Methane Emissions: U.S. and International Mitigation Efforts

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SUMMARY

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Methane Emissions: U.S. and International Mitigation Efforts

Methane is a greenhouse gas (GHG) emitted in part as a result of human activities. According to climate scientists, approximately 0.5°C of the net 1.1°C increase in global surface temperatures that has occurred since 1850 may be attributed to methane emissions. According to scientists, methane emissions are generally increasing around the world.

A number of stakeholders and policymakers consider mitigating (i.e., reducing or abating) methane emissions one of the most effective ways to address near-term global warming. This is due to methane's potency as a GHG—it has approximately 80 times the warming impact of carbon dioxide over 20 years—and the availability of relatively cost-effective mitigation strategies.

A number of satellites designed to monitor methane emissions have been launched in recent years. These monitoring technologies provide near real-time data to detect and address large emissions events, opportunities to enhance regulatory enforcement, and potential to improve the accuracy of greenhouse gas inventories.

The United States is engaged in a range of actions—both domestic and international efforts—that address methane emissions. Congress has enacted a number of policies intended to mitigate methane emissions, in particular from the oil and gas sector. For example, Congress addressed methane emissions through a budget reconciliation measure commonly referred to as the Inflation Reduction Act of 2022 (IRA; P.L. 117-169), which allocated funding to assist the oil and gas sector in reducing methane emissions, introduced a charge on methane emissions from oil and gas facilities, and required the U.S. Environmental Protection Agency to revise Greenhouse Gas Reporting Program regulations focusing on the oil and gas industry.

The United States participates in a range of international efforts that seek to reduce global methane emissions, including the Paris Agreement (PA) obligations under the United Nations Framework Convention on Climate Change and the Global Methane Pledge (GMP). The Trump Administration has announced the withdrawal of the United States from the PA. The GMP is a voluntary commitment to reduce global anthropogenic methane emissions (i.e., those caused by human activities) by at least 30% from 2020 levels by 2030. The United States is engaging in a number of collaborative efforts with international partners—including through bilateral agreements and participation in international coalitions and working groups—to facilitate methane mitigation.

National governments have developed a number of methane mitigation policies and initiatives. These policies range from national plans with no binding legal requirements and targets, to incentive programs, to regulations with binding requirements. The policies may be of interest to Members considering mitigation options in the United States.

Congress may consider what, if any, actions to take on methane emissions. Some Members support stronger measures to address methane emissions from fossil fuels, agriculture, and waste management. Members could explore options such as continuing federal agency initiatives, accelerating regulatory actions, or increasing funding for methane detection and mitigation. Others advocate for rolling back existing regulations, citing economic and competitiveness concerns. Some Members have proposed repealing the methane emissions charge in the IRA, limiting federal agency authority, or reducing funding for methane reduction.

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Introduction

Methane is a potent but short-lived greenhouse gas (GHG).[1] According to climate scientists, approximately 0.5°C of the net 1.1°C increase in global surface temperatures that has occurred since 1850 may be attributed to methane emissions.[2] Scientists estimate *anthropogenic* sources (i.e., human activities) account for 55%-70% of total global methane emissions. The remaining emissions are from natural sources, such as wetlands.[3] The main sources of anthropogenic methane emissions are agriculture activities, fossil fuel production, and waste management.[4]

Some policymakers and stakeholders contend that reducing near-term global warming is an important climate change goal and that mitigating methane is one of the best opportunities to achieve this objective. Technically feasible and relatively cost-effective methane mitigation strategies are available.[5] In addition to climate impacts, mitigating methane emissions provides public health and environmental benefits, such as improving air quality by reducing ground-level ozone formation.[6]

In 2024, the U.S. Environmental Protection Agency (EPA) stated that near-term methane mitigation—combined with longer-term efforts to address carbon dioxide (CO_2)—would play a key role in avoiding global average temperatures that exceed the targets set by the Paris Agreement (PA).[7] In its 2024 nationally determined contribution (NDC) under the PA, the United

[1] Intergovernmental Panel on Climate Change (IPCC), *Climate Change 2021—The Physical Science Basis: Working Group I Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, ed. V. Masson-Delmotte et al. (Cambridge University Press, 2023), pp. 817-922, https://doi.org/10.1017/9781009157896.

[2] According to the IPCC Sixth Assessment Report (AR6), global surface temperature was 1.09°C (0.95°C to 1.20°C) higher in 2011-2020 than in 1850-1900. The likely range of total human-caused global surface temperature increase is 0.8°C to 1.3°C, with a best estimate of 1.07°C. Contributions from emissions to the 2010-2019 warming relative to 1850-1900 assessed from radiative forcing studies are as follows: CO_2: 0.8°C (0.5°C to 1.2°C); methane: 0.5°C (0.3°C to 0.8°C); nitrous oxide: 0.1°C (0.0°C to 0.2°C); and fluorinated gases: 0.1°C (0.0°C to 0.2°C). Other human drivers (principally aerosols) contributed a cooling of 0.0°C to 0.8°C, natural (solar and volcanic) drivers changed global surface temperature by ±0.1°C, and internal variability changed it by ±0.2°C. For more information on observed warming and its causes, see IPCC, *Climate Change 2023: Synthesis Report—Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, ed. H. Lee and J. Romero, 2023, pp. 35-115, p. 42, https://doi.org/10.59327/IPCC/AR6-9789291691647.

[3] Marielle Saunois et al., "Global Methane Budget 2000-2020," *Earth System Science Data*, preprint 2024, p. 53 (hereinafter Saunois et al., "Global Methane Budget," 2024).

[4] For more information regarding sources of global methane emissions, see United Nations Environment Programme (UNEP) and Climate and Clean Air Coalition (CCAC), *Global Methane Assessment: Benefits and Costs of Mitigating Methane Emissions*, 2021, https://www.ccacoalition.org/resources/global-methane-assessment-full-report (hereinafter UNEP and CCAC, *Global Methane Assessment*, 2021).

[5] U.S. Environmental Protection Agency (EPA), *Global Non-CO_2 Greenhouse Gas Emission Projections and Mitigation 2015-2050*, October 2019, https://www.epa.gov/sites/default/files/2019-09/documents/epa_non-co2_greenhouse_gases_rpt-epa430r19010.pdf; UNEP and CCAC, *Global Methane Assessment*, 2021.

[6] Methane is a primary precursor to the formation of tropospheric ozone (i.e., smog). Tropospheric ozone is itself a GHG and an air pollutant that harms human and ecosystem health. For more information, see UNEP and CCAC, *Global Methane Assessment*, 2021.

[7] For example, according to EPA, "Methane mitigation provides one of the best opportunities for reducing near-term warming and offers important climate benefits." Further, "In the oil and gas sector, methane reductions are highly achievable and cost-effective using existing and well-known solutions and technologies that actually result in recovery of saleable product." See EPA, "Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review," 89 *Federal Register* 16820, March 8, 2024.

States set a target to reduce GHG emissions by 61%-66% below 2005 levels by 2035.[8] The NDC states the following:

> While this submission does not set NDC sub-targets for individual gases, the United States anticipates, as part of achieving its 2035 NDC emissions target, methane reductions of at least 35 percent from 2005 levels in 2035. Cutting methane emissions is among the fastest ways to reduce near-term warming and is an essential complement to carbon dioxide (CO_2) mitigation.

In 2025, President Trump signed an executive order directing the United States to withdraw from the PA.[9] The PA allows for any party to voluntarily withdraw by providing written notice to the United Nations, and that withdrawal becomes effective one year after notice is received.

The United States has a range of methane mitigation policies in place, including some that have been in place for years and others that have been recently developed. For example, a budget reconciliation measure in the 117th Congress—commonly referred to as the Inflation Reduction Act of 2022 (IRA; P.L. 117-169)—included several provisions that address methane emissions, particularly a fee on methane emissions from specific sources that went into effect in 2024.[10] Some Members in the 118th Congress proposed further efforts to mitigate methane emissions. Other Members supported efforts to modify or repeal some of the recently enacted policies, particularly some of the IRA provisions.

In addition to domestic efforts, the United States is a party to a number of multilateral and bilateral initiatives that address climate change issues and methane emissions in particular. Some Members of Congress may be interested in international efforts to mitigate methane emissions, particularly given the United States' leadership role in certain international initiatives, such as the Global Methane Pledge (GMP). Congress may want to assess the effects of these initiatives and consider changes to existing initiatives or support for different or new international initiatives. Congress may also wish to assess the scale and extent of current U.S. policies related to methane and determine what additional domestic actions, if any, should be taken to further the objectives of these international efforts.

This report begins with background information on methane emissions, both globally and within the United States. This background information also discusses methane mitigation technologies and policies and recent advances in methane monitoring. The report then provides an overview of U.S. policies, including recently enacted and proposed legislation. Subsequent sections discuss the range of international efforts to mitigate methane emissions. These include multilateral and bilateral initiatives, as well as selected examples of methane policies in specific countries. The report concludes with considerations for Congress.

[8] United Nations Framework Convention on Climate Change (UNFCCC), *Nationally Determined Contribution: United States of America*, December 19, 2024, https://unfccc.int/sites/default/files/2024-12/United%20States%202035%20NDC.pdf (hereinafter U.S. NDC, 2024).

[9] Executive Order 14162, "Putting America First in International Environmental Agreements," 90 *Federal Register* 8455, January 20, 2025.

[10] For more information, see CRS Report R47206, *Inflation Reduction Act Methane Emissions Charge: In Brief*, by Jonathan L. Ramseur.

Background

Effects of Methane Emissions

Methane is a more potent GHG than CO_2, ton-for-ton, with a global warming potential (GWP) approximately 80 times more than CO_2 for the first 20 years, and 30 times more in the 100 years after it is emitted to the atmosphere.[11] In other words, methane has approximately 80 times the warming impact compared to CO_2 over a 20-year period and 30 times the impact over a 100-year period.[12]

Methane is considered a short-lived climate pollutant. Methane remains in the atmosphere for approximately 12 years after it is emitted. Reducing methane emissions in the near term can provide a more immediate impact on climate change compared with similar reductions of other GHGs, particularly CO_2.

Some methane mitigation efforts can also provide health benefits by improving air quality and reducing exposure to pollutants. In addition to affecting climate, methane contributes to the formation of tropospheric ozone (i.e., ground-level ozone).[13] Tropospheric ozone affects air quality and can harm human health by causing respiratory issues and aggravating cardiovascular diseases. Tropospheric ozone can also damage vegetation, such as crops and forests. Additionally, the combustion of methane in gas appliances can contribute to indoor air pollution by releasing pollutants such as nitrogen oxides, which may exacerbate asthma and other respiratory conditions.[14]

Global Methane Emissions

The concentration of methane in the atmosphere has more than doubled since 1750.[15] Scientists attribute this increase to human activities.[16] **Figure 1** illustrates historical concentrations of methane in the atmosphere from ice core data (1010-1992) and modern concentrations of

[11] Global warming potential (GWP) is an index that allows comparisons of the heat-trapping ability of different greenhouse gases (GHG) over a period of time. For more information regarding GWP, see EPA, "Understanding Global Warming Potentials," August 8, 2024, https://www.epa.gov/ghgemissions/understanding-global-warming-potentials. According to the IPCC *Sixth Assessment Report*, methane has a GWP of 81.2 over a 20-year period. When averaged over a 100-year time period—the time period often used in annual GHG inventories—methane's GWP is 27.9 times greater than that of an equivalent mass of CO_2. For more information, see C. Smith et al., "2021: The Earth's Energy Budget, Climate Feedbacks, and Climate Sensitivity Supplementary Material," in IPCC, *Climate Change 2021—The Physical Science Basis: Working Group I Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, ed. V. Masson-Delmotte et al. (Cambridge University Press, 2023), Table 7.SM.7, https://doi.org/10.1017/9781009157896.

