See, for example, Brilé Anderson et al., "How Much Carbon Offsetting and Where? Implications of Efficiency, Effectiveness, and Ethicality Considerations for Public Opinion Formation," *Energy Policy*, 2016.

¹⁹ Jiehong Lou et al., "Corporate Motivations and Co-Benefits Valuation in Private Climate Finance Instruments through Voluntary Carbon Markets," *Climate Action* (Nature Partner Journals), 2023, <https://cgs.umd.edu/research-impact/publications/corporate-motivations-and-co-benefit-valuation-private-climate-finance>.

²⁰ Compliance carbon markets may also be described as regulatory or mandatory carbon markets.

²¹ For more information, see 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.

²² In addition, the European Union has had a cap-and-trade system in place for more than 20 years. For more information, see CRS Report R48247, *Border Carbon Adjustments: Policy Considerations, Legislation, and Developments in the European Union*, by Jonathan L. Ramseur, Kristen Hite, and Christopher A. Casey.

cap-and-trade program,²³ Washington’s cap-and-trade program,²⁴ and the Regional Greenhouse Gas Initiative (RGGI), a cap-and-trade program that operates in a number of Northeast states.²⁵

In a cap-and-trade program, an emissions cap is partitioned into emission allowances (or permits). Typically, an *emission allowance* represents the authority to emit one MTCO₂e—the same measure used for carbon offsets. Under an emissions cap, covered entities generally have a financial incentive to reduce their own emissions as much as possible. A cap-and-trade system creates a new commodities market, allowing entities to buy and sell emissions allowances.

At the end of each established compliance period (typically a calendar year or multiple years), covered entities submit emissions allowances to an implementing agency to cover the number of tons of GHGs emitted during the period. Generally, if an entity did not provide enough allowances to cover its emissions, it would be subject to penalties.

Potential Benefits

Carbon offsets have the potential to provide a range of benefits. Carbon offsets and their markets can potentially support GHG removal from the atmosphere. Most climate scientists do not consider the elimination of all human-caused GHG emissions feasible, in part because of the difficulty of fully eliminating emissions from the global economy.²⁶ In order to achieve long-term GHG emissions reductions goals (e.g., net-zero GHG emissions by 2050), researchers estimate that GHG removal from the atmosphere would need to play a key role.²⁷ Carbon offset markets can support this objective.

Carbon offsets may offer economic benefits in several ways. First, the inclusion of carbon offsets would likely decrease the overall costs of achieving a GHG emissions reduction goal. Although this benefit may be realized in a voluntary market context, it may be more readily observed in a compliance program (e.g., GHG emissions trading program), because entities in a compliance program would be required to make GHG emissions reductions and face penalties for noncompliance. The inclusion of carbon offsets in a compliance program would expand emissions mitigation opportunities for regulated sources (e.g., electric power plants), likely

²³ For more information on California’s cap-and-trade program, see CRS Report R48314, *The California Cap-and-Trade Program: Overview and Considerations for Congress*, by Kathryn G. Kynett; see also California Air Resources Board, “FAQ Cap-and-Trade Program,” <https://ww2.arb.ca.gov/resources/documents/faq-cap-and-trade-program>.

²⁴ For more information, see Washington Department of Ecology, “Washington’s Cap-and-Invest Program,” <https://ecology.wa.gov/air-climate/climate-commitment-act/cap-and-invest>.

²⁵ The Regional Greenhouse Gas Initiative (RGGI) lists participating states as Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Rhode Island, and Vermont. See RGGI, “Elements of RGGI,” <https://www.rggi.org/program-overview-and-design/elements>. For more background information on RGGI, see CRS Report R41836, *The Regional Greenhouse Gas Initiative: Background, Impacts, and Selected Issues*, by Jonathan L. Ramseur.

²⁶ For example, a 2021 report from the IPCC states that “most strong-mitigation scenarios assume—in addition to emissions reductions—some form of carbon dioxide removal.” See IPCC, *Change 2021: The Physical Science Basis*, Contribution of Working Group I to the Sixth Assessment Report of the IPCC, <https://www.ipcc.ch/report/sixth-assessment-report-working-group-i/>.

²⁷ See, for example, IPCC, *Climate Change 2023, Synthesis Report, Summary for Policymakers*, Contribution of Working Group III to the Sixth Assessment Report of the IPCC, 2023, <https://www.ipcc.ch/report/sixth-assessment-report-cycle/>; see also CRS In Focus IF12753, *Climate Change: What Are Net-Zero Emissions?*, by Jonathan D. Haskett.

reducing their compliance costs, because offset projects may be less expensive than making on-site GHG emissions reductions.²⁸

Second, carbon offset frameworks create a financial incentive for a range of stakeholders who may not otherwise be engaged in activities that reduce or sequester emissions. Such stakeholders may include U.S. landowners and agricultural operations, among others. If the carbon offset opportunity and its associated financial benefits did not exist, these stakeholders would have fewer incentives to reduce their GHG emissions or use their land to sequester GHG emissions. For example, the direct payments from the voluntary carbon market to landowners may lead to reforestation projects that would not otherwise have occurred.

In addition, carbon offset frameworks provide a mechanism to channel private-sector finance to emerging and developing countries.²⁹ Issues regarding these potential benefits are beyond the scope of this report.

Some offset projects have the potential to offer environmental benefits beyond climate mitigation, which are often referred to as *co-benefits*. For example, some offset projects that promote carbon sequestration in soil (e.g., conservation tillage) could improve soil structure and help prevent erosion.³⁰ These projects may reduce water pollution from nonpoint sources, a leading source of water pollution in U.S. waterbodies.³¹

Some may argue that these co-benefits should be compared with the potential co-benefits that could result from a facility (e.g., electric power plant) making on-site GHG emissions reductions, rather than purchasing carbon offsets. As discussed below, GHG emissions reductions at certain sources may yield reductions in non-climate-related air pollutants. Reductions in pollutants from these sources would likely provide health benefits. Policymakers and stakeholders may consider evaluating the potential co-benefits from carbon offsets in this context.

Potential Concerns

Carbon offset projects may also raise concerns among some stakeholders. A principal concern with carbon offsets is their quality and credibility.³² Concerns regarding quality and credibility may raise questions about the effectiveness of carbon offsets and their markets. The availability of offsets that do not reduce GHG concentrations in the atmosphere—or reduce less GHG emissions than expected—could undermine climate change policy goals.

²⁸ For example, economic modeling of H.R. 2454 (111th Congress, the “Waxman-Markey” bill), which included a GHG emissions cap-and-trade program, among other provisions, indicated that the inclusion of carbon credits (offsets) as a compliance option would have reduced compliance costs by half. See EPA, *EPA Preliminary Analysis of the Waxman-Markey Discussion Draft: The American Clean Energy and Security Act of 2009 in the 111th Congress*, 2009; Congressional Budget Office, *Congressional Budget Office Cost Estimate: H.R. 2454, American Clean Energy and Security Act of 2009* (as Ordered Reported by the House Committee on Energy and Commerce), 2009; and, CRA International, *Impact on the Economy of the American Clean Energy and Security Act of 2009 (H.R. 2454)*, 2009.

²⁹ See, for example, United Nations Trade and Development, “Leveraging Carbon Markets for Least Developed Countries,” 2024, <https://unctad.org/news/leveraging-carbon-markets-least-developed-countries>; and Voluntary Carbon Markets Integrity Initiative, *A Confident Carbon Market: Business Perspectives*, 2025, <https://vcmintegrity.org/wp-content/uploads/2025/07/A-Confident-Carbon-Market-Business-Perspectives.pdf>.

³⁰ See, for example, IPCC, *Climate Change 2022: Mitigation of Climate Change*, Contribution of Working Group III to the Sixth Assessment Report of the IPCC, 2022, <https://www.ipcc.ch/report/sixth-assessment-report-working-group-3/>.

³¹ EPA, “Basic Information about Nonpoint Source (NPS) Pollution,” <https://www.epa.gov/nps/basic-information-about-nonpoint-source-nps-pollution>.

³² See, for example, National Academies of Sciences, Engineering, and Medicine, *Accelerating Decarbonization in the United States: Technology, Policy, and Societal Dimensions*, 2024, p. 611, <https://www.nationalacademies.org/projects/DEPS-BEES-19-01>.

The quality and credibility of carbon offsets is often described in terms of “realness,” which refers to whether the offset represents an actual and quantifiable amount of GHG emissions reduction or sequestration. A determination of whether a carbon offset project represents real reductions or sequestration of GHG emissions would likely involve the concepts identified below.

- **Additionality** is a key consideration for carbon offsets. *Additionality* means that an offset project represents an activity that is beyond what would have occurred under a business-as-usual scenario. In other words, would the emissions reductions or sequestration have happened anyway? An additionality test would likely consider (1) whether the project would have happened without the financial support from the carbon offset program or buyer; (2) whether the project is required by federal, state, or local laws; and (3) whether the activity is a common practice or conforms to an industry standard. Additionality considerations may vary by activity and may involve situations in which the available information is incomplete, which may lead to inconsistent determinations.
- **Double-counting** refers to the concern that the GHG emissions reductions or removals from a carbon offset project would be claimed by more than one party. For example, a U.S. company might purchase carbon offsets generated through the development of a wind farm in another country. If both the U.S. buyer and the host country were to claim the GHG emissions reduction toward their climate targets, the carbon offset would be double-counted.
- **Permanence** refers to the duration of carbon offset projects. Permanence considers whether the carbon offset project will be subsequently negated by human activity (e.g., change in land use) or a natural occurrence (e.g., forest fire, disease, or pestilence). Permanence considerations are particularly relevant for forestry projects.
- **Leakage** refers to an increase in GHG emissions outside of the carbon offset project area in response to emissions reduction or avoidance within the project area. For example, an offset project that restricts timber harvesting at a specific location or region may boost logging at an alternative location, thus counteracting the climate change effectiveness of the offset project.

The level of concern for the above concepts may vary by offset type. For example, permanence concerns are likely most prevalent for forestry projects. Carbon offset protocols are specific to offset project types and typically contain methods that project developers must employ to produce credible offsets. Protocols include a carbon offset verification process to ensure the specific protocol was followed. The major carbon registries (identified below) require third-party verification (i.e., not the project developer, participant, or purchaser).³³

A number of studies have questioned the credibility of certain carbon offset projects in the voluntary market.³⁴ These studies found that specific offset projects were overestimating the

³³ Derik Broekhoff et al., *Securing Climate Benefit: A Guide to Using Carbon Credits*, GHG Management Institute and Stock Environment Institute, 2025, https://offsetguide.org/wp-content/uploads/Guides/Carbon_Credit%20Guide_EN.pdf.

