

Data Quality Record for Long-Term Performance Goals

Long-Term Performance Goal Text: By September 30, 2026, EPA's climate partnership programs will reduce expected annual greenhouse gas (GHG) emissions by 545 million metric tons of carbon dioxide equivalent (MMTCO₂e). EPA's climate partnership programs reduced 518.6 MMTCO₂e of annual GHG emissions in 2019.

Corresponding Annual Performance Goal: Million metric tons of carbon dioxide equivalent reduced annually by EPA's climate partnership programs.

Goal Number/Objective: Goal 1/Objective 1.1

NPM Lead: Office of Air and Radiation (OAR)

1a. Purpose of Long-Term Performance Goal:

This long-term performance goal (LTPG) tracks greenhouse gas (GHG) reductions from EPA's climate partnership programs. These programs work with the private sector and others to achieve more than would be possible through federal regulations alone. These programs seek out and overcome market barriers, drive policy at the state and local level, and capture and channel marketplace ingenuity towards climate action. A continued trend of reduced GHG emissions conveys the effectiveness of EPA's climate partnership program programs.

1b. Performance Measure Term Definitions:

The Intergovernmental Panel on Climate Change (IPCC) developed the Global Warming Potential (GWP) concept to compare the ability of a GHG to trap heat in the atmosphere relative to another gas. The GWP of a GHG is defined as the ratio of the accumulated radiative forcing within a specific time horizon caused by emitting 1 kilogram of the gas, relative to that of the reference gas CO₂ ([IPCC 2013](#)). Therefore, GWP-weighted emissions are provided in million metric tons of CO₂ equivalent (MMTCO₂e).

The EPA climate programs included in this LTPG are ENERGY STAR products and homes program, buildings program, and industrial program; Green Power Partnership; AgSTAR Program; Coalbed Methane Outreach Program; Landfill Methane Outreach Program; Natural Gas STAR/Methane Challenge Programs; SF₆ Emission Reduction Partnerships for Electric Power Systems; Responsible Appliance Disposal; GreenChill; and SmartWay. In 2022, EPA transitioned the Natural Gas STAR Partnership, ending the partnership agreements and annual reporting elements of the program, while retaining a focus on technology transfer and stakeholder engagement. As a result, GHG emissions reductions from the Natural Gas STAR Partnership are no longer included in the totals reported under this long-term performance goal. For more information, see here: <https://www.epa.gov/natural-gas-star-program/natural-gas-star-program-reporting>.

1c. Unit of Measure:

Million metric tons of carbon dioxide equivalent (MMTCO₂e)

2a. Data Source:

Data sources used to support the program-specific methodologies include partner reports on facility-

specific improvements (e.g., space upgraded, kilowatt-hours (kWh) reduced), national market data from industry and federal sources, and performance measurements for the technology and practices advanced by the program. Source data used in the program-specific methodologies is collected from a variety of sources including partner reports, the Greenhouse Gas Reporting Program (GHGRP), and published market and performance data from industry and federal sources. Some data sources are considered confidential business information and are protected accordingly, while others are publicly available. Where appropriate, programs have information collection requests (ICRs) to support the collection of data to inform the estimation of program benefits.

For some partnership programs, EPA is reporting calculated GHG emissions based on generally accepted carbon conversion factors and methods to convert material-specific reductions in fossil energy use and other GHGs to GHG emissions reductions in MMTCO₂e.

2b. Data needed for interpretation of (calculated) Performance Result:

EPA's partnership programs avoided 469.9 million metric tons of GHG emissions in 2021. 2021 is the latest year for which data are available.

3. Calculation Methodology:

Results are the aggregate sum of avoided GHG emissions for a given year across the EPA partnership programs described in section 1b. EPA reports progress on this LTPG only when *all* contributing programs have an actual result for a given year. EPA expects to have a two-year data lag when reporting results for this LTPG.