[12] The 20-year and 100-year GWP values for some GHGs differ depending how long they persist in the atmosphere. For a gas present in the atmosphere for a short period of time after emission, the 20-year GWP will be larger than the 100-year GWP. The 20-year GWP value for methane reflects this and is larger than the 100-year GWP value, which spreads the measure of the same warming effect over 100 years.

[13] UNEP and CCAC, *Global Methane Assessment*, 2021.

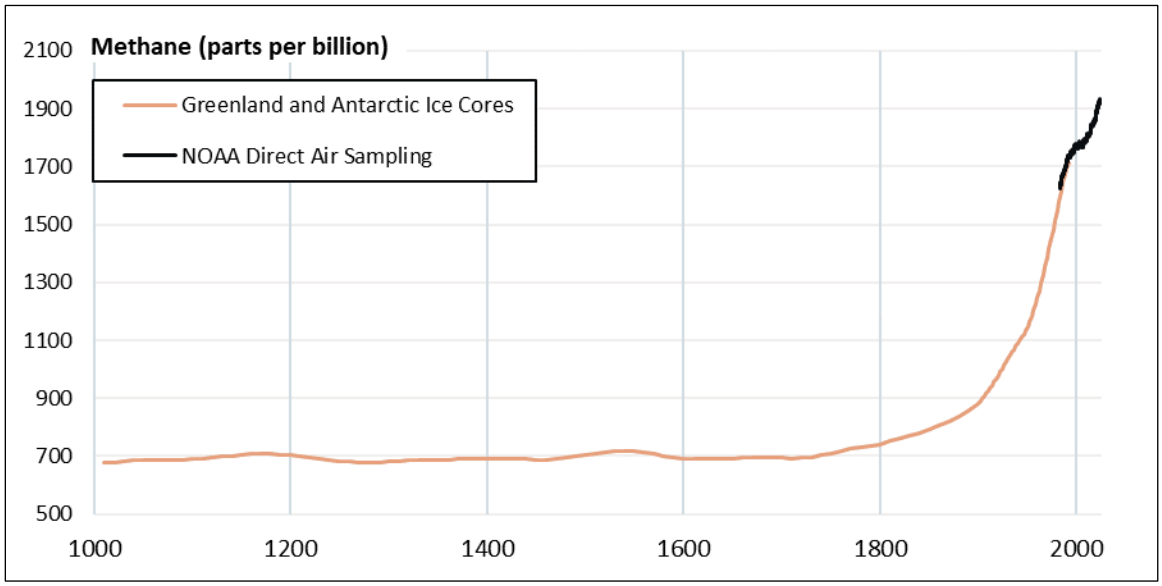
[14] Eric D Lebel et al., "Methane and NOx Emissions from Natural Gas Stoves, Cooktops, and Ovens in Residential Homes," *Environmental Science and Technology*, vol. 56, no. 4 (January 2022), pp. 2529-2539.

[15] The term *concentration* is derived from wet chemistry, and is commonly used when discussing methane in the atmosphere in lieu of the gas-specific terms *mole fraction* and *mixing ratio*.

[16] C. Smith et al., "2021: The Earth's Energy Budget, Climate Feedbacks, and Climate Sensitivity Supplementary Material," in IPCC, *Climate Change 2021—The Physical Science Basis: Working Group I Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, ed. V. Masson-Delmotte et al. (Cambridge University Press, 2023), https://doi.org/10.1017/9781009157896.

methane in the atmosphere (1983-2024).[17] Over the last decade, methane concentrations in the atmosphere have increased at an accelerating rate and are greater than at any time in at least 800,000 years.[18]

Figure 1. Atmospheric Concentrations of Methane, 1010-2024



Source: Prepared by CRS; data from D. M. Etheridge et al., "Atmospheric Trace-Gas Variations as Revealed by Air Trapped in an Ice Core from Law Dome, Antarctica," *Annals of Glaciology*, vol. 10 (1988), pp. 28-33; National Oceanic and Atmospheric Administration (NOAA) direct air sampling data available at NOAA, "Trends in CH4," and the NOAA Global Monitoring Laboratory.

While estimates of the total concentration of methane in the atmosphere are based on decades of direct measurements, estimating the individual contributions from specific sources or regions is more challenging and involves greater uncertainties.[19] The relative contributions of anthropogenic sources are generally similar across studies using different methodologies.[20] For example, studies indicate that anthropogenic sources contribute approximately 55%-70% of total global methane emissions. The remaining emissions are from natural sources, such as wetlands, where microbes break down organic matter in *anaerobic* (i.e., low-oxygen) conditions—producing methane.[21]

[17] Scientists determine historical methane atmospheric concentration levels by analyzing air bubbles trapped in ice cores from Antarctica and Greenland, which preserve a record of past atmospheric composition. D. M. Etheridge et al., "Atmospheric Trace-Gas Variations as Revealed by Air Trapped in an Ice Core from Law Dome, Antarctica," *Annals of Glaciology*, vol. 10 (1988), pp. 28-33.

[18] The oldest ice cores for which there are data available date back to 800,000 years ago. C. Smith et al., "2021: The Earth's Energy Budget, Climate Feedbacks, and Climate Sensitivity Supplementary Material," in IPCC, *Climate Change 2021—The Physical Science Basis: Working Group I Contribution to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, ed. V. Masson-Delmotte et al. (Cambridge University Press, 2023), https://doi.org/10.1017/9781009157896.

[19] Saunois et al., "Global Methane Budget," 2024.

[20] Saunois et al., "Global Methane Budget," 2024.

[21] Other natural sources include freshwater systems, geologic and ocean sources, and terrestrial permafrost. Human activities can also influence methane emissions from sources categorized as natural sources. For more information regarding estimates of anthropogenic and natural sources of methane emissions, see Saunois et al., "Global Methane Budget," 2024, p. 53.

Scientists generally agree on the main sources of global anthropogenic methane emissions. One assessment is provided by the Global Methane Budget, which synthesizes research and tracks emissions trends.[22] According to the Global Methane Budget, the main sources of anthropogenic methane emissions are from activities in the agriculture (40%), fossil fuels (35%), and waste management (20%) sectors.[23]

The main agricultural sources of global methane emissions are livestock and rice cultivation. Livestock (e.g., cattle) produce methane during digestion, and manure can also release methane under certain storage conditions. Rice paddies emit methane due to the anaerobic conditions created by flooding during cultivation.

Methane emissions from the energy sector are mainly from fossil fuel production. Methane is co-produced with oil and is the primary component of natural gas. Methane may be emitted into the atmosphere through both unintentional (i.e., *fugitive emissions*) and intentional releases. For example, methane is emitted from leaking infrastructure and as the result of flaring and venting. Methane may be released at various stages of oil production, refinement, transportation, and storage. As a main component of natural gas, methane emissions occur during production, processing, storage, transmission, and distribution. Methane emissions can also occur from natural gas appliances such as gas stoves, water heaters, and building heating systems, primarily due to leaks.[24] Methane is naturally present in coal seams and can be released during coal extraction.

Methane emissions occur in the waste sector when organic waste, such as food and yard waste, decompose under anaerobic conditions in landfills, and similarly from sewage treatment at wastewater treatment facilities.

U.S. Methane Emissions

According to the EPA, methane is the second-most-prevalent GHG emitted in the United States (behind CO_2), accounting for an estimated 11% of total GHG emissions in the United States in CO_2 equivalents (CO_2e) (see **Figure 2**).[25]

[22] Saunois et al., "Global Methane Budget," 2024.

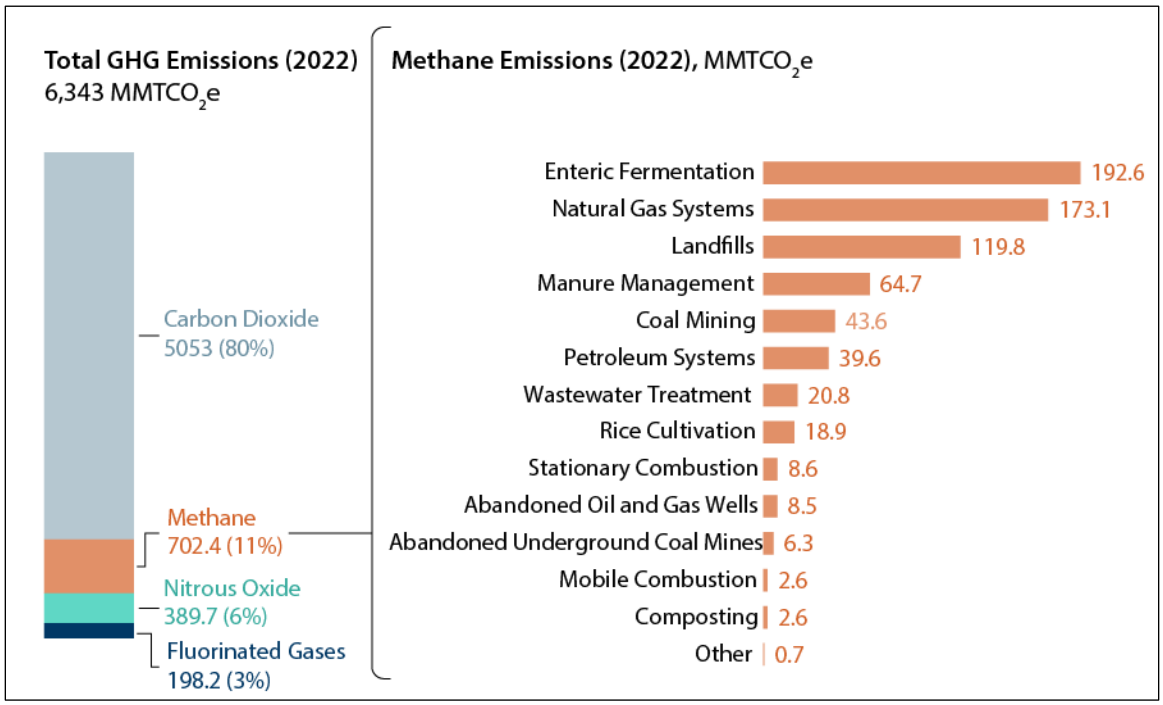
[23] According to the Global Methane Budget, a synthesis of available science, studies using various methodologies—such as atmospheric measurements with inversion modeling ("top-down") and inventories with activity data ("bottom-up")—reach similar conclusions about the relative contributions of agriculture, fossil fuels, and waste to global methane emissions. For more information, see Saunois et al., "Global Methane Budget," 2024.

[24] Eric D. Lebel et al., "Methane and NOx Emissions from Natural Gas Stoves, Cooktops, and Ovens in Residential Homes," *Environmental Science and Technology*, vol. 56, no. 4 (January 2022), pp. 2529-2539; Zachary Merrin and Paul W. Francisco, "Unburned Methane Emissions from Residential Natural Gas Appliances," *Environmental Science and Technology*, vol. 53, no. 9 (March 2019), pp. 5473-5482; Eric D. Lebel et al., "Quantifying Methane Emissions from Natural Gas Water Heaters," *Environmental Science and Technology*, vol. 54, no. 9 (April 2020), pp. 5737-5745.

