

Frequently Asked Questions

DESTRUCTION OF OZONE DEPLETING SUBSTANCES AND HIGH-GWP FOAM (ODS) METHODOLOGY

VERSION 2.0

2025-02-05

1. Are issued credits ex-ante or ex-post?

All carbon credits issued by ACR are ex-post, meaning carbon credits are only issued by ACR after mitigation activities have concluded and emission reductions have undergone a successful verification. The validated Greenhouse Gas (GHG) Project Plan contains an estimate of the quantity of credits to be generated by the project activities according to the ODS Methodology, but the quantity of emission reductions in the verified Monitoring Report is the basis for issuance of carbon credits.

2. Why is the emission rate 100% for the ODS Methodology?

Destruction of ozone depleting substances (ODS) is a net reduction in remaining global ODS bank due to an almost three-decade ban on creation of new chlorofluorocarbons (CFCs), a prohibition on creation of new hydrochlorofluorocarbons (HCFCs), and limitations on importing or exporting ODS.¹ Unless permanently destroyed, 100% of the remaining ODS will leak either through reuse or indefinite, ineffectively monitored storage. Since new refrigeration and air conditioning equipment that uses

¹ Both the U.S. and Canada ratified the Montreal Protocol in 1988.ⁱ The U.S. phased out production and consumption of CFCs and halons starting in 1996ⁱⁱ and 99.5%ⁱⁱⁱ of HCFCs starting in 2020. As a Montreal protocol ratifying non-Article 5 country, Canada also phased out production and consumption of CFCs and halons starting in 1996 and HCFCs starting in 2020.^{iv} U.S. EPA, under Title VI of the Clean Air Act, regulates the import of ODS into the U.S.^v Canada regulates import and export of ODS through the Ozone-depleting Substances and Halocarbon Alternatives Regulations.^{vi}

ⁱ UNEP (2023). Country Data. <https://ozone.unep.org/all-ratifications>. ⁱⁱ U.S. EPA (2023). Phaseout of Class I Ozone-Depleting Substances. <https://www.epa.gov/ods-phaseout/phaseout-class-i-ozone-depleting-substances>. ⁱⁱⁱ U.S. EPA (2024). Phaseout of Class II Ozone-Depleting Substances. <https://www.epa.gov/ods-phaseout/phaseout-class-ii-ozone-depleting-substances>. ^{iv} UNEP (2025). Summary of control measures under the Montreal Protocol. <https://ozone.unep.org/treaties/montreal-protocol/summary-control-measures-under-montreal-protocol> ^v U.S. EPA (2023). Importing Ozone-Depleting Substances. <https://www.epa.gov/ods-phaseout/importing-ozone-depleting-substances>. ^{vi} Government of Canada (2023). Ozone-depleting Substances and Halocarbon Alternatives Regulations (SOR/2016-137). Parts 1 and 3. <https://laws-lois.justice.gc.ca/PDF/SOR-2016-137.pdf>

ODS cannot be manufactured or sold in the U.S. and Canada,² all remaining ODS can only be used to recharge aging equipment that is prone to higher leak rates. Per the U.S. Environmental Protection Agency (U.S. EPA), 100% of blowing agents in foam leak during manufacturing, use, and disposal.³ Halons are used as fire suppressants and 100% of halons released to extinguish fires ends up in the atmosphere. Halons that are not released are stored in equipment (fire extinguishers) leak at a rate greater than 3.5% per year over the equipment lifetime, according to U.S. EPA.⁴ Halons remaining in end-of-life equipment may be recovered and reused until, eventually, everything gets emitted through use, reuse, or storage, unless destroyed.

