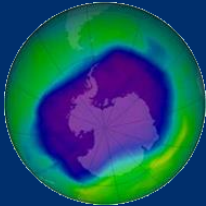


To advance the journey to self-reliance, we safeguard people and resources by systematically addressing environmental risk.



Ozone Depleting Substances (ODS) and their substitutes

Chlorofluorocarbons (CFCs)
Substitute for: None

ODP^a:

GWP^b:

Hydrochlorofluorocarbons (HCFCs)
Substitute for: CFCs

ODP:

GWP:

Hydrofluorocarbons (HFCs)
Substitute for: CFCs and HCFCs

ODP: 0

GWP:

Hydrofluoroolefins (HFOs)
Substitute for: CFCs, HCFCs, and HFCs

ODP: 0

GWP:

^a Ozone Depleting Potential (ODP): The impact on ozone of a chemical relative to CFC-11.

^b Global Warming Potential (GWP): Amount of global warming caused by a substance relative to CO₂.

Very low Low

High Very High



APPLICATION OF THE MONTREAL PROTOCOL AND ITS AMENDMENTS IN USAID PURCHASING DECISIONS

Integrating the Montreal Protocol and amendments into purchasing decisions in USAID projects will ensure compliance with requirements at the local level on ODS and HFC use.

WHAT IS THE OZONE LAYER AND WHY IS IT IMPORTANT?

The ozone layer is a region in the stratosphere that contains about 90% of the Earth's ozone. This layer absorbs harmful ultraviolet (UV) radiation from the sun. Ozone layer depletion can result in higher incidence of skin cancers, as well as deaths, incidence of cataracts, immune systems impacts, effects on building materials, and negative impacts on aquatic ecosystems, agricultural systems, and forests.

Montreal Protocol and the Kigali Amendment

The *Montreal Protocol on Substances that Deplete the Ozone Layer (1987)* is an international treaty that aims to protect the ozone layer by phasing out the production and use of approximately 100 synthetic chemicals.¹ Specifically, it calls for phasing out certain ODS, including CFCs, halons, methyl bromide, HCFCs, and most recently, HFCs, which are not ODS. The Montreal Protocol uses a step-wise approach establishing different phaseout schedules for developed and developing countries (on a ten-year delay). The Montreal Protocol led to the phaseout of CFCs by 2010, and HCFCs are on track to a global phaseout by 2030. The Kigali Amendment, establishes the global phase-down of HFCs by 2047. Because some HFCs have very high GWPs it is estimated that the implementation of the Kigali Amendment will avoid a temperature increase of 0.2 to 0.4 °C.²

Significance for USAID Projects

Universal ratification of the Montreal Protocol and growing ratification of the Kigali Amendment (88 Parties as of October 2019) mean that there are existing commitments on ODS and HFC use at the country level. By integrating the Montreal Protocol and its amendments into purchasing decisions for equipment and building materials (e.g., foams), USAID will ensure that its projects comply with current and future requirements on ODS and HFC use at the local, regional, and international level. ODS and HFCs are mainly used in six industrial sectors that could be encountered in USAID projects.³

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Applications that have transitioned away from ODS and HFCs

Extruded Polystyrene (XPS) Board Foam Blowing Agents

XPS foam, used for insulation in residential and commercial building construction, initially transitioned away from CFC-12 blowing agent to blends of HCFC-142b and HCFC-22. Transitions away from HCFC-142b/HCFC-22 blends varied according to region but included transitions to HFC-134a and HFC-152a. Most recently, transitions towards low GWP alternatives, including CO₂, HFO-1234ze(E)/hydrocarbon blends (Japan), di-methyl ether, and isobutane are being made. In some instances, regional (European Union) and country regulations have been established to drive the transition away from HFCs.⁸



Very Low Temperature (VLT) Refrigeration

VLT refrigerators historically used CFC-13 or R-503 refrigerant and then transitioned to HFC-23 and R-508B.⁹ Most recently, hydrocarbon refrigerants (e.g., propane, ethane) are being used as a refrigerant in VLT freezers. In Southern Africa, HFC-free VLT units are available for vaccine storage using hydrocarbon refrigerant and solar power, each unit can meet the needs of a population of 50,000 people.¹⁰



Of those six sectors, the most likely to be encountered in USAID projects are also those with the greatest ODS and HFC consumption of the six: refrigeration and air conditioning, and foam blowing. ODS consumption, specifically of HCFCs, is highest in the refrigeration and air conditioning sector (88% of global HCFC consumption), including in applications like household refrigerators, commercial comfort cooling (chillers), domestic and medical refrigerators, and room AC. Similarly, HCFC consumption is also high in foam blowing agents, which are used to propel liquid plastic resin in foams and are essential in establishing foam density and insulation. Foam blowing agents are used in applications like rigid and flexible polyurethane, extruded polystyrene and polyolefin foams used in insulation applications (10% of global HCFC consumption).⁴ Other sectors that use ODS and HFCs include fire suppression, aerosols, solvents, and agricultural fumigants.

CONSIDERATIONS FOR PURCHASING NEW EQUIPMENT OR BUILDING MATERIALS FOR USAID PROJECTS:

1. Identify if country has ratified the Kigali Amendment (listed [here](#)).
2. Determine if equipment or material contains ODS or HFCs.
3. Identify appropriate phase-out or phase-down schedules, considering the expected lifetime of the equipment or material.
4. Identify non-ODS or non-HFC alternatives to be used, if possible.

Reducing Use and Emissions of ODSs and HFCs

Alternatives to ODS and HFCs exist in all sectors that use them including the foam blowing agents sector and the refrigeration and air conditioning sector. Alternatives for HFCs include HFOs, HFC-HFO blends, and natural refrigerants (e.g., hydrocarbons or CO₂).⁵ The search for and implementation of these technology changes has had the support of private industry (e.g., equipment manufacturers) and global stakeholders that have endorsed the adoption of the Kigali Amendment.⁶

The implementation of the Montreal Protocol and the Kigali Amendment fosters technology transfer and economic growth. This directly contributes to UN Sustainable Development Goal (SDG) 13 on climate action and the achievement of several others, including SDGs to ensure access to affordable, reliable, sustainable and modern energy for all (SDG 7), build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation (SDG 9), and ensure sustainable consumption and production patterns (SDG 12).⁷ Implementation of the Montreal Protocol and Kigali Amendment also supports the objectives of the Paris Agreement.

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FOR MORE INFORMATION

Visit <https://www.usaid.gov/environmental-procedures> for resources and templates to implement environmental safeguarding procedures.

Contact your environmental compliance officers for guidance and additional resources: <https://www.usaid.gov/environmental-procedures/environmental-compliance-officers>