4. Quality Assurance/Quality Controls:

Quality assurance and other quality controls vary by program. More information about the quality assurance activities undertaken by the programs included in this LTPG are below:

ENERGY STAR: ENERGY STAR is the government-backed symbol for energy efficiency, providing simple, credible, and unbiased information that consumers and businesses rely on to make well-informed decisions. In accordance with our mission, EPA is committed to documenting quantifiable program results and using well-established methods to estimate the benefits of its programs. The specific approach will vary by program strategy, sector, availability of data, and market characteristics. For more details on current ENERGY STAR program accomplishment metrics and related technical notes, see here: <https://www.energystar.gov/impacts>.

Green Power Partnership (GPP): As a condition of partnership, GPP Partners report data annually on their use of qualifying green power, expressed in megawatt-hours. These self-reported data are screened to ensure that Partner disclosure of green power use meets GPP eligibility requirements (e.g., minimum amount of use, resource eligibility, generation vintage etc.) and any issues are resolved with the Partner.

EPA requires that all voluntary green power use be incremental to what is already required by mandate or regulation (e.g., renewable energy use required by state renewable portfolio standards) or otherwise available to Partners absent proactive voluntary green power procurement. GPP Partners' voluntary green power use data is based on and substantiated through the Partner's ownership of the renewable energy certificates (RECs) to preclude double counting and ensure incremental market impact. EPA only counts GPP Partners' voluntary green power use that follows program participation or engagement. EPA estimates that the majority of recognized green power use is due to influence of the partnership,

Partners make commitments to meet and exceed EPA minimum green power usage requirements (often at incremental cost) to remain in the program.

Further, EPA notes that its efforts to foster greater demand for green power resources has likely led to additional market transformation benefits (e.g., lowered transaction costs, improved product offerings, increased overall value), leading to additional voluntary green power use that is not included in the program's GHG emissions reduction estimates (i.e., residential green power procurement and use). For more details, see here: https://www.epa.gov/sites/default/files/2016-01/documents/gpp_partnership_reqs.pdf.

Voluntary Methane Emissions Reductions Programs: EPA's voluntary methane programs facilitate the reduction of methane emissions from oil and natural gas systems and the recovery of methane from landfills, agriculture (manure management), and coal mines, as well as promote use of the recovered methane as a clean energy resource. Each program estimates the emissions reductions associated with their partners and/or activities on an annual basis by tracking data and applying program-specific methodologies. Value of gas mitigated assumes all methane mitigated is sold as natural gas, using an average annual natural gas price from EIA.

- **Natural Gas STAR Program:** The Natural Gas STAR Program started in 1993 with the objective of achieving methane emission reductions through implementation of cost-effective best practices and technologies. Through the program, Partner companies documented their voluntary emission reduction activities and had the opportunity to report their accomplishments to the EPA annually from 1993 to 2022.
- **Methane Challenge Partnership:** The EPA's Methane Challenge Partnership receives data annually from Methane Challenge Partners in the form of facility-level reports that characterize methane emission sources at their facilities and detail voluntary actions taken to reduce methane emissions. Methane Challenge draws on calculation methodologies from the Greenhouse Gas Reporting Program (i.e., Part 98, Subpart W reporting) and the Inventory of U.S. Greenhouse Gas Emissions and Sinks, and thus, for most emission sources, specifies the methodology to be used to calculate emission reductions. For details on the methodologies used for Methane Challenge reporting, see here: <https://www.epa.gov/natural-gas-star-program/methane-challenge-reporting>.
- **AgSTAR Program:** AgSTAR uses a methodology that estimates emission reductions from anaerobic digester projects, both direct methane emissions reduced, and indirect carbon dioxide emissions avoided. AgSTAR maintains a [database of anaerobic digester systems](#) at livestock facilities in the United States that serves as the basis for these emission reductions estimates. Direct methane emissions reductions result from the capture and use of biogas that otherwise would escape into the atmosphere from livestock manure management systems. Digester biogas methane projects that generate energy also have a secondary benefit of avoided emissions of carbon dioxide from displaced fossil fuel combustion. The AgSTAR program estimates baseline methane emissions from livestock manure using the same methodology used in the U.S. Greenhouse Gas (GHG) Inventory. For details about these calculations, see here (www.epa.gov/sites/default/files/2021-04/documents/us-ghg-inventory-2021-chapter-5-agriculture.pdf) and here (www.epa.gov/sites/default/files/2021-04/documents/us-ghg-inventory-2021-annex-3-additional-source-or-sink-categories-part-b.pdf). For more information

on the program generally, see here: <https://www.epa.gov/agstar>.