Consolidating and storing recovered or virgin stockpiles of ODS results in leaks. Per U.S. EPA, ODS are recovered in small cylinders and transferred to bigger bulk or ISO tanks for transportation and storage. Each transfer can result in up to 3% of ODS being lost.⁵ In addition, up to 3% of ODS can be lost each year from valve leaks in stored cylinders.⁵ Improper storage conditions, like outdoor storage leading to rusting of cylinders, can result in all stored ODS being emitted within four to five years.⁵ The business-as-usual scenario for ODS is “no destruction” and the 100% emissions rate is

² As part of ozone protection initiatives under the Title VI of the Clean Air Act, U.S. EPA implements “Nonessential Products Ban Program” that prohibits manufacturing of all non-essential equipment that uses ODS like CFCs and HCFCs.ⁱ Manufacture of new equipment charged with HCFC-22 and HCFC-142b was banned from January 1, 2010ⁱⁱ and for remaining HCFCs from January 1, 2020.ⁱⁱⁱ In Canada, manufacture, use and sale of products or substances containing ODS (CFCs, HCFCs, Halons) is prohibited by the Ozone-depleting Substances and Halocarbon Alternatives Regulations (SOR/2016-137)^{iv} under the Canadian Environmental Protection Act – 1999.

ⁱ U. S. EPA (2023). Ban for Nonessential Products Containing Ozone-depleting Substances.

<https://www.epa.gov/ozone-layer-protection/ban-nonessential-products-containing-ozone-depleting-substances>.

ⁱⁱ U. S. EPA (2023). Phaseout of Ozone-Depleting Substances. Equipment Manufacturers, Importers, and Exporters: Frequent Questions. <https://www.epa.gov/ods-phaseout/equipment-manufacturers-importers-and-exporters-frequent-questions>.

ⁱⁱⁱ U.S. EPA (2023). Phaseout of Class II Ozone-Depleting Substances.

<https://www.epa.gov/ods-phaseout/phaseout-class-ii-ozone-depleting-substances>.^{iv} Government of Canada (2023). Ozone-depleting Substances and Halocarbon Alternatives Regulations (SOR/2016-137). Parts 1 and 3. <https://laws-lois.justice.gc.ca/PDF/SOR-2016-137.pdf>

³ U.S. EPA (2023). Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2021. Annex 3 - Methodological Descriptions for Additional Source and Sink Categories. Table A-121, Page A-261, <https://www.epa.gov/system/files/documents/2023-04/US-GHG-Inventory-2023-Annexes.pdf>

⁴ U.S. EPA (2023). Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2021. Annex 3 - Methodological Descriptions for Additional Source and Sink Categories. Page A-252. <https://www.epa.gov/system/files/documents/2023-04/US-GHG-Inventory-2023-Annex-3-Additional-Source-or-Sink-Categories-Part-A.pdf>

⁵ U.S. EPA (2021). ODS Destruction in the United States and Abroad. Section 3.2, page 7.

<https://www.epa.gov/system/files/documents/2022-08/April%202021%20ODS%20Destruction%20in%20the%20United%20States%20and%20Abroad%20Report.pdf>

representative of the fact that all stored ODS will eventually be emitted to the atmosphere if not destroyed.

Moreover, the future possibility of regulations requiring destruction of ODS is highly unlikely. In the more than three decades since the Montreal Protocol entered into force, no Member State jurisdiction has adopted regulations to require the destruction of ODS at end-of-life as the only option.⁶ Following guidance from United Nations Environment Program (UNEP),⁷ most country regulations have focused on maximizing recovery and reuse of ODS to service remaining equipment, allowing them to operate until the end of their economically useful lives. There would be numerous logistical and financial implementation hurdles for any destruction mandate; these hurdles likely contribute to and explain the continued lack of widespread regulatory action to require destruction. These difficult-to-overcome barriers and the demand for ODS to supply remaining equipment means that not destroying ODS is likely to remain common practice for the foreseeable future. While neither proposed nor anticipated, should such requirements be contemplated in the future, there would still be a significant lead time before an international agreement is reached, ratified, codified into domestic legislation, developed into a regulation, put into effect, and implemented (let alone the possibility of delays or nullification resulting from court challenges). Credits issued for ODS destruction activities in the present are sufficiently ahead of the enforcement of any theoretical legal requirements and, as such, a 100% emission rate does not compromise regulatory additionality.

3. How is the Crediting Period defined?

The ACR Standard v8.0 defines the Crediting Period as “The finite length of time for which a GHG Project Plan is valid, and during which a GHG project can generate carbon credits against its baseline scenario.” The project action to destroy ODS immediately and irreversibly prevents all GHG emissions associated with the leakage of that ODS. This Methodology calculates the GHG emission reductions of the project under a single Reporting Period during which the ODS is destroyed and uses that same period as the Crediting Period, consistent with the ACR Standard definition. Once destroyed and verified there is 100% certainty that the emissions have been completely prevented without any further monitoring or the potential for reversal.