³⁴ See, for example, Thales A. P. West et al., “Overstated Carbon Emission Reductions from Voluntary REDD+ Projects in the Brazilian Amazon,” *Proceedings of the National Academy of Sciences*, September 2020; Barbara K. Haya et al., “Comprehensive Review of Carbon Quantification by Improved Forest Management Offset Protocols,” *Frontiers in Forests and Global Change*, March 2023; Nina Lakhani, “Revealed: Top Carbon Offset Projects May Not Cut Planet-Heating Emissions,” *The Guardian*, September 2023; Alejandro Guizar-Coutiño et al., “A Global (continued...) ”

amount of GHG emissions the project would reduce or sequester. Other studies have raised questions about the credibility of specific carbon offsets generated during the implementation of the Kyoto Protocol, the predecessor of the 2015 PA.³⁵ For example, a 2021 study examined wind farm carbon offset projects in India and estimated that roughly 50% of offsets created from these projects would not meet a test of additionality.³⁶

Some argue that the results documented in these studies (and the news articles that cite them)³⁷ have undermined the credibility of all carbon offsetting efforts and damaged public trust in these climate mitigation options.³⁸

In addition to concerns regarding credibility, some have raised concerns about certain trade-offs that carbon offsets may present. For example, carbon offsets provide the opportunity for GHG emissions sources, such as power plants and industrial facilities, to reduce their net GHG emissions levels, without making on-site GHG emissions reductions. From a climate change perspective, the location of the GHG emissions reduction does not matter. This outcome may present a trade-off, because these facilities generally produce both GHG emissions and emissions of traditional air pollutants. The more traditional air pollutants (e.g., lead, particulate matter, and sulfur dioxide) may present risks to human health on a local or regional scale, whereas GHG emissions present risks on a global scale. Some have described these concerns in the context of “environmental justice.”³⁹

In addition, some offset projects may involve other trade-offs, such as land use changes, which could produce other consequences in some situations. For example, a 2022 report from the Intergovernmental Panel on Climate Change stated that large-scale deployment of biomass energy projects (i.e., growing crops for energy use) “raises concerns about food security and biodiversity conservation.”⁴⁰

Evaluation of the Effectiveness of Voluntary REDD+Projects at Reducing Deforestation and Degradation in Themoist Tropics,” *Conservation Biology*, June 2022; Annelise Gill-Wiehl et al., “Pervasive Over-Crediting from Cookstove Offset Methodologies,” *Nature Sustainability*, January 2024.

³⁵ See, for example, Raphael Calel et al., “Do Carbon Offsets Offset Carbon?” *CESifo Working Paper*, 2021; Martin Comes et al., *How Additional Is the Clean Development Mechanism?* Oeko-Institut e.V.k, 2016; U.S. Government Accountability Office (GAO), *Lessons Learned from the European Union's Emissions Trading Scheme and the Kyoto Protocol's Clean Development Mechanism*, 2008.

³⁶ Raphael Calel et al., “Do Carbon Offsets Offset Carbon?” *CESifo Working Paper*, 2021.

³⁷ See, for example, Nina Lakhani, “Corporations Invested in Carbon Offsets That Were ‘Likely Junk’, Analysis Says,” *The Guardian*, May 2024, <https://www.theguardian.com/environment/article/2024/may/30/corporate-carbon-offsets-credits>.

³⁸ See, for example, Nophea Sasaki, “Addressing Scandals and Greenwashing in Carbon Offset Markets: A Framework for Reform,” *Global Transitions*, 2025, <https://www.sciencedirect.com/science/article/pii/S258979182500026X#bib2>; and International Swaps and Derivatives Association, *Navigating the Risks of Greenwashing in the Voluntary Carbon Market*, 2024, <https://www.isda.org/a/I9wgE/Navigating-the-Risks-of-Greenwashing-in-the-Voluntary-Carbon-Market.pdf>.

³⁹ For example, environmental justice concerns regarding offsets have generated considerable interest in the context of California’s cap-and-trade program, which allows offsets as a compliance alternative. For more information, see CARB, “Cap-and-Trade FAQ,” <https://ww2.arb.ca.gov/resources/documents/faq-cap-and-trade-program>. See, for example, Danae Hernandez-Cortes and Kyle C. Meng, *Do Environmental Markets Cause Environmental Injustice? Evidence from California's Carbon Market*, National Bureau of Economic Research, 2020; and Lara J. Cushing et al., *A Preliminary Environmental Equity Assessment of California's Cap-and-Trade Program*, University of Southern California Dornsife Equity Research Institute, 2016.

⁴⁰ IPCC, *Climate Change 2022: Mitigation of Climate Change*, Contribution of Working Group III to the Sixth Assessment Report of the IPCC, 2022, <https://www.ipcc.ch/report/sixth-assessment-report-working-group-3/>.

Voluntary Carbon Offset Project Activity

Voluntary carbon offsets are generated throughout the world and involve a range of project types. This section presents information on voluntary carbon offset project activity, including the number of projects by type and location, and trends in carbon offset project issuance over time. The last subsection presents carbon offset sales data that were collected in an annual survey.

The information in the figures in this section (other than the sale data) is sourced from the Berkeley Carbon Trading Project.⁴¹ The Berkeley Project compiles a database of voluntary (and compliance) market carbon offset projects. The database includes offset project details from five major voluntary offset project registries: American Carbon Registry, Climate Action Reserve, Architecture for REDD+ Transactions, Gold Standard, and Verra. According to the Berkeley Project, these five registries “generate almost all of the world’s voluntary market offsets.”⁴²

Projects by Type and Location

Figure 1 provides a breakdown by project location—United States compared to other countries—and type of activity for carbon offsets issued between 2004 and 2025.

As **Figure 1** illustrates, the rankings by offset type for the United States are different from the global rankings by offset type. For projects located in the United States, the three most common project types by offset issuance involved the following:

- **Chemical processes projects (41%).** These projects included a number of different project types. The largest projects by issuance volume included replacement of high-global-warming-potential chemicals in refrigeration manufacturing (see text box below); reclamation and reuse of hydrofluorocarbons in various appliances;⁴³ and reduction of nitrous oxide emissions at nitric acid and adipic acid production facilities.⁴⁴
- **Waste management projects (22%).** Of these projects, 93% involved methane collection and destruction at municipal solid waste landfills.⁴⁵
- **Forestry and land use projects (20%).** Of these projects, 86% involved improved forest management, which generally requires a landowner to forgo timber harvesting for a period of time.⁴⁶

⁴¹ CRS selected this database because its carbon offset project information is comprehensive in scope, publicly available, and easy to navigate.

⁴² Berkeley Carbon Trading Project, University of California, Berkeley, “Voluntary Registry Offsets Database,” <https://gspp.berkeley.edu/berkeley-carbon-trading-project/offsets-database>.

⁴³ See, for example, an offset protocol for this type of project from American Carbon Registry, “Destruction of Ozone Depleting Substances and High-GWP Foam,” <https://acrcarbon.org/methodology/destruction-of-ozone-depleting-substances-and-high-gwp-foam/>.

⁴⁴ See, for example, the Climate Action Reserve, “U.S. Nitric Acid Production Protocol,” <https://climateactionreserve.org/how/protocols/industrial/nitric-acid-production/>.

⁴⁵ See, for example, the Climate Action Reserve, “U.S. Landfill Protocol,” <https://climateactionreserve.org/how/protocols/waste/us-landfill/>.

⁴⁶ See, for example, American Carbon Registry, “Improved Forest Management on Non-Federal U.S. Forestlands,” https://acrcarbon.org/wp-content/uploads/2022/07/ACR-Methodology-IFM-on-Non-Federal-US-Forestlands-v2_1-20240701.pdf.

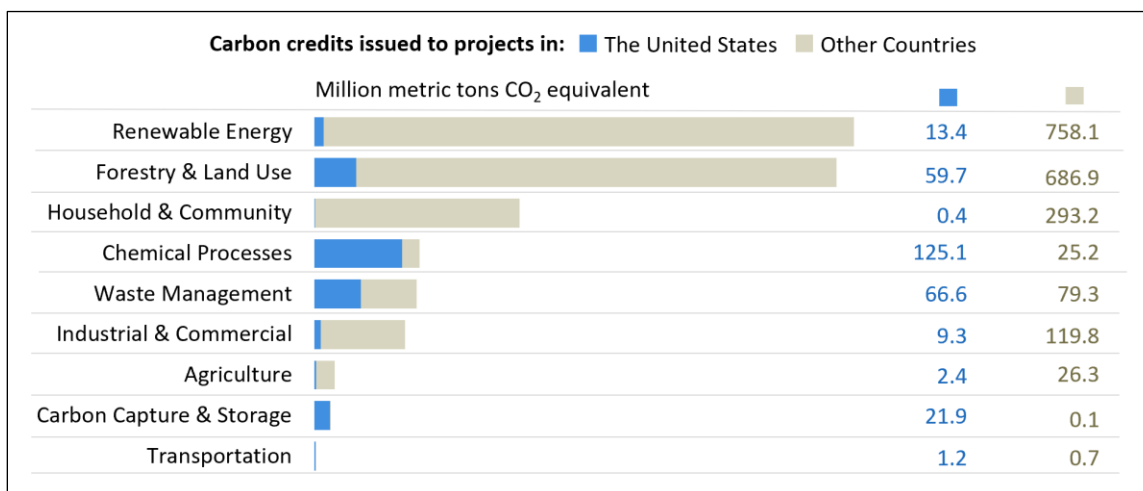
Replacement of Certain Chemicals in Refrigeration Manufacturing: A Carbon Offset Case Study

Refrigeration manufacturers may use blowing agents to create foam insulation during the appliance production process.⁴⁷ In recent years, these blowing agents have contained hydrofluorocarbons (HFCs). HFCs are GHGs with relatively high global warming potentials (GWPs).⁴⁸ Replacing the blowing agents with chemicals with a lower GWP would reduce the GHG emissions generated during the production of appliances (all else being equal). In 2016, the American Carbon Registry (ACR) developed a carbon offset protocol for this activity.⁴⁹ Between 2017 and 2025, 66 U.S. projects generated 32 million MTCO₂e of carbon offsets under this protocol. Another 24 million MTCO₂e are scheduled to be issued in subsequent years.

Pursuant to the Kigali Amendment to the Montreal Protocol,⁵⁰ the United States enacted legislation to phase-down HFC production and consumption. The American Innovation and Manufacturing Act of 2020 (AIM)⁵¹ created a schedule to reduce HFC production and consumption.⁵² This act directs the U.S. Environmental Protection Agency (EPA) to promulgate regulations prohibiting the use of certain HFCs in specific industries, including blowing agents in refrigeration manufacturing.⁵³ This prohibition took effect January 1, 2025.⁵⁴

This regulatory prohibition alters the additionality of offset projects that would replace HFC blowing agents with low-GWP substitutes. As EPA regulations effectively require refrigeration manufacturers to replace the HFC blowing agents, a carbon offset project supporting such a replacement would not likely be considered additional. As a result of this regulatory development, ACR made this protocol “inactive” as of December 31, 2024.

Figure 1. Voluntary Carbon Offsets Issued by Type of Activity and Project Location
Data from 2004 to 2025



Source: Prepared by CRS; data from Barbara K. Haya et al., Voluntary Registry Offsets Database v2025-12, Berkeley Carbon Trading Project, University of California, Berkeley, <https://gspp.berkeley.edu/berkeley-carbon->

⁴⁷ EPA, “Substitutes in Foam Blowing Agents,” <https://www.epa.gov/snap/substitutes-foam-blowing-agents>.

⁴⁸ See footnote 14.

⁴⁹ ACR, *The Transition to Advanced Formulation Blowing Agents in Foam Manufacturing and Use*, Version 1.0, April 2016, <https://acrcarbon.org/wp-content/uploads/2023/03/acr-transition-to-advanced-formula-blowing-agents-v1-0cp-1.pdf>.

⁵⁰ For more information, see United Nations Environment Programme, “The Montreal Protocol,” <https://www.unep.org/ozonaction/who-we-are/about-montreal-protocol>.

⁵¹ P.L. 116-260, §103.