- Landfill Methane Outreach Program (LMOP): LMOP uses a methodology that estimates emission reductions, both direct and indirect, from landfill gas energy projects implemented at landfills. The direct reductions represent the collection and destruction of methane generated from landfills that are not subject to EPA's air regulations. Indirect reductions are calculated as the avoided carbon dioxide emissions from the combustion of fossil fuels. LMOP maintains a comprehensive database of municipal solid waste landfills and landfill gas energy projects in the United States. LMOP calculates annual reductions from projects for which the program provides assistance or technical information, and for projects involving program partners. For more information, see here: <https://www.epa.gov/lmop/voluntary-data-collection-lmop-partners>.
- Coalbed Methane Outreach Program (CMOP): CMOP annually measures the program's accomplishments using a metric of methane emissions reductions achieved from coal mine methane recovery projects in the United States. Emissions reductions attributable to program activities are distinguished from methane emissions reductions that would have occurred without the program. CMOP applies a tiered approach with weightings of 90 percent, 70 percent, and 40 percent, depending on the extent of the program's involvement in the specific project or the type of project. For example, ventilation air methane (VAM) emission reduction projects are assigned the highest weighting because of the program's instrumental role in promoting and demonstrating this innovative emissions reduction technology. Similarly, projects where direct technical assistance was provided by CMOP are also given a high weighting. For more information, see here: <https://www.epa.gov/cmop/coalbed-methane-outreach-program-accomplishments>.

Voluntary Fluorinated Greenhouse Gas Emissions Reduction Programs: Through fluorinated greenhouse gas (FGHG) partnership programs, EPA identifies cost-effective emissions reductions opportunities, recognizes industry accomplishments, and facilitates the transition toward best environmental practices and technologies that are more environmentally friendly.

- SF₆ Emissions Reduction Partnership for Electric Power Systems (EPS): The SF₆ Emissions Reduction Partnership for Electric Power Systems has been estimating emissions of SF₆ using a facility-specific mass-balance methodology provided by the [2006 IPCC Guidelines](#) as the Tier3 approach for estimating emissions from electrical transmission and distribution facilities. EPA calculates program achievements as the difference between annual estimated emissions under "Business as Usual" (BAU) practices and annual reported emissions under the program. In 2012, the Greenhouse Gas Reporting Program began providing annual facility-level emissions data from this sector, from both partners and non-partners. In most cases, these data replace the partnership-collected data since the majority of partner facilities are subject to mandatory reporting through the Greenhouse Gas Reporting Program. For more information, see here: <https://www.epa.gov/eps-partnership>.
- Responsible Appliance Disposal Program (RAD): RAD program benefits are calculated based on data reported annually by partners, including: the number and age of appliances collected; type and quantity of refrigerant recovered and reclaimed or destroyed; type and quantity of foam blowing agent recovered and reclaimed or destroyed; weight of metals, plastics, and glass recycled; quantity of hazardous waste products managed; and used oil recovered. Benefits

calculated include emissions avoided from the proper recovery of refrigerants and foam blowing agents and the recycling of durable materials (i.e., metals, plastics, and glass). Although the energy savings from the removal of old, working units from the electricity grid could be calculated, these benefits are not included in the RAD totals to avoid potential double-counting with ENERGY STAR.

To estimate annual emissions avoided from the proper recovery of refrigerants and foam blowing agents, the net masses of individual refrigerants and foam-blown agents recovered from appliances are used. Net masses are the actual masses recovered or removed, multiplied by the efficiency of destruction and reclamation processes. These masses are then multiplied by their global warming potential (GWP) and summed.