[25] CO_2e is a unit used to express the GWP of different GHGs in terms of the amount of CO_2 that would have the same warming effect over a specific time period, typically 100 years. For more information, see EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2022*, 2024, Table ES-2, https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2022.

Figure 2. U.S. Total Greenhouse Gas (GHG) Emissions by Gas, and Sources of Methane Emissions

2022 Emissions Estimates in Million Metric Tons of Carbon Dioxide Equivalents ($MMCOT_2e$)



Source: Prepared by CRS with data from U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2022*, Table ES-2, https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2022/.

Between 1990 and 2022, EPA estimates U.S. methane emissions decreased by approximately 19% (see **Figure 3**).

EPA estimates methane emissions as part of its national inventory of GHG emissions (U.S. GHG Inventory).[26] The U.S. GHG Inventory is submitted to the United Nations as part of the U.S. commitment under the UNFCCC and the PA. It is developed as a "bottom up" inventory consistent with UNFCCC requirements and Intergovernmental Panel on Climate Change (IPCC) guidelines to ensure comparability among national inventories.[27] "Bottom-up" refers to the methodology of calculating emissions based on activity data (e.g., fuel consumption, livestock populations, waste generation) and applying emissions factors that estimate the emissions associated with those activities. This approach relies on detailed, sector-specific data collected at the source level.

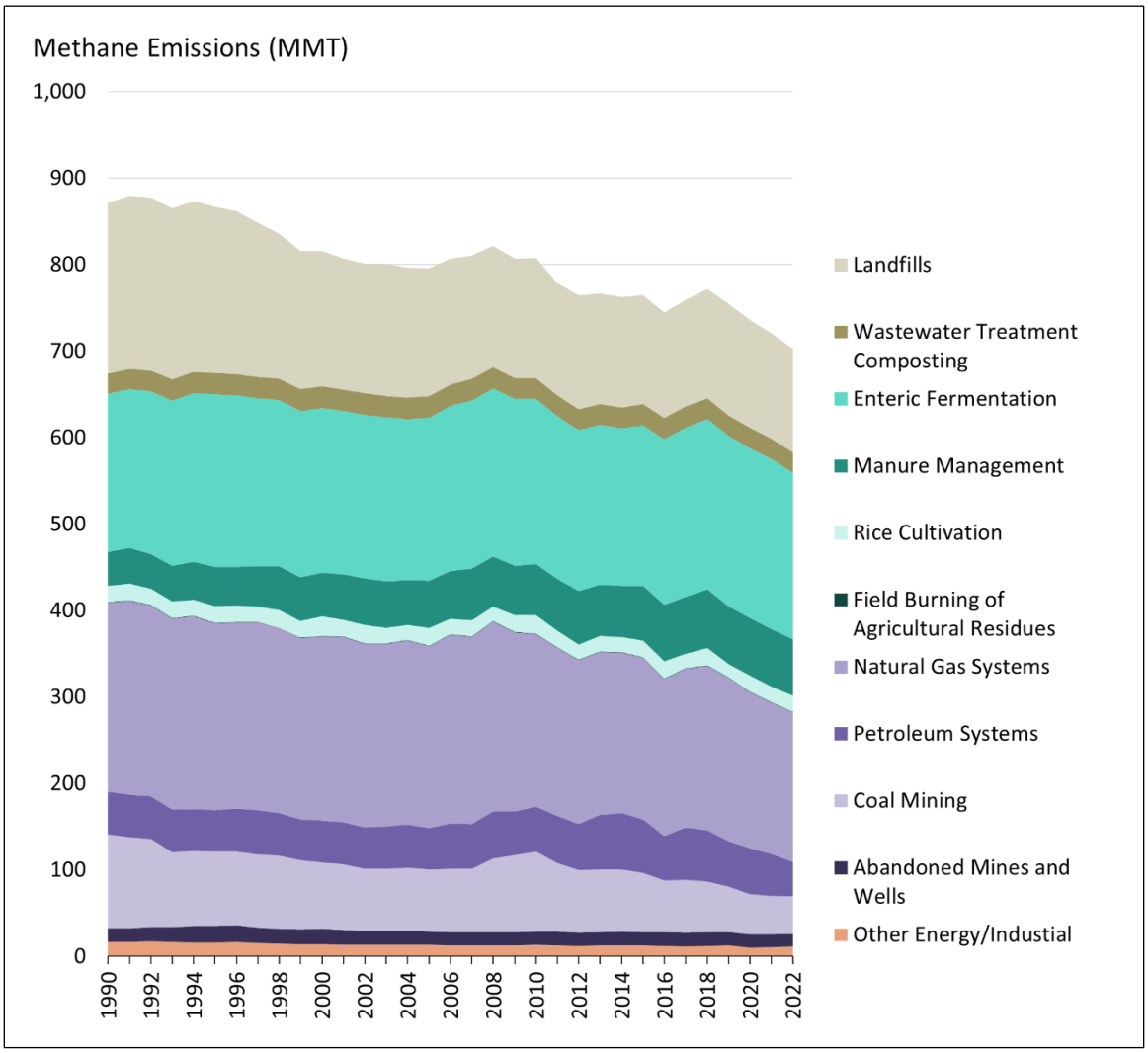
Bottom-up inventories have some limitations. These include uncertainties in activity data or emissions factors, which may not fully capture actual emissions. Additionally, bottom-up methods may miss emissions that are difficult to measure or account for, such as fugitive emissions from natural gas systems or certain agricultural practices.

[26] For more information, see EPA, "Inventory of U.S. Greenhouse Gas Emissions and Sinks," last updated November 22, 2024, https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks.

[27] For more information, see United Nations (UN), "Reporting Requirements," https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review-under-the-convention/greenhouse-gas-inventories-annex-i-parties/reporting-requirements.

Figure 3. U.S. Methane Emissions and Sources, 1990-2022

In millions of metric tons (MMT)



Source: Prepared by CRS with data from the U.S. Environmental Protection Agency, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2022. 430-R-24-004*, April 11, 2024, Table 2.1.

Some stakeholders have criticized the EPA emissions estimates for underestimating emissions from certain sources, and some studies have produced conflicting estimates.[28] For example, some studies found EPA underestimates methane leaking from U.S. oil and gas operations by as much as 50%. In addition, recent research using satellite observations found methane emissions from landfills at higher levels than EPA estimates.[29]

[28] See, for example, Jeffrey S. Rutherford et al., "Closing the Methane Gap in US Oil and Natural Gas Production Emissions Inventories," *Nature Communications* (2021); and Ramon Alvarez et al., "Assessment of Methane Emissions from the U.S. Oil and Gas Supply Chain," *Science*, June 2018.

[29] Hannah Nesser et al., "High-Resolution US Methane Emissions Inferred from an Inversion of 2019 TROPOMI Satellite Data: Contributions from Individual States, Urban Areas, and Landfills," *Atmospheric Chemistry and Physics*, vol. 24, no. 8 (April 2024).

According to EPA, "EPA has engaged with researchers on how remote sensing, ambient measurement, and inverse modeling techniques for estimating greenhouse gas emissions could assist in improving the understanding of inventory estimates."[30]

Further discussion of these estimates is beyond the scope of this report.

Methane Mitigation: Technologies and Management Practices

A variety of strategies are available to mitigate anthropogenic methane emissions. This section identifies mitigation options in the agricultural, fossil fuel, and waste sectors.[31]

Some methane mitigation measures in specific economic sectors may be more cost-effective than methane mitigation measures in other sectors, or than mitigation measures for other GHGs.[32] Technologies that capture and repurpose methane can offer a dual benefit of reducing emissions while potentially creating economic value by converting methane into energy or other useful products.

There are challenges to mitigating methane and implementing these strategies. One obstacle is the upfront investments may not be readily available. The costs and complexities of monitoring methane emissions, particularly from diffuse or remote sources, can make it difficult to prioritize mitigation efforts—both at the policy level and for individual sites—and to verify whether the mitigation strategies achieved their intended outcomes. In some regions, a lack of infrastructure or technical expertise, and limited awareness (e.g., of the amount of methane emissions occurring, of the value of methane reduction, and of available mitigation strategies) present challenges.

Currently, methane-specific policies directly target sources responsible for approximately 13% of global methane emissions, with much of this coverage concentrated in North America, Europe, and the Asia-Pacific.[33] These policies generally target emissions from fossil fuels, which are more prevalent in these regions and focus on technologies like leak detection, repair programs, and flaring reduction measures.

Currently, no technologies directly remove methane from the atmosphere.[34] Without such technologies, the only available approach to address the climate impact of methane is to prevent or reduce emissions (i.e., mitigation).

Methane Mitigation in the Agriculture Sector

In the agriculture sector, methane mitigation strategies include changes in practices and operations, as well as technological approaches. These strategies include targeted changes in

[30] EPA, *Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2022*, 2024, p. ES-27, https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2022.

[31] UNEP and CCAC, *Global Methane Assessment*, 2021.

[32] In the context of climate policy, *cost effectiveness* refers to a quantitative method or metric for comparing the costs of mitigation strategies, typically as the amount of GHG emissions reduced per dollar. For more information, see U.S. Department of Agriculture (USDA), "Cost-Effectiveness and Policy Design," https://www.ers.usda.gov/topics/natural-resources-environment/environmental-quality/cost-effectiveness-and-policy-design/.

[33] Maria Olczak et al., "A Global Review of Methane Policies Reveals That Only 13% of Emissions Are Covered with Unclear Effectiveness," *One Earth*, vol. 6, no. 5 (May 2023), pp. 519-535.

[34] National Academies of Sciences, Engineering, and Medicine, *A Research Agenda Toward Atmospheric Methane Removal* (Washington, DC: The National Academies Press, 2024), https://doi.org/10.17226/27157.

practices or operations specifically aimed at reducing emissions, such as improving manure management for livestock and water management in rice cultivation. For example, manure management strategies include reducing the time manure is stored under anaerobic conditions by frequently removing it from barns and applying it to fields. Water management strategies for rice cultivation include using alternate wetting and drying to reduce continuous flooding and composting rice straw instead of flooding fields. In addition, farming practices that lower GHG emissions and support other environmental goals, such as rotational grazing, can also help reduce methane emissions. Technological approaches include existing technologies such as dairy digesters, which capture methane from manure and convert it into biogas for energy use, as well as emerging options such as methane-reducing feed additives that inhibit methane production during digestion in livestock.[35]

Some of these approaches may provide direct benefits to agricultural producers in addition to reducing methane emissions. For example, dairy digesters capture methane from manure and convert it into biogas, which can be processed into renewable natural gas (RNG) for injection into pipelines or used on-site for electricity or heat. By using captured biogas for on-site energy generation, farms can in theory reduce energy costs or sell surplus energy to the grid, creating an economic benefit for farmers.

The cost-effectiveness of methane mitigation strategies in agriculture is generally lower than in the oil and gas sector, according to global assessments.[36] Challenges to implementing methane mitigation strategies in the agriculture sector include the additional labor, time, and costs required to implement these methods, and access to capital. In some cases, there is also limited access to technical knowledge or incentives to adopt these practices. For rice cultivation, implementing strategies like alternating wetting and drying can be constrained by water availability, infrastructure, or familiarity with the technique.