⁵² For more information, see CRS In Focus IF11779, *Hydrofluorocarbon Phasedown: Background and Issues Facing Congress*, by Kathryn G. Kynett and Kristen Hite.

⁵³ EPA, “Phasedown of Hydrofluorocarbons: Restrictions on the Use of Certain Hydrofluorocarbons Under the (continued...) ”

trading-project/offsets-database. This version of the database contains all projects, issuances, and retirements through December 31, 2025.

Notes: The carbon offset projects in this figure include voluntary carbon offset projects listed globally by five major voluntary offset project registries: American Carbon Registry, Climate Action Reserve, Architecture for REDD+ Transactions, Gold Standard, and Verra. According to background information from the Berkeley Carbon Trading Project database, these registries include “almost all of the world’s voluntary market offsets.” The information in the figure does not include offsets from compliance frameworks. The database added a sixth registry (Isometric) in 2026. Data from that registry are not included in this figure.

By comparison, **Figure 1** indicates the most common project types by offset issuance in other countries involved the following:

- **Renewable energy projects (38%).** Of the renewable energy offsets, 44% involved wind energy; 31% involved hydroelectricity projects.⁵⁵
- **Forestry and land use projects (35%).** Of the forestry and land use offsets issued, 82% involved Reducing Emissions from Deforestation and Forest Degradation (REDD+) projects;⁵⁶ the “+” indicates that many of these projects included co-benefits, such as “biodiversity protection and livelihood betterment.”⁵⁷
- **Household and community projects (15%).** More than 70% of the household and community offsets involved replacing wood-fired or charcoal-fired cookstoves with less GHG-intensive cookstoves (e.g., biofuel stoves).⁵⁸

Figure 2 compares quantity of carbon offsets issued and the number of offset projects by country between 2004 and 2025. The figure lists the 10 countries that accounted for the most carbon offsets by issuance (measured in million MTCO₂e) and the number of offset projects for these countries. The figure also includes similar information for other countries, in aggregate.

As **Figure 2** illustrates, project locations in India accounted for the most offsets issued (405 million MTCO₂e) and the highest number of individual projects (1,855). Locations in the United States and China rank second and third, respectively, for the most carbon offsets issued during this time period.

American Innovation and Manufacturing Act of 2020,” 88 *Federal Register* 73098, October 24, 2023.

⁵⁴ For more information, see EPA, “Technology Transitions Program,” <https://www.epa.gov/climate-hfcs-reduction/technology-transitions-program>.

⁵⁵ For the renewable energy category, projects in India accounted for largest percentage (39%) of the offsets issued; projects in China accounted for second-largest percentage (22%) of the offsets issued.

⁵⁶ For the forestry and land use category, projects in India accounted for largest percentage (36%) of the offsets issued; projects in China accounted for second-largest percentage (21%) of the offsets issued.

⁵⁷ Berkeley Carbon Trading Project, University of California, Berkeley, “Scopes & Types,” support document for offsets database, <https://gspp.berkeley.edu/assets/uploads/page/VROD-ScopesTypes.pdf>.

⁵⁸ For example, one of the largest cookstove projects (registered with the Gold Standard) issued almost 15 million metric tons of CO₂ equivalent (MTCO₂e) for replacing cookstoves in Kenya. See Gold Standard Registry, <https://registry.goldstandard.org/projects/details/3461>.

**Figure 2. Location of Voluntary Carbon Offsets by Country:
Offsets Issued and Number of Projects**

Data from 2004 to 2025

	Carbon Offsets Issued Million metric tons CO ₂ equivalent	Number of Projects
India	404.7	1,855
United States	300.1	1,168
China	254.8	1,553
Türkiye	145.5	556
Brazil	143.7	370
Peru	97.8	71
Indonesia	97.1	86
Kenya	83.8	335
Guyana	58.4	1
Cambodia	54.1	42
Other Countries	649.7	4,159

Source: Prepared by CRS; data from Barbara K. Haya et al., Voluntary Registry Offsets Database v2025-12, Berkeley Carbon Trading Project, University of California, Berkeley, <https://gspp.berkeley.edu/berkeley-carbon-trading-project/offsets-database>. This version of the database contains all projects, issuances, and retirements through December 31, 2025.

Notes: The carbon offset projects in this figure include voluntary carbon offset projects listed globally by five major voluntary offset project registries: American Carbon Registry, Climate Action Reserve, Architecture for REDD+ Transactions, Gold Standard, and Verra. According to background information from the Berkeley Carbon Trading Project database, these registries include “almost all of the world’s voluntary market offsets.” The information in the figure does not include offsets from compliance frameworks. The database added a sixth registry (Isometric) in 2026. Data from that registry are not included in this figure.

Offset projects vary widely from country to country in terms of scale (measured in million MTCO₂e) per project. The country-specific average of offsets issued per project ranged from 0.2 million MTCO₂e per project in China to 1.4 million MTCO₂e per project in Peru. In the United States, this measure was 0.3 million MTCO₂e. As **Figure 2** indicates, Guyana is an outlier for this measure. One carbon offset project was located in Guyana between 2004 and 2025. This forestry management project is the largest offset project in the world to date,⁵⁹ issuing more than 58 million MTCO₂e with another 58 million MTCO₂e of offset credit scheduled for issuance in the future.

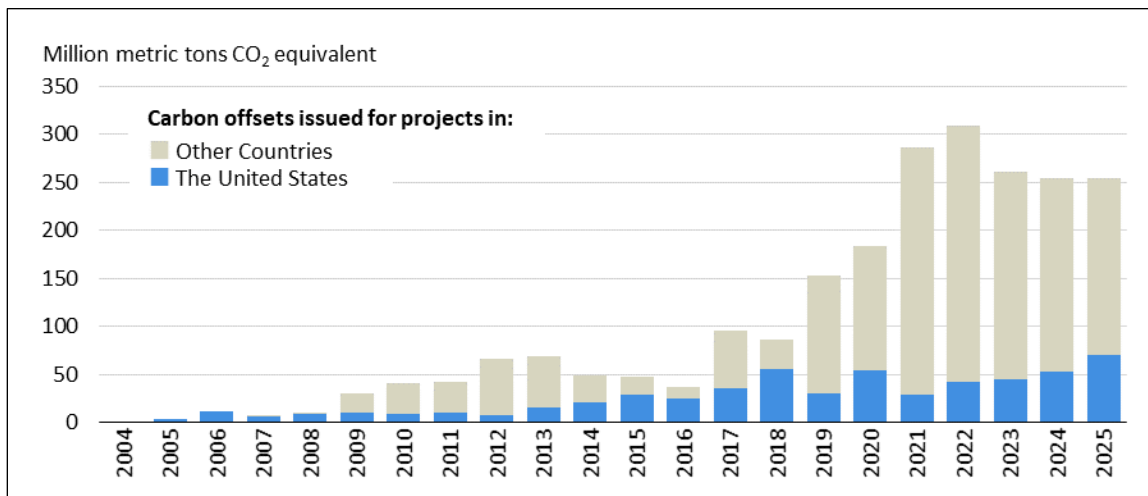
Projects Issued Per Year

Figure 3 illustrates the number of voluntary carbon offsets issued from the five voluntary registries (listed above) between 2004 and 2025. The number of issued voluntary offsets has generally increased over the last two decades, although year-to-year growth has been uneven. For example, as **Figure 3** indicates, the number of offsets issued globally increased from 36 million MTCO₂e in 2016 to 309 million MTCO₂e in 2022 and then decreased to 253 million MTCO₂e in

⁵⁹ This project was developed by the Guyana Forestry Commission and follows a protocol developed by Architecture for REDD+ Transactions (ART). This protocol is called The REDD+ Environmental Excellence Standard (TREES), <https://www.artredd.org/trees/>.

2025. In the United States, the number of offsets issued increased from 25 million MTCO₂e in 2016 to 42 million MTCO₂e in 2022 and then increased to 70 million MTCO₂e in 2025.

Figure 3. Annual Amount of Voluntary Carbon Offsets Issued from 2004 to 2025
Projects in the United States and Other Countries



Source: Prepared by CRS; data from Barbara K. Haya et al., Voluntary Registry Offsets Database v2025-12, Berkeley Carbon Trading Project, University of California, Berkeley, <https://gspp.berkeley.edu/berkeley-carbon-trading-project/offsets-database>. This version of the database contains all projects, issuances, and retirements through December 31, 2025.

Notes: The carbon offset projects in this figure include voluntary carbon offset projects listed globally by five major voluntary offset project registries: American Carbon Registry, Climate Action Reserve, Architecture for REDD+ Transactions, Gold Standard, and Verra. According to background information from the Berkeley Carbon Trading Project database, these registries include “almost all of the world’s voluntary market offsets.” The information in the figure does not include offsets from compliance frameworks. The database added a sixth registry (Isometric) in 2026. Data from that registry are not included in this figure.

As a point of comparison, the total GHG emissions in the United States in 2022 were 6,343 million MTCO₂e.⁶⁰ The U.S.-based voluntary offsets issued in 2022 were equivalent to 0.7% of total U.S. GHG emissions in 2022. In the context of global GHG emissions, researchers estimated the global GHG emissions were 49,573 million MTCO₂e in 2022.⁶¹ The aggregate voluntary offsets issued around the world in 2022 (309 million MTCO₂e) were equivalent to 0.6% of total GHG emissions.

To put these offset projects in context, the United States generated about 6.3 billion tons of GHG emissions in 2022. The quantity of GHG emissions reduced in 2022 by voluntary carbon offset projects in the United States was equivalent to 0.7% of these total emissions.

Estimates of Carbon Offset Prices

The prices of voluntary carbon offsets are not comprehensively reported by an authoritative source. Carbon registries provide information on the number of carbon offsets issued, but these registries do not provide sales price information.

⁶⁰ EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2022*, 2024, Table 2-1, <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2022>.

⁶¹ Climate Watch, World Resources Institute, “Historical GHG Emissions,” 2026, <http://www.climatewatchdata.org>.

Several organizations provide some limited price data for voluntary carbon offset projects. For example, the Ecosystem Marketplace, a nonprofit organization, conducts a periodic survey of participants in the voluntary carbon market and publishes information on carbon offset projects, including sales prices. **Table 1** lists the average sales prices per MTCO₂e for different carbon offset project types for 2023 and 2024, as reported by Ecosystem Marketplace.

Table 1. Carbon Offset Average Prices by Category in 2023 and 2024

Data from Ecosystem Marketplace Annual Survey of Market Participants

Carbon Offset Category	Average Price in 2023 (in U.S. Dollars per MTCO ₂ e)	Average Price in 2024 (in U.S. Dollars per MTCO ₂ e)
Forestry and Land Use	\$10	\$9
Renewable Energy	\$4	\$3
Chemical Processes / Industrial Manufacturing	\$4	\$4
Household / Community Devices	\$8	\$7
Waste Disposal	\$7	\$7
Agriculture	\$7	\$8
Energy Efficiency/Fuel Switching	\$4	\$3

Source: Prepared by CRS; data from Forest Trends' Ecosystem Marketplace, *State of the Voluntary Carbon Market 2025*, Table 3, 2025, <https://www.ecosystemmarketplace.com/publications/2025-state-of-the-voluntary-carbon-market-sovcm/>.

Notes: Prices in U.S. dollars per metric ton of carbon dioxide equivalent (MTCO₂e). The prices reflect carbon offset transactions throughout the world and were not adjusted for inflation.