⁶ Japan (see https://www.env.go.jp/earth/furon/files/englishmaterial_202303.pdf for English language information) and Canada (see <https://www.gazette.gc.ca/rp-pr/p2/2016/2016-06-29/html/sor-dors137-eng.html>) have rules that mandate either reclamation/reuse or destruction of recovered ODS from servicing and end-of-life equipment. Australia (see <https://www.legislation.gov.au/C2022A00094/latest/text>) has legislation that extends producer responsibility (mostly by paying upfront levies) to improve recovery and management of ODS from end-of-life equipment.

⁷ UNEP (1999), Recovery and Recycling Systems: Guidelines for the Refrigeration Sector. https://wedocs.unep.org/bitstream/handle/20.500.11822/8730/-Recovery%20and%20Recycling%20Systems%20Guidelines_%20Phasing%20out%20ODS%20in%20Developing%20Countries-%20Refrigeration%20Sector%20-2004439.pdf?sequence=2&isAllowed=y (unep.org)

4. Why are “substitute emissions” removed from this version of the ODS Methodology?

Substitute emissions are removed from this version of the ODS Methodology for two related reasons. First, the project activity—destruction of ODS—is not the determining factor in a user switching to a different refrigerant in new or retrofitted equipment. Substitution of ODS is a result of old equipment reaching end-of-life and newer equipment—equipment that does not or cannot use ODS—replacing it. The user switches to different equipment and a different refrigerant based on factors related to the age of the old equipment, including reduction in energy costs, improved features, better functionality, or other demand drivers.

Second, including substitute emissions would overestimate the project emissions. The current without-project scenario for ODS is “no destruction” due to the high cost of destruction and no legal mandate to do so. ODS can be used to service existing equipment or stored indefinitely in the U.S. and Canada, and both of these scenarios result in release to the atmosphere. Since voluntary destruction of ODS is not common practice, it can be inferred that ODS recovered from decommissioned or retrofitted (to use non-ODS refrigerant) equipment will either be reused to recharge other existing equipment or stored. This means, in the without-project scenario, both the recovered ODS and replacement refrigerant will be in existence even after a non-ODS refrigerant replaces the ODS. To quantitatively demonstrate this, consider the following equations. In the without-project scenario, where ODS is not destroyed, if “A” is the emissions from reuse or storage of recovered ODS and “B” is the emissions from use of replacement refrigerant, the total emissions that would occur is $A + B$. When the recovered ODS is destroyed in the with-project scenario, the equation for the total emissions that would occur will be $A + B - A = B$, which correctly reflects the emissions that would occur from use of replacement refrigerant in new or retrofitted equipment.⁸ However, if the emissions from use of replacement refrigerant is deducted from the avoided emissions due to the destruction of ODS by the project, then the equation becomes $A + B - (A - B) = 2B$, which suggests that the project emissions would be two times the emissions from use of replacement refrigerant after the ODS is destroyed, which is inaccurate.

5. Why are AR5 global warming potential (GWP) values used instead of AR6?

Per the ACR Standard, GHG emission reductions and removals with a 2021 vintage or later shall use the 100-year time horizon GWP values from the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report (AR5). ACR uses AR5 values to align with the decisions of the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA) and with national inventories (including those of the U.S. and Canada to which this Methodology applies). While the IPCC released updated GWP values in the Sixth Assessment Report (AR6), ACR continues to use AR5

⁸ Note that these equations are for explanatory purposes and, for simplicity and clarity, exclude project activity emissions (e.g., transportation and destruction of ODS); these emissions *are* accounted for in the ODS Methodology.

GWP values, consistent with international agreements on common metrics which countries are using or transitioning to for their GHG inventory accounting and Nationally Determined Contributions (NDCs).⁹

⁹ UNFCCC (2023). Common Metrics. <https://unfccc.int/process-and-meetings/transparency-and-reporting/reporting-and-review/methods-for-climate-change-transparency/common-metrics>