Methane Mitigation in the Fossil Fuel Sector

According to a 2021 assessment by the United Nations Environment Programme (UNEP) and the Climate and Clean Air Coalition (CCAC), the fossil fuel sector contains the greatest potential to mitigate methane emissions globally.[37] This is primarily due to the high volume of methane emissions from oil and gas operations and the fact that a large portion of these emissions can be reduced with existing leak detection and repair methods, often at low or even negative cost (as discussed below). Mitigation strategies in this sector focus on detecting and preventing leaks throughout the production, processing, and transportation of fossil fuels; limiting intentional releases from venting; reducing flaring; and capturing methane for use as an energy source. In addition, some state and local jurisdictions have pursued policies to phase out natural gas use in buildings—such as by including bans on gas connections in new construction—to reduce reliance on fossil fuels and limit methane emissions associated with natural gas appliances.[38]

[35] EPA, "Practices to Reduce Methane Emissions from Livestock Manure Management," last updated July 30, 2024, https://www.epa.gov/agstar/practices-reduce-methane-emissions-livestock-manure-management; Tenzin Tseten et al., "Strategies to Mitigate Enteric Methane Emissions from Ruminant Animals," *Journal of Microbiology and Biotechnology*, vol. 32, no. 3 (March 2022), pp. 269-277.

[36] UNEP and CCAC, *Global Methane Assessment*, 2021.

[37] UNEP and CCAC, *Global Methane Assessment*, 2021.

[38] For example, states such as California, New York, and Washington, along with cities like Berkeley, CA, and New York City, have implemented or proposed policies to restrict natural gas use in new buildings. Additionally, in 2024, nine states and Washington, DC, signed a memorandum of understanding committing to accelerating the transition to zero-emissions residential buildings by promoting electrification and phasing out fossil-fuel-based heating systems. For (continued...)

In the oil and gas sector, the costs of leak detection and repair may be offset by the sale of recovered methane, since the captured gas is a commodity with economic value.[39] Whether these costs can be offset can depend on the price of natural gas. There is a financial benefit to recapturing methane when the cumulative expected returns from recovered methane exceed the cost of upfront mitigation measures. The upfront costs to recover methane or repair leaks may be a deterrent. When the market value of the recovered methane is greater than the cost of mitigation measures required to capture it, oil and gas facilities have an incentive to install leak reduction and capture technologies.[40] Even when the market value of the recovered methane is greater than the cost of mitigation, some businesses may not voluntarily implement mitigation projects. For example, these projects may offer lower or less immediate financial returns compared with other projects. Inadequate infrastructure (e.g., lack of natural gas pipelines) or underdeveloped local markets may also limit the ability to transport and use abated methane from petroleum operations.

In coal mining, mitigation strategies address methane released during extraction as well as emissions from abandoned mines. This includes managing coal mine methane through pre-mining degasification to capture methane before mining begins. Methane emissions from coal mining can also be reduced through coal mine methane recovery (where methane and coal are recovered simultaneously) and by capturing methane present in the mine's ventilation air. Removing methane from the mine atmosphere reduces the risk of explosions and enhances worker safety.[41] Techniques like degasification systems for coal mines can trap methane at the source for on-site energy use or for transportation to processing facilities where it can be sold as natural gas.[42] This approach requires upfront investment in infrastructure, and market conditions may not provide enough financial incentive for businesses to invest in such projects.[43] The costs of methane capture technologies and complexity of the infrastructure can vary depending on the mine, and costs can sometimes outweigh the potential financial benefits.[44] For abandoned mines, strategies such as flooding coal mines can help trap methane and prevent its release into the atmosphere.

Methane Mitigation in the Waste Sector

According to the 2021 UNEP and CCAC assessment, the greatest potential for methane mitigation in the waste sector is in improved treatment and disposal of solid waste.[45] Mitigation

more information, see Northeast States for Coordinated Air Use Management (NESCAUM), "Multistate Memorandum of Understanding on Accelerating the Transition to Zero-Emission Residential Buildings," 2024. The memorandum was signed by California, Colorado, Maine, Maryland, Massachusetts, New Jersey, New York, Oregon, Rhode Island, and the District of Columbia. See also Nate Seltenrich, "Clearing the Air: Gas Stove Emissions and Direct Health Effects," *Environmental Health Perspectives*, vol. 132 (February 2024).

[39] According to the International Energy Agency (IEA), 75% of global emissions in the oil and gas sector can be reduced by implementing well-known measures such as leak detection and repair programs and upgrading leaky equipment. This figure represents the share of emissions that are both technologically feasible and economically viable to mitigate with current measures, while additional or alternative actions would be required to address the remaining 25%. IEA, *Global Methane Tracker 2024*, 2024, https://www.iea.org/reports/global-methane-tracker-2024.

[40] IEA, *Global Methane Tracker 2024*, 2024, https://www.iea.org/reports/global-methane-tracker-2024.

[41] C. Özgen Karacan et al., "Coal Mine Methane: A Review of Capture and Utilization Practices with Benefits to Mining Safety and to Greenhouse Gas Reduction," *International Journal of Coal Geology*, vol. 86, no. 2-3 (May 2011), pp. 121-156.

[42] IEA, *Global Methane Tracker 2023*, 2023, https://www.iea.org/reports/global-methane-tracker-2023.

[43] EPA, *Coal Mine Methane (CMM) Finance Guide*, updated July 2019, https://www.epa.gov/sites/default/files/2016-04/documents/cmop_finance_guide_march_2016_revision.pdf (hereinafter EPA, *Coal Mine Methane Finance Guide*, 2019).

[44] EPA, *Coal Mine Methane Finance Guide*, 2019.

[45] UNEP and CCAC, *Global Methane Assessment*, 2021.

strategies in this sector focus on reducing methane emissions at various stages of waste management, from collection to disposal. These include methods to prevent methane formation, such as separating waste at the source for recycling and reuse and diverting organic waste for composting to eliminate methane-generating decomposition in landfills.[46]

There are different technological approaches to capturing methane from waste. Covering landfills reduces methane emissions while also capturing and utilizing biogas—a mixture of methane and CO_2 from organic waste. Waste treatment with energy recovery involves landfill gas collection and flaring, converting methane to CO_2. Secondary and tertiary treatment processes further enhance biogas recovery and utilization.

Biogas recovery systems—often referred to as *landfill gas-to-energy systems*—collect methane produced during waste decomposition and utilize it to generate electricity or heat on-site, or for processing and injection into natural gas pipelines, or as a transportation fuel.[47] Implementing methane capture systems, such as landfill gas-to-energy projects, requires upfront investment in infrastructure and technology. The operation of these systems can range in complexity, as gas recovery rates can vary over time and by the surface area of the landfill and are influenced by factors such as waste composition, climate, and landfill age.

Methane Monitoring

Advancements in methane monitoring technology have become important components of domestic and international efforts to detect methane emissions. Various jurisdictions and stakeholders are using methane remote sensing data from satellites, as well as aerial and ground-based platforms, to identify emissions sources, track trends, verify compliance with regulations, and guide mitigation efforts. Remote sensing data can provide economic benefits to companies as a result of identifying and stopping leaks more quickly—helping to prevent further product loss. These technological advances present an opportunity to improve the accuracy of national GHG inventories.[48]

Satellite-based monitoring enhances these efforts by providing independent, high-resolution data on methane emissions, helping to identify discrepancies and improving overall transparency. In addition, satellite monitoring can support enforcement of import standards, such as carbon border adjustments, and be used to enhance accountability for voluntary industry commitments by tracking progress on methane reduction efforts.[49]

In particular, a number of satellites have been designed to monitor methane emissions and were launched in recent years—for example Sentinel-5p, GHGSat, MethaneSAT, and Tanager-1.[50]

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[46] UNEP and CCAC, *Global Methane Assessment*, 2021.

[47] U.S. Department of Energy (DOE), "Alternative Fuels Data Center: Renewable Natural Gas Production," https://afdc.energy.gov/fuels/natural-gas-renewable.

[48] Under the Paris Agreement (PA), national GHG inventories are submitted to the UNFCCC and serve as a basis for setting nationally determined contributions (NDCs) and tracking progress toward emissions reduction targets.

[49] G. Lopez and B. Ratner, *The Methane Emissions Opportunity: Our Perspective on Leveraging Technology in Continuous Improvement in the Oil and Gas Sector*, JPMorgan Chase, 2023, https://www.jpmorgan.com/content/dam/jpm/cib/complex/content/redesign-custom-builds/carbon-compass/JPMC_methane.pdf.

[50] Sentinel-5P is operated by the European Space Agency (ESA) as part of its Copernicus program. GHGSat is owned by a private Canadian company specializing in industrial emissions monitoring. MethaneSAT, a project of the Environmental Defense Fund (EDF), has received technical assistance from the National Aeronautics and Space Administration (NASA). Tanager-1 is part of the Carbon Mapper program, developed in partnership with Planet Labs, supported by the State of California, and funded with technical support from NASA's Jet Propulsion Laboratory. For (continued...)

These satellites are designed to continuously monitor and provide near real-time data on global and regional methane emissions, as well as single point sources—depending on the remote sensing technology.[51] Different instrumentation and technologies offer varying spatial resolutions and detection thresholds.

In addition to advances in data collection, there have also been advances in data processing to convert raw data into methane emissions estimates, and in new data platforms supporting data sharing. For example, the UNEP International Methane Emissions Observatory (IMEO) launched a new satellite-based system, the Methane Alert and Response System (MARS).[52] This system collects data from multiple satellites and uses new algorithms and machine learning to identify abnormally large emissions events—sometimes referred to as *super-emitter* events—and notify governments and companies to ensure timely intervention.

The data from these methane monitoring systems are being integrated into decisionmaking processes and regulatory frameworks. For example, a 2024 EPA rule for oil and gas operations established a Super Emitter Program that allows the agency to respond to emissions events detected remotely by "qualified third parties," as defined in the rule.[53] This response may include notifying the operator of the facility, requiring corrective actions, or pursuing enforcement measures to address the emissions event.

These technologies provide benefits and have costs and limitations. For example, in some cases methane satellites are providing new opportunities for the public to access data at little or no cost. Methane monitoring technologies, particularly satellites and aircraft, may present relatively high costs compared to modeling estimates. For example, satellites and aircraft measurements cost more than computer model estimates extrapolated from limited sampling during normal operation. In addition, satellites may have coverage limitations. For example, they may not be able to detect emissions events under certain environmental conditions or may miss detection of sporadic emissions events, depending on their sampling frequency.[54]

U.S. Methane Mitigation Policies and Approaches

U.S. methane mitigation policies cover a range of activities, including methane emissions regulations and fees that focus on the oil and gas sector, promotion of methane leak detection and repair, funding for technology development, and incentives for the capture and use of methane from landfills and agricultural operations. This section provides highlights of some of these policies.

more information, see John H. Quigley, *Remote Sensing Based Monitoring Networks for the Next Generation of Energy and Environmental Policymaking*, Kleinman Center for Energy Policy, 2024, https://kleinmanenergy.upenn.edu/research/publications/remote-sensing-based-monitoring-networks-for-the-next-generation-of-energy-and-environmental-policymaking/.

[51] D. J. Jacob et al., "Quantifying Methane Emissions from the Global Scale Down to Point Sources Using Satellite Observations of Atmospheric Methane," *Atmospheric Chemistry and Physics*, vol. 22, no. 14 (2022), pp. 9617–9646.

[52] UNEP, *An Eye on Methane: International Methane Emissions Observatory 2023 Report*, 2023, https://www.unep.org/resources/report/eye-methane-international-methane-emissions-observatory-2023-report.

[53] EPA, "Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for Existing Sources: Oil and Natural Gas Sector Climate Review," 89 *Federal Register* 16820, March 8, 2024.

[54] For more information, see CRS In Focus IF12072, *Advances in Satellite Methane Measurement: Implications for Fossil Fuel Industry Emissions Detection and Climate Policy*, by Jonathan D. Haskett.