An annual report from the World Bank also includes carbon offset prices.⁶² The categories in the World Bank report are slightly different from those used in **Table 1**, so a comparison between the two price sources is problematic. In general, the relative price differences between the different categories in **Table 1** are similar to the relative price differences in the World Bank data. For example, in both sources, projects in the forestry and land use category have the highest prices, and renewable energy projects are among the lowest prices.

In general, carbon offsets eligible for use in compliance markets fetch a higher price than voluntary carbon offsets.⁶³ For example, the price of carbon offsets used to meet countries' GHG emissions reduction obligations under the PA has been higher than offsets ineligible for these markets. The World Bank report cited examples of several countries purchasing offsets at sales prices of \$30 and \$40 per offset.⁶⁴

Federal Government Involvement

A number of U.S. federal agencies have undertaken varying degrees of activity regarding voluntary carbon offsets. Several of these actions were conducted pursuant to statutory direction

⁶² World Bank, *State and Trends of Carbon Pricing 2025*, 2025, <https://www.worldbank.org/en/publication/state-and-trends-of-carbon-pricing> (hereinafter World Bank, *Carbon Pricing 2025*).

⁶³ World Bank, *Carbon Pricing 2025*.

⁶⁴ For example, the report indicated that Switzerland paid over \$30/MTCO₂e for offsets that meet PA conditions. See World Bank, *Carbon Pricing 2025*.

or authority. Selected federal government actions are summarized below. The selected actions below are not a comprehensive list of all federal agency activity regarding carbon offsets and generally include actions taken in recent years.⁶⁵

U.S. Department of Agriculture

The Consolidated Appropriations Act, 2023 (P.L. 117-328) authorized the Secretary of the U.S. Department of Agriculture (USDA) to establish a Greenhouse Gas Technical Assistance Provider and Third-Party Verifier Program.⁶⁶ The stated intent of the program is to facilitate participation of farmers, ranchers, and private forest landowners in voluntary carbon offset markets, among other objectives. The program would evaluate and maintain a list of carbon offset agricultural and forestry-related protocols in voluntary markets and establish qualifications for third-party offset verifiers and providers of technical assistance.⁶⁷ Pursuant to this statutory authorization, USDA has taken the following actions:

- October 2023: USDA published a *Report to Congress: A General Assessment of the Role of Agriculture and Forestry in U.S. Carbon Markets*.⁶⁸ In this report, USDA examined a number of issues involving carbon offsets in the agriculture and forestry sectors.
- February 2024: USDA published a report, *Intent to Establish the Greenhouse Gas Technical Assistance Provider and Third-Party Verifier Program*.⁶⁹ In this report, USDA announced its determination to establish the program and explained its rationale for taking this action.
- May 2024: In a *Federal Register* notice, USDA requested public input to support the preparation of proposed regulations intended to implement the program.⁷⁰
- August 2024: In a *Federal Register* notice, USDA established an Advisory Council for the program and solicited public input for membership on the council.⁷¹
- January 2025: USDA published a list of members selected to serve on the Advisory Council.⁷² This list includes federal government officials and

⁶⁵ For additional information, see GAO, *Carbon Credits: Limited Federal Role in Voluntary Carbon Markets*, 2025, <https://www.gao.gov/products/gao-25-107128>.

⁶⁶ Codified at 7 U.S.C. §6712. President Biden signed the act on December 29, 2022.

⁶⁷ The act uses the phrase “agriculture or forestry credit” rather than carbon offset. The act defines this phrase as “a credit derived from the prevention, reduction, or mitigation of greenhouse gas emissions or carbon sequestration on agricultural land or private forest land that may be bought or sold on a voluntary environmental credit market.”

⁶⁸ U.S. Department of Agriculture (USDA), *Report to Congress: A General Assessment of the Role of Agriculture and Forestry in U.S. Carbon Markets*, October 2023, <https://www.usda.gov/sites/default/files/documents/USDA-General-Assessment-of-the-Role-of-Agriculture-and-Forestry-in-US-Carbon-Markets.pdf>.

⁶⁹ USDA, *Justification Report: USDA Intent to Establish the Greenhouse Gas Technical Assistance Provider and Third-Party Verifier Program*, February 2024, <https://www.usda.gov/sites/default/files/documents/GCSA-JustificationReport.pdf>.

⁷⁰ USDA, “Greenhouse Gas Technical Assistance Provider and Third-Party Verifier Program,” Request for Information, 89 *Federal Register* 46335, May 29, 2024, <https://www.govinfo.gov/content/pkg/FR-2024-05-29/pdf/2024-11424.pdf>.

⁷¹ USDA, “Greenhouse Gas Technical Assistance Provider and Third-Party Verifier Program Advisory Council: Notice of Intent To Establish Charter and Solicitation for Nominations,” 89 *Federal Register* 65836, August 13, 2024, <https://www.govinfo.gov/content/pkg/FR-2024-08-13/pdf/2024-17938.pdf>.

⁷² USDA, “GCSA Advisory Council Members,” <https://www.ams.usda.gov/rules-regulations/GCSA/advisory-council/members>.

stakeholders representing a range of perspectives, including the agricultural industry, private landowners, scientific research, and carbon markets.

- April 2025: The USDA Secretary released a memorandum directing the USDA White House Liaison Office to “provide a plan for potential consolidations, terminations, and reorganizations of all [USDA] Federal Advisory Committees.”⁷³

Since its creation in January 2025, the Advisory Council has not convened for a meeting. The April 2025 memorandum effectively paused Advisory Council activities.⁷⁴

Commodity Futures Trading Commission⁷⁵

The Commodity Futures Trading Commission (CFTC) has taken action in recent years to govern financial instruments related to carbon offsets.⁷⁶ Carbon offsets created in voluntary (and compliance) markets can serve as the underlying assets for derivatives contracts, which may include futures, options, and swaps.⁷⁷

The Commodity Exchange Act (CEA)⁷⁸ provides the CFTC with regulatory authority over derivatives trading platforms, commonly known as futures exchanges.⁷⁹ In addition, the CFTC has authority to enforce prohibitions of fraud and manipulation in commodity spot markets, though not to otherwise broadly regulate commodity spot markets.⁸⁰ The CFTC defines a *spot market* as “a market of immediate delivery of and payment for a commodity or product.”⁸¹ Although the CFTC authority focuses on derivative markets and activity, the regulation of derivatives can indirectly influence behavior in spot markets.⁸²

Carbon Offset Market Guidance

In 2022 and 2023, CFTC convened meetings with stakeholders to discuss a range of carbon offset market issues,⁸³ particularly carbon offset integrity and options to address it.⁸⁴ The CFTC stated

⁷³ Memorandum from Brooke Rollins, Secretary of Agriculture, “Restructuring of Federal Advisory Committees Within the Department of Agriculture,” Secretary’s Memorandum 1078-007, April 21, 2025, <https://www.usda.gov/sites/default/files/documents/sm-1078-007.pdf>.

⁷⁴ CRS personal communication with USDA (May 4, 2026).

⁷⁵ For more information on the Commodity Futures Trading Commission (CFTC), congressional clients may contact Rena Miller, CRS Specialist in Financial Economics. For more background, see CRS Report R48095, *Voluntary Carbon Credit Markets and the Commodity Futures Trading Commission*, by Rena S. Miller and Jonathan L. Ramseur.

⁷⁶ For more information, see CRS Report R48451, *Introduction to Derivatives and the Commodity Futures Trading Commission*, by Rena S. Miller.

⁷⁷ For a hypothetical example of a futures trade in oil, see Appendix A in International Swaps and Derivatives Association, *Role of Derivatives in Carbon Markets*, 2021, <https://www.isda.org/a/soigE/Role-of-Derivatives-in-Carbon-Markets.pdf>.

⁷⁸ The Commodity Exchange Act (CEA) was enacted in 1936 (P.L. 74-765). CEA is codified in 7 U.S.C. §§1 et seq.

⁷⁹ 7 U.S.C. §7.

⁸⁰ 7 U.S.C. §9.

⁸¹ CFTC Glossary, <https://www.cftc.gov/LearnAndProtect/AdvisoriesAndArticles/CFTCGlossary/index.htm#S>.

⁸² See, for example, Gibson, Dunn & Crutcher LLP, “CFTC Issues Proposed Guidance Regarding the Listing of Voluntary Carbon Credit Derivative Contracts,” 2023, <https://www.gibsondunn.com/cftc-issues-proposed-guidance-regarding-the-listing-of-voluntary-carbon-credit-derivative-contracts/>.

⁸³ CFTC uses the term *voluntary carbon credit* (or VCC) in its documents and activities.

⁸⁴ CFTC, “CFTC Announces Voluntary Carbon Markets Convening,” press release and meeting transcript, June 2, (continued...)

that these discussions may help the commission determine whether to issue “new or amended guidance, interpretations, or policy statements related to the voluntary carbon markets.”⁸⁵

In December 2023, the CFTC published in the *Federal Register* proposed guidance regarding voluntary carbon credit derivative contracts.⁸⁶ In October 2024, CFTC issued final guidance on these issues.⁸⁷ Among other provisions, the final guidance identified four characteristics that derivative markets should consider regarding the quality of the carbon offset derivatives:

1. transparency,
2. additionality,
3. permanence and risk of reversal, and
4. quantification.

CFTC stated that the guidance is for “illustrative purposes only” and provides “contextual information” regarding compliance with CFTC regulations.⁸⁸ Although the CFTC guidance is nonbinding and does not create new obligations, some environmental groups argued the guidance would strengthen the integrity of voluntary carbon offsets.⁸⁹ Others argued CFTC did not have the legal authority to issue the guidance and the guidance was inconsistent with the CFTC’s obligations under the Commodity Exchange Act.⁹⁰

In September 2025, the CFTC withdrew its guidance on voluntary carbon credit derivative contracts.⁹¹ The CFTC argued that the guidance did not provide carbon offset derivative markets “with any new regulatory structure or standards that resulted in the advancement of market transparency or liquidity for [carbon offset] derivatives contracts.” In addition, the CFTC stated that the guidance “placed a disproportionate focus on a particular class of derivative contracts [i.e., carbon offset derivatives], which could lead to confusion and inconsistencies in ... implementation of the CEA and Commission regulations.”⁹²

2022, <https://www.cftc.gov/PressRoom/Events/opaeventcftccarbonmarketconvene060222>; and CFTC, “CFTC Announces Second Voluntary Carbon Markets Convening on July 19,” press release and meeting transcript, July 19, 2023, <https://www.cftc.gov/PressRoom/Events/opaeventvoluntarycarbonmarkets071923>.

⁸⁵ CFTC, “CFTC Announces Second Voluntary Carbon Markets Convening on July 19,” press release and meeting transcript, July 19, 2023.

⁸⁶ CFTC, “Commission Guidance Regarding the Listing of Voluntary Carbon Credit Derivative Contracts; Request for Comment,” proposed guidance, 88 *Federal Register* 89410, December 27, 2023.

⁸⁷ CFTC, “Commission Guidance Regarding the Listing of Voluntary Carbon Credit Derivative Contracts,” final guidance, 89 *Federal Register* 83378, October 15, 2024, <https://www.govinfo.gov/content/pkg/FR-2024-10-15/pdf/2024-23105.pdf> (hereinafter “CFTC Guidance, 2024”).

⁸⁸ CFTC Guidance, 2024.