To calculate annual emissions avoided from the recycling of durable materials, RAD multiplies the total mass of ferrous metals, non-ferrous metals, plastics, and glass recovered from appliances by emissions factors from EPA's Waste Reduction Model (WARM). WARM emission factors account for the difference between emissions from the alternative scenario (i.e., recycling) and baseline scenario (i.e., landfilling). For more information, see here: https://www.epa.gov/rad/program-benefits#Related_Pages_2.

- GreenChill Partnership: To determine emissions reductions from the GreenChill Partnership, Partners submit data on the amount of refrigerant installed in and emitted from equipment in all their stores, corporate-wide. EPA analyzes this information from partners, extrapolates trends, and compares the results to typical U.S. non-GreenChill supermarkets. GreenChill partners provide emissions data disaggregated by chemical. These data are used to calculate emissions in CO₂ equivalents and to determine the weighted average emissions rate of the GreenChill partners. To ensure calculation accuracy, each partner is given a report it can use to double-check its corporate-wide emissions rates, and partnership averages are provided so that partners can assess the reasonableness of those averages, benchmark their own emissions rates, and set goals to improve.

The average partner emissions are then compared to the national average for typical U.S. supermarkets, based on information from EPA's Vintaging Model, the partners, and other industry experts. The emissions reductions from the partnership are then taken as the difference of the emissions from the typical U.S. store and the partnership average store, multiplied by the number of stores represented by the data provided by the partners. For more information, see here: <https://www.epa.gov/greenchill/greenchill-resources-and-reports>.

Voluntary Emissions Reductions Programs in the Transportation Sector: EPA is addressing climate change by reducing GHG emissions from the transportation sector. GHG emissions from transportation account for about 29 percent of total U.S. greenhouse gas emissions, making it the largest contributor of U.S. GHG emissions. Between 1990 and 2019, GHG emissions in the transportation sector increased more in absolute terms than any other sector.

- SmartWay: SmartWay is a voluntary collaboration between the EPA and the business community (e.g., truck and rail carriers, shippers, logistics companies) to improve fuel efficiency and reduce environmental impacts from moving goods. Established by EPA in 2004, SmartWay is the only voluntary program working across the entire freight system to comprehensively

address key national economic, energy, and environmental goals related to goods movement and freight sustainability. Environmental, state, and community groups rely upon SmartWay's clean air achievements in protecting Americans' health and well-being.

The SmartWay partnership program has annual reporting and data verification requirements for SmartWay members. There is also annual data verification and review of submitted partner information by SmartWay partner account managers. Additionally, the program offers annual partner webinars to assist partners in submitting their data correctly, and a resource guide on the SmartWay website, which outlines steps companies can take to ensure data integrity. Finally, there are numerous data checks and technical guidance embedded in the partner submission tools, including out of range limits for critical input values and year over year data comparisons. SmartWay staff periodically assess and analyze the program's data to determine the appropriateness of these checks and evaluate the need for additional and/or updated data checks. For more details on SmartWay's calculation methodologies please see here:

https://www.epa.gov/sites/default/files/2016-05/documents/smartway_transport_partnership_best_practices_in_data_quality_assurance_and_quality_control_.pdf

5. Data Limitations/Qualifications:

Although EPA devotes considerable effort to obtaining the best possible information on which to evaluate emissions reductions from its regulatory and voluntary programs, uncertainties in the performance data could be introduced through data assumptions and analytical methods (e.g., carbon conversion factors, engineering analyses, and econometric analyses). Where uncertainties exist, EPA uses the best available information and practices that yield conservative benefit estimates. Through quality assurance (QA) processes like automated reporting and data checks, EPA works to minimize any errors in program data collection, calculations, and reporting; though some may still occur.

6. Technical Contact:

Daniel Hopkins (OAR)

7. Certification Statement/Signature:

I certify the information in this DQR is complete and accurate.

DAA Signature Original signed by Elizabeth (Betsy) Shaw Date 5/2/2024