Legislation

Congress has taken action to address U.S. methane emissions through, among other legislation, provisions in the budget reconciliation measure commonly referred to as the Inflation Reduction Act (IRA; P.L. 117-169) and in the Infrastructure Investment and Jobs Act (IIJA; P.L. 117-58). The IRA imposed a charge on methane emissions for specific types of oil and gas facilities—the first time the federal government has directly imposed a charge, fee, or tax on GHG emissions.[55] Further, the IRA directed EPA to update the reporting requirements for the oil and gas industry's methane emissions under the Greenhouse Gas Reporting Program (GHGRP).

The IRA and IIJA also provided appropriations that support methane mitigation. The IRA allocated $1.4 billion for grants, loans, and technical assistance to help the oil and gas sector monitor and reduce methane emissions.[56] The IIJA provided $4.7 billion for grants to cap abandoned oil and gas wells, reduce methane leaks, and to repair and replace aging natural gas distribution pipelines.[57]

In the 118th Congress, Members introduced legislation related to methane emissions (see **Appendix A**).[58] These proposals covered a wide range of objectives.

Some bills focused on repealing recently enacted provisions or limiting related regulatory measures, including the following selected examples:

- Eliminating the methane fee and the EPA incentive program for petroleum and natural gas systems established under the IRA.[59]
- Altering the methane monitoring program to make it optional for financial assistance programs and removing methane measurement as a condition for eligibility for the orphaned well grant program established by the IIJA.[60]
- Restricting EPA from using funds for certain activities, such as those related to regulating or requiring reporting for methane emissions from livestock.[61]

Other bills would have supported research, development, and deployment of technologies for detecting, capturing, and mitigating methane emissions, including the following selected examples:

- Establishing a federal strategy for monitoring methane.[62]

[55] CRS Report R47206, *Inflation Reduction Act Methane Emissions Charge: In Brief*, by Jonathan L. Ramseur.
[56] For more information, see EPA, "Methane Emissions Reduction Program," https://www.epa.gov/inflation-reduction-act/methane-emissions-reduction-program.

[57] U.S. Department of the Interior, "Through President Biden's Bipartisan Infrastructure Law, 24 States Set to Begin Plugging Over 10,000 Orphaned Wells," press release, 2022, https://www.doi.gov/pressreleases/through-president-bidens-bipartisan-infrastructure-law-24-states-set-begin-plugging.

[58] Two bills adopted into law in the 118th Congress specifically address methane emissions. The National Defense Authorization Act for Fiscal Year 2024 (P.L. 118-31) became law in 2023 and requires certain defense contractors to disclose their GHG emissions, including methane. The Consolidated Appropriations Act of 2024 (P.L. 118-42) became law in 2024, and Section 435 prohibits EPA from using certain funds from the act to promulgate or implement regulation requiring the issue of permits under Title V of the Clean Air Act (42 U.S.C. §§7661 et seq.) for methane and other GHG emissions resulting from livestock.

[59] For examples, see, in the 118th Congress, H.R. 1, H.R. 246, H.R. 484, H.R. 1023, H.R. 1141, H.R. 2811, and H.R. 947.

[60] See, in the 118th Congress, H.R. 7053 and S. 3496.

[61] See, in the 118th Congress, H.R. 4366, S. 937, and S. 997. A provision to this effect was adopted into law by P.L. 118-42.

[62] For example, see, in the 118th Congress, S. 9513 and H.R. 7651.

- Establishing a program for methane detection research and technology development.[63]

Some Members sought to incentivize voluntary emissions reductions through tax credits, grants, and support for industry-led initiatives, particularly in agriculture and energy:

- Establishing a tax credit for capturing methane from mines.[64]
- Reducing methane emissions from livestock and through grants to improve waste management practices, changes to livestock feed, and expanded support for farming practices that result in fewer GHG emissions and support other environmental goals.[65]

Some Members proposed bills related to fossil fuel imports and exports:

- Establishing a methane border adjustment mechanism and imposing fees on imported goods based on their methane emissions.[66]
- Directing EPA to collect and publish data on carbon dioxide and methane emissions linked to fossil fuel exports to enhance transparency and accountability for emissions beyond U.S. borders.[67]

Executive Branch Activities

Past administrations have issued regulations and adopted policies aimed at addressing methane emissions across various sectors. This section highlights some of these executive branch activities but does not provide a comprehensive list of all actions taken.

The Biden Administration took a number of actions to address methane emissions, many of which are described in the *U.S. Methane Emissions Reduction Action Plan* and subsequent updates.[68] Following are examples of key actions.

EPA has taken regulatory actions to address methane emissions in the oil and gas sector. In 2024, EPA issued a final rule to collect an annual waste charge—an authority provided by the IRA.[69] Also in 2024, EPA issued a final rule to strengthen emissions standards for new and existing oil and gas facilities. This rule updates emissions limits, requires certain leak detection and repair protocols and control technologies, and expands the scope of the rule to additional sources.[70] In addition, also in 2024, EPA issued a final rule to strengthen and expand the methane emissions reporting requirements under the GHGRP to ensure more complete and accurate data collection.[71]

[63] For example, see, in the 118th Congress, S. 9513.

[64] See, in the 118th Congress, H.R. 3982 and S. 5167.

[65] For example, see, in the 118th Congress, H.R. 1840, H.R. 4327, S. 1016, and S. 1947.

[66] See, in the 118th Congress, H.R. 8962. For more information on border carbon adjustments, 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.

[67] See, in the 118th Congress, H.R. 9558.

[68] White House, *U.S. Methane Emissions Reduction Action Plan*, 2021; White House, *Delivering on the U.S. Methane Emissions Reduction Action Plan*, 2022; White House, *Accelerating Progress: Delivering on the U.S. Methane Emissions Reduction Action Plan*, 2023.

[69] EPA, "Waste Emissions Charge for Petroleum and Natural Gas Systems," 89 *Federal Register* 5318, November 18, 2024.

[70] 89 *Federal Register* 16820, March 8, 2024.

[71] EPA, "Standards of Performance for New, Reconstructed, and Modified Sources and Emissions Guidelines for (continued...)

These rules address underreporting of methane emissions from petroleum and natural gas systems and facilitate the use of satellite data to identify super-emitters and quantify large emissions events. The rules also require direct monitoring of key emissions sources, and updated the methods for calculation.[72] The rules respond to a directive in the IRA for the measurement of methane emissions to rely on empirical data. In 2024, EPA released a request for information on use of advanced technologies for quantification of methane in the GHGRP.[73]

In the waste sector, EPA announced its intent to issue a proposed rule in 2025 to update emissions standards for solid waste landfills in order to mitigate methane.[74] Regulations for landfill emissions have been in place since 1996, when EPA first established New Source Performance Standards and Emission Guidelines to control methane and other pollutants from municipal solid waste landfills.[75] Whether the Trump Administration will continue this effort is to be determined.

The U.S. Department of Agriculture (USDA) has also taken a number of actions to mitigate methane emissions from agriculture, including through grants programs, incentivizing farmers to use land management practices that reduce GHG emissions (e.g., cover crops and rotational grazing), and technical assistance for farmers. Additionally, USDA invests in research, for example, to address methane from livestock—including funding to accelerate the development of feed additives.[76]

In addition to the actions described above, the Biden Administration co-led the launch of the Global Methane Pledge (GMP) together with the EU (see "International Methane Mitigation Activities"), hosted a Methane Summit, and announced a cabinet-level Methane Task Force to accelerate mitigation efforts.[77]

On January 20, 2025, President Trump signed an executive order directing the United States to withdraw from the Paris Agreement (PA).[78] Per the agreement's provisions, a party may withdraw by providing written notification to the United Nations, with the withdrawal becoming effective one year after the notice is received. Under the PA, the United States had committed to reducing GHG emissions, including methane, as part of broader global climate efforts.

International Initiatives

In addition to its participation in the GMP and other multilateral efforts focused on methane, the Biden Administration advocated for accelerated action on non-CO_2 GHGs (e.g., methane, hydrofluorocarbons) more broadly as well as addressing emissions across all sectors in the

Existing Sources: Oil and Natural Gas Sector Climate Review," 89 *Federal Register* 16820, March 8, 2024; EPA, "Greenhouse Gas Reporting Rule: Revisions and Confidentiality Determinations for Petroleum and Natural Gas Systems," 89 *Federal Register* 42062, May 14, 2024. For more information on the Greenhouse Gas Reporting Program, see CRS In Focus IF11754, *EPA's Greenhouse Gas Reporting Program*, by Angela C. Jones.

[72] EPA, "Biden-Harris Administration Announces Final Rule to Cut Methane Emissions, Strengthen and Update Greenhouse Gas Emissions Reporting for the Oil and Gas Sector," press release, May 6, 2024.

[73] EPA, "Use of Advanced and Emerging Technologies for Quantification of Annual Facility Methane Emissions Under the Greenhouse Gas Reporting Program," 89 *Federal Register* 70177, November 27, 2024.

[74] White House, "Factsheet: Biden-Harris Administration Announces New Actions to Detect and Reduce Climate Super Pollutants," press release, July 23, 2024.

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

[76] White House, *Accelerating Progress: Delivering on the U.S. Methane Emissions Reduction Action Plan*, 2023.

[77] White House, "Factsheet: Biden-Harris Administration Hosts White House Methane Summit to Tackle Dangerous Climate Pollution, While Creating Good-Paying Jobs and Protecting Community Health," press release, July 26, 2023.

[78] Executive Order 14162, "Putting America First in International Environmental Agreements," 90 *Federal Register* 8455, January 20, 2025.

economy as part of multilateral and bilateral climate efforts.[79] For example, in 2023, the United States convened a summit on non-CO_2 GHGs, together with China and the United Arab Emirates, and issued a call to action for other countries to include non-CO_2 GHGs in nationally determined contributions (NDCs) under the PA.[80]

In addition to cofounding the GMP, the United States has led other efforts, such as the Methane Finance Sprint. President Biden launched the Methane Finance Sprint in 2023 and invited other governments, along with the private sector and financial institutions, to contribute to the effort. In response, and concurrent with the 28th session of the Conference of the Parties to the UNFCCC (COP28), world leaders announced over $1 billion in new grant funding for projects designed to reduce methane emissions, with a focus on low- and middle-income countries.[81] The Methane Finance Sprint funded the relaunch of the World Bank Global Flaring and Methane Reduction Partnership, $200 million for the launch of the Enteric Fermentation Accelerator, and additional support for the CCAC, the IMEO, and other methane-related programs.

The United States has also funded international activities to reduce methane emissions through the U.S. Agency for International Development (USAID). USAID has funded methane mitigation work in Haiti, Indonesia, Kenya, Mexico, Philippines, Tanzania, Thailand, and Vietnam through the $22.15 million Methane Accelerator funded by the U.S. Department of State.[82]

International Methane Mitigation Activities

A variety of multilateral and bilateral initiatives address methane emissions. These efforts encompass a wide range of activities, including establishing methane reduction targets, developing and implementing methane reduction policies, employing advanced monitoring technologies, enhancing reporting, and providing technical assistance and capacity-building.

Multilateral Efforts

United Nations Framework Convention on Climate Change (UNFCCC)

Methane is a covered GHG under the United Nations Framework Convention on Climate Change (UNFCCC) and the PA.[83] Most parties to the PA have included methane in their NDCs, which are nonbinding pledges that outline their emissions reduction goals, implementation strategies, and time frames for achieving their goals.[84] Of the 168 latest available NDCs, representing 195 parties to the PA, over 90% included methane as one of the GHGs in their overall target.[85] About 30 of

[79] White House, "Factsheet: Biden-Harris Administration Announces New Actions to Detect and Reduce Climate Super Pollutants," press release, July 23, 2024.