⁸⁹ See, for example, Holly Pearen (Lead Counsel Environmental Defense Fund), “CFTC Guidance will Strengthen Voluntary Carbon Credits,” press release, September 20, 2024, <https://www.edf.org/media/cftc-guidance-will-strengthen-voluntary-carbon-credits>; Clean Air Task Force, “CFTC Should Reinstate Carbon Market Guidance and Strengthen Oversight, Urges CATF,” press release, December 11, 2025, <https://www.catf.us/2025/12/cftc-should-reinstate-carbon-market-guidance-strengthen-oversight-urges-catf/>.

⁹⁰ See, for example, Alexandra Thornton, Center for American Progress, “CAP Comments on Proposed Guidance for Financial Contracts Based on Voluntary Carbon Credits,” May 9, 2025, <https://www.americanprogress.org/article/cap-comments-on-proposed-guidance-for-financial-contracts-based-on-voluntary-carbon-credits/>; and Jim Copland, Manhattan Institute, Comment Letter on CFTC Carbon Credit Derivatives Rulemaking, February 16, 2024, <https://manhattan.institute/article/comment-letter-on-cftc-carbon-credit-derivatives-rulemaking>.

⁹¹ CFTC, “Withdrawal of Commission Guidance,” 90 *Federal Register* 44321, September 15, 2025, <https://www.cftc.gov/sites/default/files/2025/09/2025-17793a.pdf>.

⁹² CFTC, “Withdrawal of Commission Guidance,” 90 *Federal Register* 44321, September 15, 2025, <https://www.cftc.gov/sites/default/files/2025/09/2025-17793a.pdf>.

Enforcement Action

In October 2024, the CFTC issued its first enforcement action against alleged fraud in the carbon offsets derivatives market.⁹³ CFTC filed a civil complaint in federal court against the CEO of a carbon offset project developing company. The complaint cites violations of the CEA and CFTC regulations. The complaint alleges the project developer made fraudulent claims about GHG emissions levels associated with a number of carbon offset projects. The carbon offsets involved cookstove projects located in several continents.⁹⁴ According to the federal court filing, the project developer was one of the largest cookstove carbon project developers in the world.⁹⁵ As discussed above (and illustrated in **Figure 1**), cookstove projects accounted for 70% of the “household and community” offset projects, the third-largest category of global carbon offset projects.

Also in October 2024, the Department of Justice filed related criminal charges against the same project developer.⁹⁶ The indictment states that the project developer provided “false and misleading information” about the number of cookstoves and “inflated the amount of emission reductions” associated with each of the cookstove projects.⁹⁷ For example, the indictment states the developer “took steps to falsely and misleadingly increase the reported number of cookstoves in place.”⁹⁸ Due to this activity, the indictment alleges that the project was credited with millions more carbon offsets than it should have received. These offsets were worth “tens of millions of dollars at then prevailing [carbon offset] prices.”⁹⁹

Federal Trade Commission

The Federal Trade Commission Act of 1914 established the Federal Trade Commission (FTC).¹⁰⁰ The act directs the FTC to prohibit “unfair or deceptive acts or practices in or affecting commerce.”¹⁰¹ To support these efforts, in 1992 the FTC published “Guides for the Use of Environmental Marketing Claims,” commonly referred to as “Green Guides.” The Green Guides provide nonbinding guidance to help marketers understand how to avoid making deceptive environmental advertising claims across a range of consumer products and marketing strategies.¹⁰²

⁹³ CFTC, “CFTC Charges Former CEO of Carbon Credit Project Developer with Fraud Involving Voluntary Carbon Credits,” press release, October 2, 2024, <https://www.cftc.gov/PressRoom/PressReleases/8994-24>.

⁹⁴ Both the civil and criminal filings were against Ken Newcombe, former CEO of C-Quest (the project developer). Reportedly, the defendant served on the board of Verra and helped develop the protocol for cookstove offsets (Washington Post, “He Helped Offset Companies’ Planet-Warming Pollution. Now He’s Accused of Fraud,” October 3, 2024).

⁹⁵ Complaint for Injunctive and Other Equitable Relief and for Civil Monetary Penalties Under the Commodity Exchange Act and Commission Regulations, *Commodity Futures Trading Commission v. Newcombe*, No. 1:24-cv-07477 (S.D.N.Y. Oct. 2, 2024), Dkt. No. 1.

⁹⁶ Department of Justice, “U.S. Attorney Announces Criminal Charges In Multi-Year Fraud Scheme In The Market For Carbon Credits,” press release, October 2, 2024, <https://www.justice.gov/usao-sdny/pr/us-attorney-announces-criminal-charges-multi-year-fraud-scheme-market-carbon-credits>.

⁹⁷ Sealed Redacted Indictment, *United States v. Newcombe*, No. 1:24-cr-00567 (S.D.N.Y. Oct. 1, 2024), Dkt. No. 2, https://www.justice.gov/d9/2024-10/indictment_-_us_v._newcombe_et_al._24_cr._567_redacted.pdf.

⁹⁸ Sealed Redacted Indictment, *United States v. Newcombe*, No. 1:24-cr-00567 (S.D.N.Y. Oct. 1, 2024), Dkt. No. 2, https://www.justice.gov/d9/2024-10/indictment_-_us_v._newcombe_et_al._24_cr._567_redacted.pdf.

⁹⁹ Sealed Redacted Indictment, *United States v. Newcombe*, No. 1:24-cr-00567 (S.D.N.Y. Oct. 1, 2024), Dkt. No. 2.

¹⁰⁰ P.L. 63-203; codified in 15 U.S.C. §§41 et seq.

¹⁰¹ 15 U.S.C. §45.

¹⁰² The Green Guides are codified in 16 C.F.R. Part 260.

The FTC has revised the Green Guides several times. In its most recent revision (2012), the FTC included a section on carbon offsets.¹⁰³ Provisions in this section address several carbon offset integrity issues, including additionality, double-counting, and measurement. In December 2022, the FTC published a *Federal Register* notice seeking public comment on the Green Guides, including the section on carbon offsets.¹⁰⁴

The FTC has taken enforcement action against a number of companies regarding environmental marketing violations. As of the date of this report, none of these actions has involved carbon offsets.¹⁰⁵

Securities and Exchange Commission¹⁰⁶

The Securities and Exchange Commission (SEC) states that its mission is to protect investors; maintain fair, orderly, and efficient markets; and facilitate capital formation.¹⁰⁷ Pursuant to this mission, the SEC issued guidance in 2010 to assist publicly listed companies in evaluating when climate change risks require disclosure to their investors and the public.¹⁰⁸ Subsequent to the 2010 guidance, the SEC determined there was a need to standardize and enhance the information available to investors.¹⁰⁹ In 2022, the SEC proposed a rule that would require companies to disclose specific climate-related information, including information about a company's use of carbon offsets.¹¹⁰

In 2024, the SEC finalized this rulemaking.¹¹¹ The final rule requires companies to disclose the aggregate amount of carbon offsets used, if the offsets were a "material component" of the company's plans to achieve climate-related targets or goals. In addition, the final rule requires a company to disclose further details about the carbon offsets, including the amount, the project type, the location, the registries used to track the offsets, and their costs.

A number of stakeholders challenged the final rule in federal court. In April 2024, the SEC announced that the compliance date of the final rule was delayed pending the completion of judicial review in consolidated legal proceedings.¹¹² In February 2025, the chairman of the SEC

¹⁰³ 16 C.F.R. §260.5. FTC, "Guides for the Use of Environmental Marketing Claims," 77 *Federal Register* 62122, October 11, 2012.

¹⁰⁴ FTC, "Guides for the Use of Environmental Marketing Claims," request for comments, 87 *Federal Register* 77766, December 20, 2022, <https://www.govinfo.gov/content/pkg/FR-2022-12-20/pdf/2022-27558.pdf>.

¹⁰⁵ Based on a search in the FTC database ("Legal Library: Cases and Proceedings"), at <https://www.ftc.gov/legal-library/browse/cases-proceedings>. In addition, a 2025 GAO report cites Federal Trade Commission (FTC) officials, who confirm this finding (GAO, *Carbon Credits: Limited Federal Role in Voluntary Carbon Markets*, 2025).

¹⁰⁶ For background information on the SEC, see CRS In Focus IF11714, *Introduction to Financial Services: The Securities and Exchange Commission (SEC)*, by Eva Su.

¹⁰⁷ SEC, "About the SEC," <https://www.sec.gov/about/mission>.

¹⁰⁸ SEC, "Commission Guidance Regarding Disclosure Related to Climate Change," 75 *Federal Register* 6290, February 8, 2010, <https://www.federalregister.gov/documents/2010/02/08/2010-2602/commission-guidance-regarding-disclosure-related-to-climate-change>.

¹⁰⁹ See Gary Gensler (former chair of the SEC), Statement on Proposed Mandatory Climate Risk Disclosures, March 21, 2022, <https://www.sec.gov/newsroom/speeches-statements/gensler-climate-disclosure-20220321>.

¹¹⁰ SEC, "The Enhancement and Standardization of Climate-Related Disclosures for Investors," proposed rule, 87 *Federal Register* 21334, April 11, 2022, <https://www.govinfo.gov/content/pkg/FR-2022-04-11/pdf/2022-06342.pdf>.

¹¹¹ The rule was signed by the Secretary of the SEC on March 6, 2024. See SEC, "The Enhancement and Standardization of Climate-Related Disclosures for Investors," 89 *Federal Register* 21668, March 28, 2024, <https://www.govinfo.gov/content/pkg/FR-2024-03-28/pdf/2024-05137.pdf>.

¹¹² SEC, "The Enhancement and Standardization of Climate-Related Disclosures for Investors; Delay of Effective (continued...)"

announced that SEC no longer supported the final rule, stating that the rule was “deeply flawed and could inflict significant harm on the capital markets and our economy.”¹¹³ In March 2025, the SEC sent a letter to the federal court, telling the court that the federal government would withdraw its defense of the final rule.¹¹⁴ In June 2026, the SEC issued a proposed rule that would rescind the 2024 final rule and its climate-related disclosure requirements.¹¹⁵

Biden Administration Interagency Principles

In May 2024, an interagency group in the Biden Administration released a set of principles for voluntary carbon markets, stating the following:

High-integrity voluntary carbon credit markets (VCMs), as well as carbon credit markets more broadly, have the potential to support decarbonization efforts within the United States and globally, accelerating net emissions reductions while reducing their cost. They can achieve this by further unlocking capital and demand for real, additional, lasting, and independently verified emissions reductions and removals.¹¹⁶

The Biden Administration stated that the intention of the principles was to foster market integrity and confidence in the carbon offset projects.¹¹⁷ The principles were divided into the following three broad categories:

- **Supply integrity.** Carbon offsets should be unique and additional, and represent real, quantifiable GHG emissions reductions or sequestration; offset projects should avoid inadvertent negative impacts on local communities or the environment.
- **Demand integrity.** Buyers of carbon offsets should first prioritize reducing emissions within their own supply chains; buyers should publicly disclose (on an annual basis) purchased, canceled, or retired offsets; public claims regarding GHG emissions reductions should rely only on carbon offset projects that meet high integrity standards.
- **Market integrity.** Stakeholders should seek to improve market functionality—for example, by improving transparency and data availability and providing for the accurate accounting and legal treatment of offsets; market participants should attempt to decrease transaction costs by addressing potential barriers to participation.

As of the date of this report, the Trump Administration has not taken action regarding the 2024 interagency principles.