[80] U.S. Department of State (DOS), "Accelerating Fast Mitigation: Summit on Methane and Non-CO_2 Greenhouse Gases," press release, 2023.

[81] DOS, "Highlights from the 2023 Global Methane Pledge Ministerial," press release, 2023.

[82] DOS, "Highlights from the COP 29 Global Methane Pledge Ministerial," press release, 2024.

[83] CRS Report R46204, *The United Nations Framework Convention on Climate Change, the Kyoto Protocol, and the Paris Agreement: A Summary*, by Richard K. Lattanzio.

[84] The European Union (EU) submits a single, collective NDC on behalf of its 27 member states, resulting in fewer NDCs than the total number of parties. For more information on NDCs, see CRS Report R46945, *Greenhouse Gas Emission Reduction Pledges by Selected Countries: Nationally Determined Contributions and Net-Zero Legislation*, by Kezee Procita and Claire M. Jordan.

[85] UNFCCC, *Nationally Determined Contributions Under the Paris Agreement: Synthesis Report by the Secretariat*, 2024, https://unfccc.int/sites/default/files/resource/cma2024_10_adv.pdf. IEA, *Global Methane Tracker 2024*, 2024, https://www.iea.org/reports/global-methane-tracker-2024.

these NDCs include specific targets for reducing economy-wide methane emissions, and another 20 included measures to reduce methane emissions from fossil fuels.[86] The NDC the United States submitted in 2024 includes methane as one of the GHGs in its overall GHG target but does not have a specific target for reducing methane emissions.[87] It also includes strategies for reducing methane across all major sources of anthropogenic methane emissions. In 2025, President Trump signed an executive order directing the United States to withdraw from the PA.[88] Until the withdrawal becomes effective, the United States remains a party to the agreement and continues to be subject to its reporting and transparency requirements.

Under the PA, parties are required to update and submit NDCs to the UNFCCC every five years. Current NDCs and methane pledges generally cover the period to 2030. Under the PA, the next round of NDCs was due to the UNFCCC secretariat by February 2025, and the goal is to achieve the commitments in these NDCs by 2035. While parties are legally obligated to have an NDC, and to pursue measures with the aim of achieving it, achievement of the NDC is not a legally binding or enforceable commitment.

Some of the actions at sessions of the Conference of the Parties (COP) to the UNFCCC have been relevant for methane mitigation. For example, at COP28, parties adopted a decision on the first Global Stocktake—a periodic assessment that evaluates collective progress toward the PA's climate goals—that included a first-time mention of methane reduction in the negotiated decision documents of the COP. The decision called on all parties to "accelerat[e] the substantial reduction of non-carbon-dioxide emissions globally, in particular methane emissions by 2030," and encouraged them to include all GHGs in their next NDCs. The decision also called on parties to accelerate the transition away from fossil fuels—a main source of anthropogenic methane emissions.[89] In addition, other initiatives to address methane have been announced concurrent to and in conjunction with the official proceedings of the COPs. These initiatives are discussed below.

Global Methane Pledge (GMP)

The United States, the EU, and 11 other countries launched the Global Methane Pledge (GMP) as a campaign concurrent to the proceedings of COP26 in Glasgow, UK, in 2021.[90] The GMP is a nonbinding commitment by countries to collectively reduce global methane emissions by at least 30% from 2020 levels by 2030. The GMP estimates that meeting these goals has the potential to reduce global warming by at least 0.2°C by 2050.[91]

As of November 2024, 159 nations had signed the pledge—representing more than 50% of the world's anthropogenic methane emissions.[92] The world's largest methane emitters are currently

[86] T. Fransen et al., *Nine Things to Know About National Climate Plans (NDCs)*, World Resources Institute, 2023, https://www.wri.org/insights/assessing-progress-ndcs; IEA, *Global Methane Tracker 2024*, 2024, https://www.iea.org/reports/global-methane-tracker-2024/tracking-pledges-targets-and-action.

[87] U.S. NDC, 2024.

[88] Executive Order 14162, "Putting America First in International Environmental Agreements," 90 *Federal Register* 8455, January 20, 2025.

[89] UNFCCC/PA/CMA/2023/16/Add.1, Decision 1/CMA.5, paras 28(f), 39, and 28(d).

[90] Global Methane Pledge (GMP), U.S.-EU et al., introduced November 2021, https://www.ccacoalition.org/en/resources/global-methane-pledge; *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) (hereinafter, Global Methane Pledge, 2021).

[91] Global Methane Pledge, 2021.

[92] CCAC, "About the Global Methane Pledge," https://www.globalmethanepledge.org/.

China, India, the United States, Brazil, and Russia.[93] Together, these countries emit close to half of global methane emissions. Of these, the United States and Brazil have signed on to the GMP. China, India, and Russia have not.

By joining the pledge, participating countries agree to take comprehensive domestic actions and support international efforts to mitigate methane emissions across all sectors—including the energy, waste, and agriculture sectors. The pledge includes a commitment to moving toward using best available inventory methodologies to quantify methane emissions and encourages participating countries to include methane mitigation as part of their broader efforts to reduce GHG emissions under the PA. The GMP also states that the participants intend to review progress through annual ministerial meetings. Annual ministerial meetings have historically been held concurrently with sessions of the COP.

The GMP has established six action areas, including the Energy Pathway, the Waste Pathway, the Food and Agriculture Pathway, Methane Plans and Policies, Data for Methane Action, and Finance for Methane Abatement. Each pathway represents targeted thematic areas for coordinated global action to reduce methane emissions.

Some countries have taken concrete steps to reduce methane emissions through new regulations and requirements on methane, including the United States, EU, and Canada. A number of other countries—including Brazil, China, and Kazakhstan—have announced plans to develop new regulations.[94]

Some observers have highlighted a gap between commitments to reduce emissions by specific amounts and detailed implementation plans to achieve these emissions reductions. For example, fewer than one-third of the countries participating in the GMP have provided details on the reduction strategies they plan to use to reduce methane emissions or have developed national methane action plans.[95]

Incorporating methane into NDCs, required as part of the PA, could provide a framework for assessing progress toward meeting the GMP targets. Ahead of the 29th session of the Conference of the Parties to the UNFCCC (COP29), the GMP Champions group, composed of Canada, the EU, the Federated States of Micronesia, Germany, Japan, Nigeria, and the United States, released a statement encouraging countries to accelerate action to mitigate methane.[96] The GMP Champions group emphasized the importance of including methane in NDCs, reducing methane emissions from the energy sector, and leveraging technical and financial assistance alongside data-driven solutions. They urged countries to follow CCAC guidance to include methane in countries' NDCs as a way to accelerate action on methane mitigation, and in their first Biennial Transparency Reports.[97] Starting in 2024, countries are required, under the PA, to submit Biennial

[93] DOS, "Highlights from the COP29 Global Methane Pledge Ministerial," press release, 2024 (hereinafter DOS, "Highlights from Global Methane Pledge Ministerial," 2024).

[94] DOS, "Highlights from Global Methane Pledge Ministerial," 2024.

[95] DOS, "Highlights from Global Methane Pledge Ministerial," 2024. Note that the GMP does not specifically require action plans but does includes a commitment to maintain up-to-date, transparent, and publicly available information on policies and methane commitments.

[96] CCAC, "Global Methane Pledge Champions Call for Accelerated Global Action on Methane Mitigation, Spotlight New Super Pollutant NDC Guidance," press release, September 23, 2024, https://www.ccacoalition.org/news/global-methane-pledge-champions-call-accelerated-global-action-methane-mitigation-spotlight-new-super-pollutant-ndc-guidance.

[97] CCAC, *Opportunities for Increasing Ambition of Nationally Determined Contributions Through Integrated Air Pollution and Climate Change Planning: A Practical Guidance Document*, 2019, https://www.ccacoalition.org/sites/default/files/resources//2019_NDC_enhancing_ambition.pdf.

Transparency Reports every two years, providing detailed information on their GHG emissions, mitigation efforts, adaptation actions, and support received or provided for climate initiatives.

Declaration on Reducing Methane from Organic Waste

Azerbaijan, holding the presidency for the COP29, launched the *Declaration on Reducing Methane from Organic Waste* as one of the multilateral pledges it put forward during the conference.[98] The United States was 1 of the 30 countries that signed the declaration.[99] By endorsing this declaration, parties committed to setting sectoral targets to reduce methane emissions from waste and food as part of national policy documents and including these targets in future NDCs.

Measurement, Monitoring, Reporting, and Verification (MMRV) Working Group

The United States, the European Commission, and 12 other natural-gas-importing and exporting countries formed an international working group for the measurement, monitoring, reporting, and verification of methane and CO_2 emissions in order to facilitate comparable and reliable information about these emissions across the natural gas supply chain to drive global emissions reductions.[100]

Joint Declaration from Energy Importers and Exporters

The United States, EU, Japan, Canada, Norway, Singapore, and the United Kingdom issued a *Joint Declaration from Energy Importers and Exporters on Reducing Greenhouse Gas Emissions from Fossil Fuels*, outlining their commitment to reducing GHG emissions including methane across all stages of production, processing, and distribution—to the extent practicable.[101] The declaration supports improving emissions monitoring and data transparency, calls for mobilizing technical assistance and financing, and encourages private-sector fossil energy producers and purchasers to leverage contracts to reduce emissions.[102]

Bilateral Initiatives

The United States participates in bilateral engagement and agreements with various countries that address methane mitigation issues. Selected examples of such bilateral initiatives are presented below.

[98] Letter from H. E. Mukhtar Babayev, COP29 President-Designate, to COP29 participants, 2024, https://cop29.az/en/pages/cop29-presidency-action-agenda-letter.

[99] COP29 Azerbaijan, "Countries Representing Nearly 50% of Global Methane Emissions From Organic Waste Pledge to Reduce Emissions From Sector | Day Nine – Food, Water and Agriculture Day," press release, November 19, 2024, https://cop29.az/en/media-hub/news/countries-representing-nearly-50-of-global-methane-emissions-from-organic-waste-pledge-to-reduce-emissions-from-sector.

[100] DOE, "DOE Announces Global Collaboration to Reduce Methane Emissions," press release, November 15, 2023.

[101] DOS, "Joint Declaration from Energy Importers and Exporters on Reducing Greenhouse Gas Emissions from Fossil Fuels," press release, 2022.

[102] Environmental Defense Fund, "President Biden Announces New Initiatives at COP27 to Strengthen U.S. Leadership in Tackling Climate Change," press release, November 11, 2022, https://www.edf.org/media/president-biden-announces-new-initiatives-cop27-strengthen-us-leadership-tackling-climate.

United States-China

In recent years, the United States and China have included commitments on methane mitigation in joint climate agreements. For example, in the *2021 U.S.-China Joint Glasgow Declaration on Enhancing Climate Action*, both countries committed to cooperate on methane abatement strategies. This includes exchanging best practices for reducing methane emissions in oil and gas operations. In the declaration, China stated its intent to develop a national action plan for methane.

Ahead of COP28, the United States and China issued the *United States-China Sunnylands Statement on Enhancing Cooperation to Address the Climate Crisis*.[103] The statement covered topics related to renewable energy, forest conservation, and non-CO_2 GHG emissions—including methane. China announced it would include non-CO_2 GHGs, including methane, in its 2035 NDC.[104] It also launched a bilateral working group focused on "climate action in the 2020s," which started meeting in the first half of 2024.[105]

Concurrent with the COP29 in 2024, in Baku, Azerbaijan, the United States and China hosted a summit focused on methane and other non-CO_2 GHGs.[106]

United States-European Union

Bilateral cooperation between the United States and the EU on methane mitigation has focused on key sectors, including oil and gas, agriculture, and waste management. In 2022, the U.S.-EU Energy Council emphasized methane mitigation as a key component of its joint effort to address climate change as part of cooperation across the two jurisdictions.[107]

The United States and the EU have emphasized the exchange of best practices and technologies for methane capture and abatement, particularly in oil and gas operations, where both parties see significant potential for emissions reductions. In 2023, both parties agreed to advance policies and regulations aimed at reducing methane emissions from fossil fuel production.[108]

The United States and the EU have also collaborated on improving measurement, monitoring, reporting, and verification (MMRV) systems to enhance transparency and accountability in emissions data, such as through the international MMRV working group for natural gas GHG emissions.[109]

United States-Kazakhstan

In 2023, the United States announced a partnership providing technical assistance to Kazakhstan to develop national standards to eliminate non-emergency venting of methane and require leak

[103] DOS, "Sunnylands Statement on Enhancing Cooperation to Address the Climate Crisis," press release, 2023, (hereinafter DOS, "Sunnylands Statement," 2023).

[104] DOS, "Sunnylands Statement," 2023.

[105] DOS, "Readout on Meeting of the U.S.-China Working Group on Enhancing Climate Action in the 2020," press release, 2024.

[106] DOS, "The Sprint to Cut Climate Super Pollutants: COP 29 Summit on Methane and Non-CO2 GHGs," press release, 2024.

[107] European Commission, "Statement by the EU and the U.S. following the 11th EU-US Energy Council," press release, March 14, 2024, https://ec.europa.eu/commission/presscorner/detail/en/STATEMENT_24_1516.

[108] DOS, "Highlights from 2023 Global Methane Pledge Ministerial," press release, 2023.

[109] DOE, "International MMRF Working Group Reaches Milestone in Developing a Credible Framework for Measuring Natural Gas Supply Chain Emissions to Drive Continuous Reductions in Methane and Carbon Dioxide Emissions in the Global Natural Gas Market," press release, October 3, 2024.

detection and repair in the oil and gas sector.[110] Kazakhstan is a major oil and gas producer in Central Asia, and the majority of its methane emissions are from its fossil fuel sector.[111]

The collaboration includes capacity-building initiatives, with U.S. agencies and private-sector experts providing technical assistance to Kazakhstan's energy sector to support its adoption of best practices for methane leak detection, repair, and emissions reporting.

Other International Agreements and Efforts

A number of other international initiatives support and contribute to methane mitigation in various ways. A range of entities leads and participates in these efforts, including international institutions, industry, nongovernmental organizations, and public-private partnerships. A brief description of selected initiatives is provided below. This list below may not be comprehensive.

- **The International Methane Emissions Observatory (IMEO).** IMEO is led by UNEP and supports global monitoring of methane emissions through satellite data and other technologies. IMEO provides data to verify and track emissions-reduction commitments, complementing efforts under the GMP by enhancing transparency and accountability.[112]
- **Global Methane Hub.** The Global Methane Hub is a philanthropic organization dedicated to reducing methane emissions globally and boosting philanthropic resources allocated specifically to methane reduction.[113]
- **Global Methane Initiative (GMI).** The GMI is an international public-private partnership focused on reducing barriers to the recovery and use of methane as a valuable energy source—including from oil and gas, coal mines, and biogas.[114] EPA leads the GMI Secretariat, which manages administrative tasks.[115]
- **The Oil and Gas Methane Partnership (OGMP 2.0).** OGMP 2.0 is led by UNEP and works with companies and governments to improve methane emissions measurement and reporting standards. This initiative focuses on generating accurate emissions data and setting industry-wide standards for the oil and gas sector.
- **Oil and Gas Decarbonization Charter (OGDC).** OGDC is a voluntary industry agreement that calls for eliminating methane emissions and routine flaring by 2030, and achieving net-zero emissions in participating companies' operations by 2050. It was announced in 2023, and over 50 oil and gas producers have joined it.[116]
- **Methane Guiding Principles (MGP).** The MGP is an industry consortium for energy companies and civil society organizations to implement specific strategies for reducing methane emissions across the oil and gas value chain. These

[110] DOS, "U.S.-Kazakhstan Joint Statement on Accelerating Methane Mitigation to Achieve the Global Methane Pledge," press release, 2023.

[111] IEA, *Kazakhstan 2022: Energy Sector Review*, 2022, https://www.iea.org/reports/kazakhstan-2022.

[112] UNEP, "International Methane Emissions Observatory," https://www.unep.org/topics/energy/methane/international-methane-emissions-observatory.

[113] Global Methane Hub, "The Global Methane Hub," https://www.globalmethanehub.org/.

[114] Global Methane Initiative, "About the Global Methane Initiative," https://www.globalmethane.org/index.aspx.

[115] EPA, "Learn About the Global Methane Initiative," https://www.epa.gov/gmi/learn-about-global-methane-initiative.

[116] COP28 Presidency, "The Oil and Gas Decarbonization Charter," introduced December 2023, https://www.ogdc.org/.

strategies include establishing best practices for leak detection and repair, providing training and resources to improve methane management, and advocating for policies and regulations to minimize emissions.[117]

- **Word Bank Global Flaring and Methane Partnership (GFMR).** The World Bank's GFMR, formerly the Global Gas Flaring Reduction Partnership (GGFR), is a multidonor trust fund composed of governments, oil companies, and multilateral organizations working to design and implement measures aimed at phasing out routine flaring of gas at oil production sites across the world and reducing methane emissions from the oil and gas sector to near zero by 2030.[118]
- **Lowering Organic Waste Methane Initiative (LOW-Methane).** LOW-Methane is a coalition of organizations working and collaborating on providing data, policies, technical assistance, and financial solutions to subnational governments and their national government counterparts to accelerate progress toward achieving the goals of the GMP. The goal of LOW-Methane is to reduce at least 1 million metric tons of methane emissions from the waste sector each year before 2030. LOW-Methane also has a goal of obtaining over $10 billion in public and private investment toward methane emissions reduction in the waste sector.[119]
- **The Waste Methane Assessment Platform (WasteMAP).** WasteMap is a joint effort of the Rocky Mountain Institute (RMI) and the Clean Air Task Force. It launched in 2022 and is an open-source platform providing information and best practices to operators, policymakers, and financiers.

Selected Methane Mitigation Policies in Other Countries

National governments have developed a number of methane mitigation policies and initiatives. These policies range from national plans with no binding legal requirements and targets, to incentive programs, to regulations with binding requirements. Examples of specific methane mitigation measures are described below. The policies identified below do not represent a comprehensive list of countries with mitigation policies or a comprehensive list of the methane mitigation policies in the countries identified below.

China

In 2023, China released its *Methane Emissions Control Action Plan* (Action Plan) outlining its approach to controlling methane emissions in the energy, agriculture, and waste sectors.[120] The Action Plan serves as a targeted strategy within the broader framework of China's five-year plans. The Action Plan includes objectives for monitoring, reporting, and verifying methane emissions, as well as for capturing and utilizing methane. China has included several commitments to reduce

[117] Methane Guiding Principles, "Enabling Actions to Reduce Methane Emissions Globally," https://methaneguidingprinciples.org/.

[118] World Bank Group, "Global Flaring and Methane Reduction Partnership," https://www.worldbank.org/en/programs/gasflaringreduction/about.

[119] DOS, "Lowering Organic Waste Methane Initiative (LOW-Methane)," press release, 2023.

[120] California-China Institute, *China's Climate Action Brief, 2023: Methane*, November 2023, https://ccci.berkeley.edu/sites/default/files/China%E2%80%99s%20Climate%20Action%20Brief.pdf; Institute for Governance and Sustainable Development, "China Releases Methane Emissions Control Action Plan," press release, November 7, 2023, https://www.igsd.org/china-releases-methane-emissions-control-action-plan/.

methane emissions in its recent five-year plans.[121] For example, China's 14th Five Year Plan sets goals to reduce methane emissions from agriculture and waste, and to increase the capture and use of methane from coal mines.[122] It also includes a plan to gradually eliminate flaring by oil and gas producers by 2030.

Brazil

Brazil has a methane mitigation policy called the "Zero Methane Program," which aims to reduce methane emissions through initiatives like increasing the capture of biogas and biomethane and using them as renewable energy sources, and encouraging research and international cooperation on methane reduction.[123] Brazil has adopted the *Brazilian Agricultural Policy for Climate Adaptation and Low Carbon Emission*, which is in effect from 2020 to 2030, to promote climate-friendly agriculture and reduce GHG emissions, including methane, from livestock and other agricultural activities.[124]

European Union

In 2024, the EU, which is the world's largest importer of oil and gas, approved new regulations addressing methane emissions from fossil fuels, including domestic and imported sources.[125] The regulations require industries to measure, monitor, report, and verify (MMRV) their methane emissions and take action to reduce them.

Canada

Canada was one of the first countries to regulate methane emissions from the oil and gas sector at the national level. Canada committed to reducing methane emissions from its oil and gas sector by at least 75% from 2012 levels by 2030.[126] Canada has also created a $750 million (Canadian dollar) Emissions Reduction Fund to reduce emissions in Canada's oil and gas sector.[127]

Mexico

Mexico issued guidelines in 2018 to regulate methane emissions from the oil and gas industry, requiring certain facilities to identify and measure all sources of methane and develop protocols to control methane emissions. Mexico also prohibited routine venting of methane, with

[121] United Nations Development Programme (UNDP), *Issue Brief—China's 14th Five-Year Plan*, 2021, https://www.undp.org/china/publications/issue-brief-chinas-14th-five-year-plan (hereinafter UNDP, *China's 14th Five-Year Plan*, 2021). Carbon Brief, "Q&A: What Does China's New Methane Plan Mean for Its Climate Goals?" November 23, 2023, https://www.carbonbrief.org/qa-what-does-chinas-new-methane-plan-mean-for-its-climate-goals/.

[122] UNDP, *China's 14th Five-Year Plan*, 2021.

[123] IEA, "National Programme for the Reduction of Methane Emissions—Zero Methane," February 14, 2023, https://www.iea.org/policies/17045-national-programme-for-the-reduction-of-methane-emissions-zero-methane.

[124] CCAC, "Brazil Launches Transformative Agricultural Methane Project," September 23, 2023, https://www.ccacoalition.org/news/brazil-launches-transformative-agricultural-methane-project (hereinafter CCAC, "Brazil Launches Agricultural Methane Project").

[125] CCAC, "Brazil Launches Agricultural Methane Project."

[126] Government of Canada, "Reducing Methane Emissions," https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/reducing-methane-emissions.html (hereinafter Government of Canada, "Reducing Methane Emissions").

[127] Government of Canada, "Reducing Methane Emissions."

exceptions for emergency situations.[128] According to CCAC, this is the first action of its kind in Latin America.[129]

Nigeria

Nigeria adopted a *National Methane Action Plan* that addresses oil and gas methane emissions with leak detection and repair programs. Nigeria has enacted a mandate that companies take action, first by implementing leak detection and repair measures in oil and gas infrastructure.[130] Companies must also start utilizing high-destruction efficiency flares to reduce the methane vented or leaked. Lastly, companies must implement controls on venting devices or replace them with zero-emissions technology. Nigeria also has a Gas Flare Commercialization Program, which monetizes captured methane and aims to eliminate routine flaring.