Selected International Frameworks

Carbon offsets play a key role in two international climate change mitigation frameworks: the PA and the Carbon Offsetting and Reduction Scheme for International Aviation. These frameworks contain elements of both voluntary and compliance markets. These two frameworks have an evolving relationship with the broader voluntary carbon markets and may affect the types of

Date.” 89 *Federal Register* 25804, April 12, 2024, <https://www.govinfo.gov/content/pkg/FR-2024-04-12/pdf/2024-07648.pdf>.

¹¹³ Acting SEC Chairman Mark T. Uyeda, “Acting Chairman Statement on Climate-Related Disclosure Rules,” February 11, 2025, https://www.sec.gov/newsroom/speeches-statements/uyeda-statement-climate-change-021025#_ftn3.

¹¹⁴ See SEC, “SEC Votes to End Defense of Climate Disclosure Rules,” press release, March 27, 2025, <https://www.sec.gov/newsroom/press-releases/2025-58>.

¹¹⁵ SEC, “Rescission of Climate-Related Disclosure Rules,” 91 *Federal Register* 33296, June 3, 2026, <https://www.sec.gov/rules-regulations/2026/05/s7-2026-19>.

¹¹⁶ White House, Department of the Treasury, Department of Energy, and Department of Agriculture, *Voluntary Carbon Markets Joint Statement and Principles*, May 2024, <https://home.treasury.gov/system/files/136/VCM-Joint-Policy-Statement-and-Principles.pdf>.

¹¹⁷ White House et al., *Voluntary Carbon Markets Joint Statement and Principles*, May 2024, p. 4.

projects developed in future voluntary markets. These two international frameworks are discussed below.

Paris Agreement and Article 6

Article 6 of the PA includes two distinct carbon offset frameworks to help countries meet their GHG emissions reduction goals.¹¹⁸ Private entities can also participate in these offset frameworks.

The 2015 PA is the second subsidiary agreement to the United Nations Framework Convention on Climate Change (UNFCCC).¹¹⁹ The UNFCCC has been the principal multilateral treaty for cooperation among nations on GHG-induced climate change since its adoption in 1992.¹²⁰ As of the date of this report, 195 Parties have ratified, accepted, or acceded to the PA, including the United States.¹²¹ In 2025, President Trump began a process to withdraw the United States from the PA.¹²² The U.S. withdrawal went into effect January 27, 2026.¹²³ Numerous countries continue to develop and use the frameworks created by the PA.

Some elements of the PA are considered legally binding; others are not.¹²⁴ For example, the PA requires participating countries to submit NDCs. Pursuant to this obligation, the United States submitted an NDC in 2021, which included the goal of reducing net GHG emissions in the United States by 50%-52% below 2005 levels by 2030.¹²⁵ Although participating countries are required to submit NDCs, the GHG emissions targets in NDCs are considered nonbinding.¹²⁶ Article 6 of the PA provides two key offset frameworks for countries to “pursue voluntary cooperation in the implementation of their [NDCs].”¹²⁷ These two frameworks are discussed below.

PA Article 6.2

PA Article 6.2 allows countries to trade emissions reductions and removals with other countries through bilateral or multilateral agreements. PA guidance from 2021—referred to as the “Paris Rulebook”—provides implementation details for these transactions.¹²⁸ The voluntary transactions

¹¹⁸ United Nations Treaty Collection, Chapter XXVII Environment, 7.d. Paris Agreement, Paris, December 12, 2015 (hereinafter, Paris Agreement [PA]).

¹¹⁹ The PA replaced the first subsidiary agreement to the UNFCCC—the 1997 Kyoto Protocol (KP), which entered into force in 2005. The KP established legally binding targets for 37 high-income countries and the European Union (EU) to reduce their GHG emissions on average by 5% below 1990 levels during 2009-2012. The United States did not join the KP. See Kyoto Protocol to the United Nations Framework Convention on Climate Change (KP), Kyoto, December 11, 1997, U.N. Treaty Collection, Chapter XXVII Environment, 7.a (2303 U.N.T.S. 162).

¹²⁰ United Nations Framework Convention on Climate Change (UNFCCC or the Convention), New York, May 9, 1992, United Nations (U.N.) Treaty Collection, Chapter XXVII Environment, 7 (S. Treaty Doc. No. 102-38).

¹²¹ United Nations, “The Paris Agreement,” <https://www.un.org/en/climatechange/paris-agreement>.

¹²² For more information, see CRS Report R48504, *U.S. Withdrawal from the Paris Agreement: Process and Potential Effects*, by Jonathan D. Haskett.

¹²³ See United Nations, Treaty Collection, Status of the Paris Agreement, Endnote 7, https://treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en#7.

¹²⁴ See footnote 10.

¹²⁵ UNFCCC, “The United States of America—Nationally Determined Contribution. Reducing Greenhouse Gases in the United States: A 2035 Emissions Target,” <https://unfccc.int/sites/default/files/2024-12/United%20States%202035%20NDC.pdf>.

¹²⁶ See footnote 10.

¹²⁷ PA, Article 6.1.

¹²⁸ See UNFCCC/CP/2021/12/Add.1, Decision 2/CMA.3 in UNFCCC, Report of the Conference of the Parties Serving as the Meeting of the Parties to the Paris Agreement on Its Third Session, Held in Glasgow from 31 October to 13 (continued...)

in Article 6.2 are not officially described as carbon offsets, but the transaction procedures and requirements are similar to carbon offsets. For example, the guidance states that the transactions must be “real, verified, and additional” and include procedures to address concerns of double-counting the emissions reductions.¹²⁹ As of the date of this report, 65 countries have bilateral agreements with other countries to develop projects under Article 6.2, and 5 countries have transferred Article 6.2 emissions credits to other countries.¹³⁰ The first such transfer (in 2023) involved Switzerland providing financial support for an electric bus program in Thailand.¹³¹

Some countries may select the Article 6.2 approach, because its decentralization provides more flexibility for countries to design their own agreements and offset project details. Other countries may prefer to use carbon offsets produced and verified through the centralized system of Article 6.4 (discussed below). Another consideration regards timing: countries have been forming Article 6.2 agreements for several years; the Article 6.4 system is in an earlier stage of development.¹³²

PA Article 6.4

PA Article 6.4 includes a second mechanism that allows countries to generate carbon offsets and sell them through a centralized system, which is operated by a supervisory body created by the PA.¹³³ Other countries would be able to purchase the offsets and use them to meet their NDC goals. This process is known as the PA Crediting Mechanism.¹³⁴ Private parties can also purchase carbon offsets through this system.

Under this mechanism, the supervisory body approves project methodologies, registers projects in a public database, and issues carbon offsets. Similar to the Article 6.2 framework, a host country needs to make a corresponding adjustment to its GHG emissions levels when carbon offsets are first transferred to another country or party.

The Article 6.4 framework is generally considered to be a successor to the Clean Development Mechanism (CDM) of the Kyoto Protocol. In 2021, PA countries decided to allow for the conditional transfer of some CDM projects into the framework of Article 6.4. This decision and its implementation have drawn criticism from some stakeholders.¹³⁵ As discussed above, some studies found that some of the offset projects in the CDM framework produced carbon offsets with questionable integrity (e.g., were not additional).

November 2021, March 8, 2022, https://unfccc.int/sites/default/files/resource/cma2021_10a01E.pdf (hereinafter Decision 2/CMA.3).

¹²⁹ To address concerns of double-counting, Article 6.2 requires participating countries to employ “corresponding adjustments,” which are intended to account for the sale of the GHG emissions credit as it relates to each country’s NDC obligations or emissions goals (PA, Article 6.2).

¹³⁰ United Nations Environment Programme, Copenhagen Climate Center, Article 6 Pipeline, Global Data, <https://article6pipeline.unepccc.org/global-data>.

¹³¹ See, for example, Klik, “First Ever ITMOs for NDC Use,” press release, January 8, 2024, <https://www.klik.ch/en/news/news-article/first-ever-itmos-for-ndc-use>.

¹³² Beatriz Granziera et al., Article 6 Explainer, The Nature Conservancy, 2025, https://www.nature.org/content/dam/tnc/nature/en/documents/TNC_Article_6_Explainer.pdf.

¹³³ The Supervisory Body is composed of 12 members from countries participating in the PA. See United Nations, “Article 6.4 Supervisory Body,” <https://unfccc.int/process-and-meetings/bodies/constituted-bodies/article-64-supervisory-body>.

¹³⁴ Under this framework, carbon offset projects are called “Article 6 emission reductions and removals” (A6.4ERs).

¹³⁵ See, for example, Carbon Market Watch, “First Wave of Article 6 Carbon Credits Misfire Spectacularly,” April 10, 2025, <https://carbonmarketwatch.org/2025/04/10/first-wave-of-article-6-carbon-credits-misfire-spectacularly/>.

In October 2025, the supervisory body approved its first sector-specific carbon offset methodology—for flaring or use of landfill gas—for developers to use when generating offsets.¹³⁶ In February 2026, the supervisory body approved the first carbon offset project through the CDM transfer process. The project involved GHG emissions from cookstoves in Myanmar.¹³⁷

These Article 6.4 implementation developments are likely to receive special attention and scrutiny from policymakers and stakeholders, especially considering the history of the CDM (the Article 6.4 predecessor). Some groups have praised the Article 6.4 process, particularly regarding the emissions standards for cookstove projects.¹³⁸ Other groups have been more critical of the underlying assumptions and emissions calculations.¹³⁹

A number of Article 6.4 implementation details are uncertain and subject to change, including how the Article 6.4 carbon credits may be used in other frameworks. For example, under the European Union (EU) Carbon Border Adjustment Mechanism (CBAM), importers of selected, carbon-intensive products (e.g., steel, cement) are required to pay a fee to the importing EU country based on the GHG emissions associated with an imported material's production or end use.¹⁴⁰ In August 2025, the EU's European Commission¹⁴¹ proposed a regulation that would allow importers to partially adjust their CBAM fee through the purchase of Article 6.4 credits.¹⁴² The implications of this development are beyond the scope of this report.

Carbon Offsetting and Reduction Scheme for International Aviation

The International Civil Aviation Organization (ICAO) implements the Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) to limit CO₂ emissions from international flights. CORSIA allows the use of carbon offsets to address the CO₂ emissions that cannot be reduced through the use of less carbon intensive aviation fuels or technological and operational improvements.

ICAO is a United Nations agency that serves as a global forum of countries to discuss and develop international civil aviation policy.¹⁴³ The United States is one of 193 member countries that are part of the ICAO Assembly, which meets every three years. The United States also is one

¹³⁶ United Nations, "Methodologies," <https://unfccc.int/process-and-meetings/the-paris-agreement/article-6/article-64-pacm/methodologies>.

¹³⁷ United Nations, "UN Carbon Market Approves First-Ever Issuance of Credits Under the Paris Agreement," press release, February 26, 2026, <https://unfccc.int/news/un-carbon-market-approves-first-ever-issuance-of-credits-under-the-paris-agreement>.

¹³⁸ Brett Hills, "First Article 6.4 Credits Issued Under the Paris Agreement," Clear Blue Markets, 2026, <https://www.clearbluemarkets.com/knowledge-base/first-article-6.4-credits-issued-under-the-paris-agreement>.

¹³⁹ See, for example, Isa Mulder, "First Wave of Article 6 Carbon Credits Misfire Spectacularly," Carbon Market Watch, 2025, <https://carbonmarketwatch.org/2025/04/10/first-wave-of-article-6-carbon-credits-misfire-spectacularly/>.