Colombia

In 2023, Colombia implemented flaring and fugitive methane emissions regulations.[131] Colombia's rule for methane essentially means that the country has committed to ending routine gas flaring by 2030. Columbia's regulations also include measures to manage fugitive methane emissions through leak detection and repair programs, vapor recovery units, and optimized equipment usage.

Considerations for Congress

Congress could consider what, if any, actions to take to address methane emissions. Members and stakeholders hold differing views on whether additional provisions to mitigate methane emissions are necessary, with some advocating for stronger policies to address climate change and others supporting the rollback of existing regulations due to economic and competitiveness concerns

Supporters of additional provisions to mitigate methane emissions argue reducing methane emissions presents a unique opportunity to mitigate climate change, as methane is a potent GHG with a relatively short atmospheric lifetime, meaning reductions can yield near-term climate benefits. Further, some stakeholders assert that methane emissions can be mitigated cost-effectively while reducing waste and increasing efficiency in sectors such as oil and gas, agriculture, and waste management. Reducing methane can also improve air quality and public health by helping to lower ground-level ozone and other air pollutants linked to respiratory issues.

Supporters of additional policies to mitigate methane emissions have proposed various actions that Congress may consider, including supporting the continuation and implementation of existing federal agency initiatives on methane reduction, directing agencies to take or accelerate specific regulatory actions, or providing additional funding. For example, the IRA established a methane emissions charge on waste emissions from the oil and gas sector. Members of Congress

[128] CCAC, "Mexico," https://www.ccacoalition.org/partners/mexico.

[129] CCAC, "Time to Celebrate a Climate Success: Mexico's Methane Regulations for the Oil and Gas Sector Have Raised the Bar for the Rest of the World," https://www.ccacoalition.org/news/time-celebrate-climate-success-mexicos-methane-regulations-oil-and-gas-sector-have-raised-bar.

[130] Global Methane Pledge, "Nigeria—GMP Methane Action Update (September 2024)," https://www.globalmethanepledge.org/news/nigeria-gmp-methane-action-update-september-2024.

[131] CCAC, "Colombia Mandates Methane Emissions Reductions in the Fossil Fuel Sector, A First for the Region," June 1, 2022, https://www.ccacoalition.org/news/colombia-mandates-methane-emissions-reductions-fossil-fuel-sector-first-region.

may consider legislative or oversight actions to ensure its continued implementation and enforcement.

Some Members have supported stricter methane controls under the Clean Air Act for landfills. As another example, EPA announced its intent to issue a proposed rule in 2025 to update emissions standards for solid waste landfills in order to mitigate methane. Whether the Trump Administration will continue this effort is to be determined. Congress might engage in oversight regarding Trump Administration plans regarding this rulemaking process. Congress may consider further actions to strengthen landfill methane regulations, such as codifying stricter standards or supporting state and local enforcement activities. Expanding financial incentives beyond those in the IRA—such as grants or tax credits for methane capture in agriculture, oil and gas, and waste management—might further reduce emissions. In its oversight role, Congress could evaluate the impact of IRA-funded programs, such as those supporting alternative energy technologies and reduced reliance on natural gas in buildings, on methane and overall GHG reductions. Additionally, increased investments in methane detection and mitigation research could improve monitoring technologies and enhance emissions-reduction efforts.

Some Members and stakeholders have expressed support for rescinding existing provisions to mitigate methane emissions. Some argue such policies impose unnecessary costs on businesses, particularly small and independent operators, and could lead to higher energy prices. Others contend technological advancements and market-driven solutions will reduce methane emissions without government intervention. Additionally, some argue that methane regulations place a disproportionate burden on the United States, potentially reducing competitiveness of U.S. industries while other major emitters like China and India have not established comparable requirements.

Members in support of rescinding existing legislative provisions and policies have proposed various actions to roll back methane emissions mitigation efforts. Some Members have introduced legislation to repeal the methane emissions charge established under the IRA. Others have proposed delaying or modifying EPA regulations on landfill and oil- and gas-sector methane emissions. Congress may also consider limiting federal agency authority over methane regulations by restricting rulemaking powers or shifting oversight to state governments. Some Members have supported rolling back financial incentives for methane reduction, such as grants or tax credits for methane capture in agriculture, oil and gas, and waste management. Additionally, Congress may consider rescinding funding for methane detection and mitigation research or revising emissions reporting requirements for regulated industries. Some have also advocated for loosening compliance requirements for methane leak detection and repair programs, citing concerns about costs and feasibility for smaller operators. Others have pushed for exemptions or relaxed standards for certain sectors, such as agriculture or independent oil and gas producers, arguing that sector-specific flexibility is necessary.

Congress may also explore withdrawing from the GMP. Congress may also consider how market-based approaches and international trade policies related to methane emissions affect U.S. industries and energy exports. In the context of liquefied natural gas (LNG) and methane emissions, some countries and trading blocs, including the EU, are considering methane performance standards for imported fossil fuels, which could affect U.S. LNG exports if they are required to meet stricter emissions reporting and reduction targets.[132] As international markets

[132] European Commission, "New EU Methane Regulation to Reduce Harmful Emissions from Fossil Fuels in Europe and Abroad," press release, May 27, 2024, https://energy.ec.europa.eu/news/new-eu-methane-regulation-reduce-harmful-emissions-fossil-fuels-europe-and-abroad-2024-05-27_en.

evolve, Congress may examine how data transparency and methane intensity requirements affect U.S. LNG production, trade, and emissions reduction efforts.[133]

[133] In December 2024, DOE released a study assessing the potential effects of U.S. liquified natural exports on the domestic economy, households, communities near production and export sites, energy security, and the environment and climate. DOE, *2024 LNG Export Study: Energy, Economic, and Environmental Assessment of U.S. LNG Exports*, 2024, https://fossil.energy.gov/app/docketindex/docket/index/30.

Appendix A. Legislation Pertaining to Methane Proposed in the 118th Congress

Table A-1. Legislation Pertaining to Methane Proposed in the 118th Congress

Legislation Number	Sponsor	Title	Major Actions
House Proposals			
H.R. 1	Rep. Scalise, Steve	Lower Energy Costs Act	Passed the House on March 14, 2023
H.R. 246	Rep. Estes, Ron	Marginal Well Protection Act	Introduced on January 10, 2023; referred to the House Energy and Commerce Committee
H.R. 484	Rep. Pfluger, August	Natural Gas Tax Repeal Act	Introduced on January 24, 2023; referred to the House Energy and Commerce Committee
H.R. 1023	Rep. Palmer, Gary	Cutting Green Corruption and Taxes Act	Passed the House on February 14, 2023
H.R. 1141	Rep. Pfluger, August	Natural Gas Tax Repeal Act	Introduced on February 21, 2023; referred to the House Energy and Commerce Committee
H.R. 1840	Rep. Pingree, Chellie	Agriculture Resilience Act of 2023	Introduced on March 28, 2023; referred to multiple committees
H.R. 2670	Rep. Rogers, Mike	National Defense Authorization Act for Fiscal Year 2024	Became law on Dec 22, 2023
H.R. 2811	Rep. Arrington, Jodey	Limit, Save, Grow Act of 2023	Passed the House on April 26, 2024
H.R. 3437	Rep. Neguse, Joe	Colorado Outdoor Recreation and Economy Act	Introduced on May 17, 2023; referred to the House Natural Resources Committee
H.R. 3982	Rep. Miller, Carol	Methane Reduction and Economic Growth Act	Introduced on June 9, 2023; referred to the House Ways and Means Committee
H.R. 4072	Rep. Lieu, Ted	Methane Emissions Research Act	Introduced on June 13, 2023; referred to the House Science, Space, and Technology Committee
H.R. 4327	Rep. Costa, Jim	Converting Our Waste Sustainably (COWS) Act of 2023	Introduced on June 23, 2023; referred to the House Agriculture Committee

Legislation Number	Sponsor	Title	Major Actions
H.R. 4366	Rep. Carter, John	Consolidated Appropriations Act, 2024	Became law on March 8, 2024
H.R. 5964	Rep. Curtis, John	Methane Emissions Reduction Act	Introduced on November 17, 2023; referred to multiple committees
H.R. 7053	Rep. Thompson, Glenn	Orphan Well Grant Flexibility Act of 2024	Introduced on January 18, 2024; referred to the House Natural Resources Committee
H.R. 7651	Rep. Casten, Sean	Methane Emissions Mitigation Research and Development Act	Introduced on March 11, 2024; referred to the House Science, Space, and Technology Committee
H.R. 8676	Rep. Crockett, Jasmine	EMIT LESS Act of 2024	Introduced on June 11, 2024; referred to the House Agriculture Committee
H.R. 8962	Rep. Brownley, Julia	Methane Border Adjustment Mechanism Act	Introduced on July 9, 2024; referred to the House Ways and Means Committee
H.R. 9513	Rep. Beyer, Donald	Methane Monitoring Science Act of 2024	Introduced on September 10, 2024; referred to the House Science, Space, and Technology Committee
H.R. 9558	Rep. Casten, Sean	Exported Carbon Emissions Report Act of 2024	Introduced on September 12, 2024; referred to the House Energy and Commerce Committee
H.R. 9970	Rep. Hudson, Richard	Transparency and Honesty in Energy Regulations Act of 2024	Introduced on October 11, 2024; referred to the House Oversight and Accountability Committee
Senate Proposals			
S. 937	Sen. Thune, John	A bill to amend P.L. 117-169 to prohibit the Environmental Protection Agency from using funds for methane monitoring to be used to monitor emissions of methane from livestock, and for other purposes.	Introduced on March 22, 2023, to the Senate Environment and Public Works Committee
S. 947	Sen. Kennedy, John	Lower Energy Costs Act	Introduced on March 22, 2023; referred to the Senate Energy and Natural Resources Committee

Legislation Number	Sponsor	Title	Major Actions
S. 997	Sen. Thune, John	Livestock Regulatory Protection Act of 2023	Introduced on March 28, 2023; referred to the Senate Environment and Public Works Committee
S. 1016	Sen. Heinrich, Martin	Agriculture Resilience Act of 2023	Introduced on March 28, 2023; referred to the Senate Agriculture, Nutrition, and Forestry Committee
S. 1634	Sen. Bennet, Michael	Colorado Outdoor Recreation and Economy Act	Introduced on May 17, 2023; referred to the Senate Energy and Natural Resources Committee
S. 1947	Sen. Merkley, Jeff	Methane Emissions Research Act of 2023	Introduced on June 13, 2023; referred to the Senate Environmental and Public Works Committee
S. 2226	Sen. Reed, Jack	National Defense Authorization Act for Fiscal Year 2024	Passed the Senate on July 27, 2023
S. 3496	Sen. Braun, Mike	Orphan Well Grant Flexibility Act of 2023	Introduced on December 13, 2023; referred to the Senate Energy and Natural Resources Committee
S. 4056	Sen. Bennet, Michael	EMIT LESS Act of 2024	Introduced on March 22, 2024; referred to the Senate Agriculture, Nutrition, and Forestry Committee
S. 5167	Sen. Warner, Mark	Methane Reduction and Economic Growth Act	Introduced on September 25, 2024; referred to the Senate Finance Committee

Source: Prepared by CRS.

Note: CRS searched the 118th Congress in Congress.gov using the following terms and phrases: "methane," "emissions," "livestock," "dairy," "agriculture," "oil," "gas," "coal," "natural gas," and "landfills."

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