¹⁴⁰ For background information, see CRS Report R48247, *Border Carbon Adjustments: Policy Considerations, Legislation, and Developments in the European Union*, by Jonathan L. Ramseur, Kristen Hite, and Christopher A. Casey.

¹⁴¹ The European Commission represents the interests of the EU as a whole and functions as the EU's executive.

¹⁴² European Commission, "CBAM: Call for Evidence on Emission Methodology, Free Allocation Adjustment and Carbon Price Paid in Third Countries," August 2025, https://taxation-customs.ec.europa.eu/news/cbam-call-evidence-emission-methodology-free-allocation-adjustment-and-carbon-price-paid-third-2025-08-29_en.

¹⁴³ International Civil Aviation Organization (ICAO), "About ICAO," <https://www.icao.int/about-icao>.

of 36 countries that serves on ICAO's Council, which meets more regularly to implement the assembly's policies.¹⁴⁴

In 2016, the ICAO Assembly agreed to limit annual increases in total CO₂ emissions from international civil aviation.¹⁴⁵ ICAO created the CORSIA program to achieve these emissions goals. CORSIA is a market-based framework that allows airline operators to use carbon offsets to meet their CO₂ emissions goals.¹⁴⁶ The scope of the CORSIA program includes flights that depart in one country and arrive in a different country.¹⁴⁷ During the "pilot phase" (2021-2023), the industry would limit its CO₂ emissions to the levels generated in 2019. During the "first phase" (2024-2026) and in subsequent years, the industry would limit its CO₂ emissions to 85% of 2019 levels.¹⁴⁸

The pilot and first phase of CORSIA (i.e., 2021-2026) are voluntary. The program becomes mandatory for member countries and their airlines in 2027. The United States volunteered to participate as a member country during the pilot and first phase.¹⁴⁹ To fulfill U.S. commitments, the Federal Aviation Administration (FAA) began to implement the CORSIA Monitoring, Reporting, and Verification Program in 2019.¹⁵⁰ Although participation from the U.S. aviation industry has been voluntary during the pilot and first phase, the FAA stated in July 2023 that "all major U.S. operators" are participating, accounting for 98% of CO₂ emissions from international flights originating in the United States.¹⁵¹

The CORSIA program (as administered by the FAA) involves a number of complicated process steps.¹⁵² Under CORSIA, participating airline operators monitor, report, and verify their annual CO₂ emissions. Airline operators began this process in 2019 to establish baseline CO₂ emissions data. The FAA aggregates the annual emissions data and submits them to ICAO. Approximately one year after an airline operator submits its annual emissions data to FAA, the FAA is to notify the operator how many carbon offsets the operator would need to obtain to address its emissions from the previous year. This process is scheduled to repeat for two more years. At the conclusion

¹⁴⁴ ICAO, "ICAO Council," <https://www.icao.int/icao-council>.

¹⁴⁵ Assembly Resolution A39-3. The Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) implementation requirements are contained in ICAO, *Annex 16 to the Convention on International Civil Aviation, Environmental Protection, Volume IV, Carbon Offsetting and Reduction Scheme for International Aviation*, Second Edition, July 2023, <https://elibrary.icao.int/product/229739>. The ICAO Council adopted the first edition of this volume in 2018 (hereinafter "ICAO Convention Annex 16").

¹⁴⁶ ICAO Convention Annex 16.

¹⁴⁷ See Assembly Resolution A39-3, "Consolidated Statement of Continuing ICAO Policies and Practices Related to Environmental Protection—Global Market-Based Measure (MBM) Scheme," https://www.icao.int/sites/default/files/environmental-protection/CORSIA/2017%20Seminar%20on%20CORSIA/Resolution_A39_3.pdf.

¹⁴⁸ Compliance was to be measured against the average from all international civil aviation in 2019 and 2020. Due to the effects of the Coronavirus Disease 2019 (COVID-19) pandemic on international air travel in 2020, ICAO adopted a baseline based solely on 2019 emissions for a three-year pilot phase, and a baseline of 85% of 2019 emissions for the period 2024-2035. See ICAO Convention Annex 16.

¹⁴⁹ See, for example, ICAO, *CORSIA States for Chapter 3 State Pairs*, July 2025, <https://www.icao.int/CORSIA/corsia-states-chapter-3-state-pairs>.

¹⁵⁰ Department of Transportation, Federal Aviation Administration, "8 FAA's CORSIA Monitoring, Reporting & Verification Program," 4 *Federal Register* 9412, March 14, 2019, <https://www.govinfo.gov/content/pkg/FR-2019-03-14/pdf/2019-04739.pdf>.

¹⁵¹ FAA, "Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA) Frequently Asked Questions," July 2023, <https://www.faa.gov/media/67966>.

¹⁵² These steps are detailed in ICAO Convention Annex 16 and illustrated in ICAO, "Implementation Plan Brochure," Phased Implementation Diagram, <https://www.icao.int/sites/default/files/sp-files/environmental-protection/CORSIA/Documents/CORSIA%20Brochure/2023%20Edition/CORSIA-Brochure2023-EN-WEB.pdf>

of a three-year phase (e.g., 2024-2026), operators have an additional year to cancel (i.e., retire) the carbon offsets they obtained during the previous phase.

During CORSIA's pilot phase (2021-2023), total CO₂ emissions from international aviation remained below 2019 emissions levels.¹⁵³ Therefore, airline operators did not need to obtain carbon offsets during this phase.¹⁵⁴ Total CO₂ emissions are projected to exceed 2019 emissions during the first phase (2024-2026). Thus, during the first phase, airline operators may need to purchase some amount of carbon offsets to account for the CO₂ emissions above 2019 levels. Country-specific agencies (like the FAA in the United States) are expected to notify operators of their annual offset obligations. Under CORSIA's three-year phased approach, airline operators are expected to purchase and cancel the aggregate number of offsets needed in the first phase by January 31, 2028.¹⁵⁵

CORSIA published a list of carbon offset projects it deems eligible for the CORSIA program.¹⁵⁶ For the 2024-2026 period, CORSIA allows offsets from 10 programs and registries, including the 5 offset registries that provided the data in **Figure 1**, **Figure 2**, and **Figure 3** above. Based on the April 2026 list of eligible emissions units, CORSIA will allow offsets from four registries—subject to specific conditions—for the 2027-2029 period. This list is subject to change. In prior years, CORSIA updated this list at least annually, often increasing the number of eligible programs and registries.

Activity from Nongovernmental Organizations

A number of nongovernmental organizations are involved in voluntary carbon offset markets and frameworks. In general, these organizations seek to improve the conditions of voluntary carbon markets by offering policy recommendations. Selected examples of such organizations and their actions are discussed below.

The Integrity Council for the Voluntary Carbon Market

The Integrity Council for the Voluntary Carbon Market describes itself as “a multi-stakeholder led independent governance body.”¹⁵⁷ In 2023, the council published 10 “Core Carbon Principles” for identifying “high-quality carbon credits that create real, verifiable climate impact.”¹⁵⁸ The 10 principles are broadly similar to concepts in the withdrawn CFTC 2024 final guidance.

International Organization of Securities Commissions

The International Organization of Securities Commissions (IOSCO) is an international body created in 1983 to “develop, implement, and promote adherence to internationally recognized

¹⁵³ ICAO, CORSIA data from CORSIA Central Registry, <https://www.icao.int/CORSIA>.

¹⁵⁴ ICAO, *Skyward Action, Realizing Aviation's Sustainable Future: 2025 ICAO Environmental Report*, <https://www.icao.int/sites/default/files/environmental-protection/Documents/EnvironmentalReports/2025/Final-ENV-REPORT.pdf>.

¹⁵⁵ ICAO Convention Annex 16.

¹⁵⁶ ICAO, *CORSIA Eligible Emissions Units*, ICAO Document, April 2026, https://www.icao.int/sites/default/files/environmental-protection/CORSIA/Documents/CORSIA%20Eligible%20Emissions%20Units/CORSIA-Eligible-Emissions-Units_April-2026.pdf.

¹⁵⁷ The Integrity Council for the Voluntary Carbon Market, <https://icvcm.org/>.

¹⁵⁸ The Integrity Council for the Voluntary Carbon Market, “The Core Carbon Principles,” <https://icvcm.org/core-carbon-principles/>.

standards for financial markets regulation.”¹⁵⁹ The IOSCO board is composed of financial regulators from around the world, including the chairs of the SEC and CFTC.¹⁶⁰ IOSCO has published a number of policy documents relating to carbon offsets. For example, in 2024, IOSCO published a final report on voluntary carbon offsets.¹⁶¹ The recommendations in this report are similar to those in the CFTC’s final guidance. The recommendations involve governance issues in voluntary carbon offset markets, including derivatives markets.

Voluntary Carbon Markets Integrity Initiative

Established in 2021, the Voluntary Carbon Markets Integrity Initiative (VCMI) is an international nonprofit organization with “a mission to enable high-integrity voluntary carbon markets.”¹⁶² VCMI guidance focuses on the demand side of voluntary carbon markets. The demand side of voluntary markets generally involves the participation of corporations making claims regarding their purchase and use of carbon offsets. In 2023, VCMI published Claims Codes of Practice for entities seeking to use carbon offsets to help meet their stated GHG emissions targets.¹⁶³ These codes of practice include public disclosure of GHG emissions, selection of “high quality” carbon offsets, and use of third-party verification.

Issues for Congress

Carbon offsets have been a topic of discussion and debate in both domestic and international climate change policy frameworks for several decades. On one hand, the inclusion of carbon offsets in climate policy frameworks offers a number of potential benefits. In particular, carbon offsets could potentially reduce the overall costs of achieving GHG emissions reduction goals. On the other hand, a number of carbon offset projects have generated controversy, as some studies have shown that some offsets did not produce measurable emissions reductions or sequestration.¹⁶⁴

Congressional interest in the voluntary carbon market may increase, considering recent developments and U.S. stakeholder involvement. As highlighted above, the number of offsets issued in voluntary carbon offset markets has increased five-fold over the last 10 years. U.S. stakeholders are engaged in these voluntary markets. In terms of host countries, the United States ranks second (behind India) in quantity of voluntary carbon offsets issued by project location between 2004 and 2025. In addition, recent developments, particularly in CORSIA and PA Article 6, indicate that carbon offsets may continue to play a role in international climate change policy.

Members of Congress may consider a number of issues involving voluntary carbon offsets. A central issue regards the role that voluntary carbon offsets could play in climate change mitigation policy. As discussed above, climate researchers estimate that projects, like carbon offsets, that

¹⁵⁹ International Organization of Securities Commissions (IOSCO), “About IOSCO,” https://www.iosco.org/v2/about/?subsection=about_iosco.

¹⁶⁰ See IOSCO, “Ordinary Members of IOSCO,” at <https://www.iosco.org/about/?subsection=membership&memid=1>.

¹⁶¹ IOSCO, *Voluntary Carbon Markets: Final Report*, 2024, <https://www.iosco.org/library/pubdocs/pdf/IOSCOPD774.pdf>

¹⁶² Voluntary Carbon Markets Integrity Initiative (VCMI), “VCMI Mission,” <https://vcmintegrity.org/about/>.

¹⁶³ VCMI, Claims Code of Practice, August 2025 (Version 3.1), https://vcmintegrity.org/wp-content/uploads/2025/08/VCMI-Claims-Code_2025Update_v.1.8-1.pdf.

¹⁶⁴ See, for example, Department of Justice, “U.S. Attorney Announces Criminal Charges in Multi-Year Fraud Scheme in the Market for Carbon Credits,” press release, October 2, 2024; Heidi Blake, “The Great Cash-for-Carbon Hustle,” *New Yorker*, 2023; and Carbon Trust, *Global Carbon Mechanisms Emerging Lessons and Implications*, 2009.

remove GHGs from the atmosphere may potentially support long-term GHG emissions reductions goals (e.g., net-zero emissions by 2050). Members who support these climate goals may consider how voluntary markets could be included to help support these policy goals.

For instance, Members may consider whether the voluntary carbon market warrants federal involvement, and, if so, the form this involvement could take. Recent analyses highlight the range of perspectives and uncertainty regarding the federal role in carbon offset markets.¹⁶⁵ When deciding on the scope of federal involvement regarding offset governance, policymakers would face a central trade-off between (1) addressing the potential concerns associated with voluntary carbon offsets—additionality, double-counting, permanence—and (2) the costs and potential consequences of addressing those concerns.¹⁶⁶ For example, some argue that more rigorous offset rules or oversight are unnecessary and could reduce participation in voluntary markets. Others may argue that participation could increase if federal oversight were to strengthen stakeholders’ trust in the credibility of voluntary carbon offsets.

Federal involvement in voluntary carbon markets could include a range of issues. For example, policymakers could decide to address specific elements of the carbon offset market, such as offset protocols, offset registries, third-party verification, or a combination of these elements. Within a particular issue, policymakers could consider a range of actions. For example, in the context of carbon offset protocols, policymakers could direct a federal agency to (1) establish new project protocols; (2) assess and certify existing registry protocols based on statutory priorities or agency discretion; or (3) provide guidance on what credible protocols should include. Some of these approaches may involve new statutory authority.

Several federal agencies have taken actions concerning the voluntary carbon market. Stakeholders have suggested other federal agencies could also play a role in carbon offset governance. As discussed above, some federal agencies (e.g., USDA, CFTC, SEC) undertook offset governance activities during the Biden Administration. These actions can be grouped into two general categories: technical assistance and market governance.

The USDA actions included elements of both categories. The USDA program would have provided technical assistance to stakeholders seeking to participate in the voluntary carbon market. The USDA program would also have assessed offset protocols and created qualifications for third-party offset verifiers. These USDA efforts also may have had some indirect governance effects, depending on its implementation.

The CFTC and SEC actions would have provided some degree of market governance. These activities have not continued during the Trump Administration. Members may consider restarting or modifying these efforts through statutory direction or specific authorization, or they may consider codifying the actions of the Trump Administration.

Other agency frameworks have been in place for a number of years. For example, the FTC Green Guides have included carbon offset provisions since 2021; the FTC has not taken enforcement action regarding carbon offset projects.¹⁶⁷ Some argue that policymakers could build upon this

¹⁶⁵ A 2024 National Academies of Sciences report states that “it is not clear what role government regulation should play ... in voluntary markets.” See National Academies of Sciences, Engineering, and Medicine, *Accelerating Decarbonization in the United States: Technology, Policy, and Societal Dimensions*, 2024; GAO, *Carbon Credits: Limited Federal Role in Voluntary Carbon Markets*, 2025, <https://www.gao.gov/products/gao-25-107128>.

¹⁶⁶ National Academies of Sciences, Engineering, and Medicine, *Accelerating Decarbonization in the United States: Technology, Policy, and Societal Dimensions*, 2024.

¹⁶⁷ Based on a search in the FTC database (“Legal Library: Cases and Proceedings”) at <https://www.ftc.gov/legal-library/browse/cases-proceedings>. In addition, a 2025 GAO report cites FTC officials, who confirm this finding (GAO, *Carbon Credits: Limited Federal Role in Voluntary Carbon Markets*, 2025).

existing framework by, for example, providing new authority or increased funding for FTC enforcement action.¹⁶⁸ Others may argue that the FTC lacks the technical expertise to evaluate claims regarding carbon offset projects.¹⁶⁹

In addition, Members may consider including other federal agencies in carbon offset governance. For example, some stakeholders recommend involving the EPA in carbon offset governance due to the EPA's experience implementing Clean Air Act programs that include design elements similar to carbon offsets.¹⁷⁰ EPA's experience from its Greenhouse Gas Reporting Program also could be relevant to carbon offset governance. Since 2010, this regulatory program has required a number of facilities to annually report GHG emissions to the agency.¹⁷¹ In addition, Members may consider engaging the Department of Energy, which has employees with technical expertise in a number of issues that may involve carbon offsets, including renewable energy, energy efficiency, carbon capture, and direct air capture.¹⁷²

Alternatively, Members could decide the federal government should maintain its existing, "limited" role in the voluntary market,¹⁷³ or take action to reduce the federal role. Members might cite several arguments to support maintaining or reducing federal involvement. For example, some may argue stakeholders have taken efforts in recent years to address offset credibility concerns in voluntary markets.¹⁷⁴ As discussed above, several organizations have issued best practices and guiding principles for the voluntary market. Some of these changes may have been influenced by increased market demand for higher-quality carbon offsets.¹⁷⁵

¹⁶⁸ See, for example, Erin E. Shortell et al., *Regulating the Voluntary Carbon Market: Existing Sources and Limitations of CFTC, SEC, and FTC Authority*, Institute for Policy Integrity (New York University School of Law), 2025, https://policyintegrity.org/files/publications/Regulating_the_Voluntary_Carbon_Market_Report_vF.pdf; and Nicole Franki, "Regulation of the Voluntary Carbon Offset Market: Shifting the Burden of Climate Change Mitigation from Individual to Collective Action," *Columbia Journal of Environmental Law*, 2023.

¹⁶⁹ See, for example, Erin Shortell et al., *Which Agency Should Regulate Carbon Credits in the US?*, Brookings Institution, 2026, <https://www.brookings.edu/articles/which-agency-should-regulate-carbon-credits-in-the-us/>.

¹⁷⁰ The authors of a 2026 analysis cite the requirements for major emissions sources in nonattainment areas (Clean Air Act §173; 42 U.S.C. §7503) as an example of EPA's relevant experience. See Erin Shortell et al., *Which Agency Should Regulate Carbon Credits in the US?*, Brookings Institution, 2026, <https://www.brookings.edu/articles/which-agency-should-regulate-carbon-credits-in-the-us/>.

¹⁷¹ In September 2025, EPA proposed to eliminate GHG reporting from all facilities, except for oil and natural gas sources. See EPA, "Reconsideration of the Greenhouse Reporting Program," 90 *Federal Register* 44591, September 16, 2025, <https://www.epa.gov/ghgreporting>; see also CRS In Focus IF11754, *EPA's Greenhouse Gas Reporting Program*, by Angela C. Jones.

¹⁷² Erin Shortell et al., *Which Agency Should Regulate Carbon Credits in the US?*, Brookings Institution, 2026, <https://www.brookings.edu/articles/which-agency-should-regulate-carbon-credits-in-the-us/>.

¹⁷³ GAO, *Carbon Credits: Limited Federal Role in Voluntary Carbon Markets*, 2025, <https://www.gao.gov/products/gao-25-107128>.

¹⁷⁴ See, for example, Vera Cherepanova, *Balancing Act: Integrity and Innovation in Voluntary Carbon Markets*, World Bank Ethics and Compliance Report, 2025, <https://www.worldbank.org/content/dam/documents/sanctions/other-documents/2025/apr/Cherepanova.V.CarbonMarkets.pdf>.

¹⁷⁵ Bipartisan Policy Center, *Innovation, Jobs, and Exports: America's Strategic Edge in the Voluntary Carbon Market*, 2025, <https://bipartisanpolicy.org/wp-content/uploads/2025/11/Innovation-Jobs-and-Exports-Americas-Strategic-Edge-in-the-Voluntary-Carbon-Market.pdf>.

Although these policy considerations focus on voluntary carbon offsets, in some cases the lines between voluntary and compliance frameworks may be unclear.¹⁷⁶ In particular, the CORSIA and PA carbon offset frameworks contain elements of both voluntary and compliance frameworks. These international systems have a complex and evolving relationship with the broader voluntary carbon market. Some offset market observers noted that “increasingly, these markets overlap and influence one another. Although they may continue to operate in parallel, they are no longer functioning ... independently.”¹⁷⁷

Some anticipate that the offset frameworks in CORSIA and PA Article 6 will “significantly impact the direction of the voluntary market” by providing a source of higher-quality carbon offsets.¹⁷⁸ Some argue that increased demand for PA and CORSIA offsets—from countries and airlines—could affect the availability of offsets available in the voluntary markets.¹⁷⁹ These outcomes could affect the prices of carbon offsets available in the voluntary market. Offset price increases could have a range of effects on the voluntary carbon market. For example, price increases could affect participation in the voluntary market and the types of projects developers seek to implement. Further analysis is beyond the scope of this report.

In addition, these potential effects and their timing are uncertain. Some point out that these potential effects would not take effect until the international frameworks are operating at scale, which could be several years in the future. Countries and relevant authorities continue to develop the implementation details for both the PA and CORSIA carbon offset frameworks. For example, although the PA went into effect in 2016, PA countries have continued to debate carbon offset framework issues at subsequent, annual meetings. In addition, CORSIA will likely adjust its list of eligible offset projects as it moves into its compliance phase in 2027. As CORSIA moves into its compliance phase, some observers question whether countries, particularly the United States, and airlines will continue to participate.¹⁸⁰

Policymakers may track these interactions and the effects they have on the voluntary offset markets. The results of these interactions may inform the debate regarding the role federal agencies should or should not play in voluntary markets. For instance, some may contend the CORSIA and PA developments may encourage voluntary offset providers to adopt more rigorous standards and requirements without government intervention.

¹⁷⁶ A 2021 Environmental Defense Fund (EDF) article stated, “ICAO’s CORSIA is the latest and first example with global application to thoroughly blur the line between voluntary and compliance carbon markets” (EDF, “Trends in the Voluntary Carbon Markets: Where We Are and What’s Next,” 2021, https://www.edf.org/sites/default/files/documents/trends-voluntary-carbon-markets_1.pdf).

¹⁷⁷ Beatriz Granziera et al., *Article 6 Explainer: Questions and Answers About the COP Decisions on Carbon Markets and What They Mean for NDCs, Nature, and the Voluntary and Compliance Markets*, The Nature Conservancy, 2025, https://www.nature.org/content/dam/tnc/nature/en/documents/TNC_Article_6_Explainer.pdf.

¹⁷⁸ EDF, “Trends in the Voluntary Carbon Markets: Where We Are and What’s Next,” 2021, https://www.edf.org/sites/default/files/documents/trends-voluntary-carbon-markets_1.pdf.

¹⁷⁹ See, for example, Allied Offsets, “CORSIA: Market Developments and Forecast Scenarios,” 2025, <https://alliedoffsets.com/wp-content/uploads/2025/05/AlliedOffsets-CORSIA-Forecast-report-May-2025-1.pdf>.

¹⁸⁰ See, for example, Carbon Direct, “CORSIA Phase 1: Credits, Compliance, and What Comes Next,” June 2026, <https://www.carbon-direct.com/insights/corsia-phase-1-credits-compliance-and-what-comes-next>.

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